

FRONTLINE DEMONSTRATION (FLD) OF TANUVAS MASTI-GUARD TECHNOLOGY AMONG DAIRY FARMERS IN DHARMAPURI DISTRICTS, TAMIL NADU

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Abstract: Dairy farming is a vital income source to rural livelihood. The productivity of dairy animals depends upon the adoption of scientific farming practices and technologies. Masti-Guard is a technology developed by Translational Research Platform for Veterinary Biologicals (TRPVB), Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Chennai, Tamil Nadu to prevent and control mastitis in dairy animals. The study, with the objective to demonstrate Masti-Guard technology through frontline demonstration (FLD) and show the results to dairy farmers at their farm-step, was carried out in Palacode block of Dharmapuri district, Tamil Nadu. By following proportionate random sample technique, 20 progressive farms from Padi, Pachinampatti and Velampatti villages were selected from study block. The study revealed that adoption of Masti-Guard technology, for prevention and control of mastitis, provided an economic benefit of Rs. 2134.125 considering the MNREGA scheme wage rate. The farmers perceived high level of satisfaction on effect of Masti-Guard technology, newly acquired know-how knowledge and newly developed do-how skills. This necessitates to make required intervention to the dairy farmers through various stages of adoption to increase the adoption rate for the benefits of farmers and the consumers of dairy products. Masti-Guard technology dissemination among the dairy farmers based on the results obtained from the proposed demonstration is a move towards mastitis-free dairy herd.

Keywords: Clean milk production, Dairy farmers, Masti-Guard technology, Mastitis.

INTRODUCTION

Mastitis in dairy cattle and buffaloes profoundly impacts the quality, economics and overall health of dairy animals [1]. More than 136 microorganisms cause mastitis [2] which poses challenges to stakeholders in dairy value chain especially dairy farmers and a threat to consumers. Such hardship is severe in case of sub-clinical mastitis which shows no visible symptoms. Proper treatment and good animal husbandry practices can reduce the antimicrobial resistance [3]. This necessitates to the need of effective deterrent early diagnostic test to be

carried out the farmers at field level. Recent focus on food safety and consumers activism also necessitates an emphasis on clean milk production by control and prevention of mastitis.

TANUVAS Masti-Guard is a technology comprising Mastitis Screening (TANUCHEK Somatic Cell Count - SCC Kit) and Teat Protection (Teat Protect Spray) Package invented by Translational Research Platform for Veterinary Biologicals (TRPVB), Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu. TANUCHEK Somatic Cell Count - SCC Kit is a simple farmer-friendly kit which determines somatic cell count in milk at farm level within 30 minutes at Rs. 2.50 per test. It detects sub-clinical mastitis. Applying Teat Protect spray, with its antiseptic property, on teat prevents and controls the infection by forming a protective teat coat. The cost of 500 ml of Teat Protect spray is Rs. 262.50/- and it is sufficient to protect one dairy animal from mastitis for one month period. Masti-Guard is efficacious in reducing the incidence of subclinical mastitis [4]. However, the SCC test needs to be done regularly to monitor the udder hygiene and health status individual animal and herd. The unit cost of the Masti-Guard is Rs. 318.50/- (inclusive of GST) which can be affordable by the farmers.

Conducting frontline demonstration (FLD) is one of the mandates of Veterinary University Training and Research Centres, the constituent units of Tamil Nadu Veterinary and Animal Sciences University (TANUVAS). FLD is a suitable extension and advisory method which enhances the technology dissemination to the end-users. It plays a significant role in knowledge enrichment and adoption of scientifically recommended dairy farming practices by dairy farmers [5]. In this the background, the FLD on “Masti-Guard technology” for maintaining udder hygiene and promoting clean milk production has been carried out with an objective to visualise the technology and its beneficial results among dairy farmers.

METHODOLOGY

The study was carried out in Padi, Pachinampatti and Velampatti villages of Palacode block, Dharmapuri district, Tamil Nadu. Farms keeping at least two crossbred dairy animals, encountering mastitis frequently and treating their animals with veterinarians formed the sampling frame which was developed with the help of local milk societies and field veterinarians. By following proportionate random sample technique, 8, 7 and 5 dairy farms were selected respectively from Padi, Pachinampatti and Velampatti villages in the study area. From each farm, one dairy animal was selected for demonstrating the technology. The economic benefit was calculated by adding the treatment cost saved, income increased due to saved milk and labour and subtracting the cost of Masti-Guard technology (*i.e.*, Rs. 318.50 per

kit). The observation made by the nearby farmers were documented and they were categorized based on their symbolic adoption of Masti-Guard technology. Data on both male and female dairy farmers' perceived satisfaction on effect of Masti-Guard technology, newly acquired know-how knowledge and newly developed do-how skills on the technology were collected and categorized into low, medium and high level of satisfaction.

The study has been conducted in three phases involving both the men and women dairy farmers of the selected 20 dairy farm families. Each phase was carried out for one month to a total of three months period as mentioned below.

- **Phase 1:** It comprises preliminary visit to village, selection of beneficiary, identification and selection of cows for demonstration and training farmers on udder hygiene and clean milk production.
- **Phase 2:** It comprises educating farmers on early detection and control of mastitis and Masti-Guard technology and demonstrating Masti-Guard involving local veterinarians to the farmers to enhance “*seeing-is-believing*” and “*learning-by-doing*”. In this phase, farmers were provided with Masti-Guard kit and Leaflet on “Clean milk production” at free of cost.
- **Phase 3:** It comprises collection of primary data and feedback from the farmers, follow-up, documentation, analysis of data and interpretation of results.

RESULTS AND DISCUSSION

Economic benefit

Table 1. Economic benefit derived by adopting “Masti-guard” technology

S. No.*	Cost of Masti-guard (Rs.)*	Treatment cost saved (Rs.)	Milk saved (Litres)	Milk price per litre (Rs.)	Income increased (Rs.)	Time saved (Hours)	Cost of labour saved**		
							Based on local wage rate		Based on MGNREGA rate
							If male	If female	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	318.5	2200	15	32	480	6	375.00	225.00	220.50
2	318.5	1900	13	32	416	6	375.00	225.00	220.50
3	318.5	1300	8	34	272	4	250.00	150.00	147.00
4	318.5	1600	9	34	306	5	312.50	187.50	183.75
5	318.5	1300	7	34	238	4	250.00	150.00	147.00
6	318.5	1500	10	32	320	5	312.50	187.50	183.75
7	318.5	2200	15	32	480	6	375.00	225.00	220.50
8	318.5	1900	13	32	416	6	375.00	225.00	220.50
9	318.5	2700	17	32	544	7	437.50	262.50	257.25
10	318.5	2500	17	34	544	6	375.00	225.00	220.50
11	318.5	1300	8	34	272	5	312.50	187.50	183.75

12	318.5	1400	8	34	272	5	312.50	187.50	183.75
13	318.5	1500	9	34	288	4	250.00	150.00	147.00
14	318.5	1800	12	32	384	5	312.50	187.50	183.75
15	318.5	1700	11	32	352	6	375.00	225.00	220.50
16	318.5	1200	7	34	238	5	312.50	187.50	183.75
17	318.5	2200	14	32	448	6	375.00	225.00	220.50
18	318.5	2500	17	32	544	6	375.00	225.00	220.50
19	318.5	2700	18	32	576	7	437.50	262.50	257.25
20	318.5	1900	10	32	320	6	375.00	225.00	220.50
Average	318.5	1865	11.9	32.8	385.5	5.5	343.75	206.25	202.125
Economic benefit (Rs.) based on local wage rate at Rs. 500 per man-day, if male involved in dairy farming [(3) + (3) + (6) + (8) – (2)]									2275.75
Economic benefit (Rs.) based on local wage rate at Rs. 300 per man-day, if male involved in dairy farming [(3) + (3) + (6) + (9) – (2)]									2138.25
Economic benefit (Rs.) based on MGNREGA rate at Rs 294 per man-day									2134.125

N.B: For calculating cost of labour saved, local wage rate i.e., Rs. 500 and 300/- paid to male and female labourers per man-day respectively and MNREGA wage rate i.e., Rs. 294/- paid to worker per man-day were considered.

** - S.No. 1-8 from Padi, 9-15 from Pachinampatti and 16-20 from Velampatti villages.*

*** - Distributed to farmers at free of cost by TANUVAS under Frontline demonstration (FLD) programme.*

The Masti-Guard technology controlled and prevented the occurrence of mastitis in cattle in the study area, reduced the treatment cost [6] & [7] and spoilage of milk due to mastitis. Farmers also stated that Teat Protect spray can also heal wound if any on teat. The economic benefit based on local wage rate (*i.e.*, Rs. 500 and 300/- paid to male and female labourers per man-day, respectively) from preventing or treating one mastitis dairy animal by adopting the Masti-Guard technology was Rs. 2275.75 and Rs. 2138.25 considering the involvement of male and female farmers, respectively, in caring the mastitis animal during its treatment. The economic benefit considering the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) scheme wage rate (*i.e.*, Rs. 294/- paid to worker per man-day in Tamil Nadu) was Rs. 2134.125 (Table 1). Also, adoption of Masti-Guard technology saved 11.9 litre of milk and 5.5. hours of labour per animal, because of the early detection of mastitis based on somatic cell count. The results visualised the beneficial effect including economic benefits to the farmers. A total of 53 nearby farmers also observed the entire demonstration.

Technology dissemination through educating nearby farmers**Table 2. Nearby farmers educated by visualizing demonstration on “Masti-Guard” technology**

S. No.	Village name	Gender	No. of farmers educated	Symbolic adoption			
				Yes		No	
				No.	%*	No.	%**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Padi (20 farmers)	Male	9	8	88.89	1	11.11
		Female	11	9	81.82	2	18.18
2	Pachinampatti (18 farmers)	Male	8	8	100.00	0	0.00
		Female	10	9	90.00	1	10.00
3	Velampatti (15 farmers)	Male	6	5	83.33	1	16.67
		Female	9	7	77.78	2	22.22
4	Total (53 farmers)	Male	23	21	91.30	2	8.70
		Female	30	25	83.33	5	16.67
Total farmers			53	46	86.79	7	13.21

* - Percentage to column (5)

**- Percentage to column (7)

The frontline demonstration educated 53 nearby farmers in the study villages about Masti-Guard technology. Of them, 86.79 per cent of the farmers were in symbolic adoption stage of the technology, because of the “*seeing-is-believing*” principle. Effective extension and advisory services (EAS) can transfer them to use adoption stage. This shows the potential intervention place for offering EAS.

Farmers’ perceived satisfaction on technology**Table 3. Satisfaction on Masti-Guard technology perceived by the farmers**

S. No.	Village name	Perceived satisfaction	Effect		Know-how		Do-how	
			Male	Female	Male	Female	Male	Female
1	Padi (Each 8 male and female farmers)	Low	0	0	0	0	0	0
		Medium	0	1	0	1	0	1
		High	8	7	8	7	8	7
2	Pachinampatti (Each 7 male and female farmers)	Low	0	0	0	0	0	0
		Medium	1	2	0	1	1	2
		High	6	5	7	6	6	5
3	Velampatti (Each 5 male and female farmers)	Low	0	0	0	0	0	0
		Medium	0	1	0	1	0	1
		High	5	4	5	4	5	4
4	Total (Each 20 male and female farmers)	Low	0	0	0	0	0	0
		Percentage *	0.00	0.00	0.00	0.00	0.00	0.00
		Medium	1	4	0	3	1	4

		Percentage*	5.00	20.00	0.00	15.00	5.00	20.00
		High	19	16	20	17	19	16
		Percentage*	95.00	80.00	100.00	85.00	95.00	80.00

* - Percentage to each 20 male and female farmers

The farmers, with their experiences through “*seeing-is-believing*” and “*learning-by-doing*”, observed the desirable results obtained from adoption of Masti-Guard technology, enriched their know-how knowledge and developed do-how skill in clean milk production using Masti-Guard technology. An overwhelming 95.00, 100.00 and 95.00 per cents of male farmers and 80.00, 85.00 and 80.00 female farmers perceived high level of satisfaction on the effect of Masti-Guard technology, newly acquired know-how knowledge and newly developed do-how skill on the technology on mastitis control and prevention. The developed skills include conducting on-farm test using TANUCHEK Somatic Cell Count - SCC Kit for quick determination of the somatic cell and improving clean milk production practices using Masti-Guard. The beneficiary farmers would become as the loci of information on “Masti-Guard” technology dissemination and they can help the other farmers in the transition from awareness stage to adoption stage. The beneficiary farmers strengthened their know-how knowledge and do-how skill on the technology through farmers-scientist interaction and developed their familiarity with faculties of VUTRC, local veterinarians and Subject Matter Specialists during FLD.

CONCLUSIONS

The frontline demonstration conducted on “Masti-Guard technology” for promoting clean milk production through prevention and control of mastitis in dairy animals, yielded beneficial results among the farmers in terms of economic benefits, knowledge enrichment, skill development and technology dissemination. Further, benefits derived by adoption of Masti-Guard technology enhances udder hygiene and clean milk production practices and satisfies farmers’ need. The feedback given by farmers emphasised that considering the procedures involved in purchase of Masti-Guard, they are willing to buy online or through peripheral centres of TANUVAS. Masti-Guard technology, with its desirable attributes of innovation and beneficial effects, is suitable for demonstration and dissemination among the dairy farmers to make a move towards mastitis-free dairy herd.

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REFERENCES

- [1] Thirunavukkarasu, D., & Sudeepkumar, N. K. (2023). Role of end-user behaviour on the adoption decision of an innovation: the case of preventive solutions to control bovine mastitis disease in dairy enterprise. *Current Science*, 124(8), 996.
- [2] Kour, S., Sharma, N., N, B., Kumar, P., Soodan, J. S., Santos, M. V. D., & Son, Y. O. (2023). Advances in Diagnostic Approaches and Therapeutic Management in Bovine Mastitis. *Veterinary Sciences*, 10(7), 449.
- [3] Patel, Y.G., Trivedi, M.M. & Rajpura, R.M. (2020). Relationship between incidences of subclinical mastitis with udder and leg hygiene score in crossbred cows. *International Journal of Science, Environment and Technology*, 9(4), 660-665.
- [4] Chander, M., Handage, S., & Singh, R. K. (2021). Good animal husbandry practices can reduce the antimicrobial resistance. *Indian Journal of Comparative Microbiology, Immunology and Infectious Diseases*, 42(spl), 57-61.
- [5] Kavithaa, N.V., Vimal Rajkumar, N. and Manokaran, S. (2020). Constraints in dairy farming: a critical analysis among the dairy farmers of Tamil Nadu. *International Journal of Science, Environment and Technology*, 9(3), 407-412.
- [6] Thangadurai, R., & Shanmugam, P. S. (2019). Assessment of prophylactic control of subclinical mastitis in dairy cattle. *Indian Veterinary Journal*, 96(5), 27-29.
- [7] Gopala, G.T., Harisha, M., Ashok, M., Rudresh, B.H., & Giridhar, K.S. (2023). A Study on Effectiveness of Dairy Farming Related Front-Line Demonstrations of Krishi Vigyan Kendra Shivamogga on Knowledge Level of Dairy Farmers. *Journal of Experimental Agriculture International*, 45(10), 116-121.
- [8] Jayalalitha, V., & Thomas, K.S. (2020). Influence of Mastiguard (TANUVAS) Practice on the Somatic Cell Count (SCC) among Dairy Cattle in Tiruchirappalli District, Tamil Nadu, India. *Journal of Veterinary Public Health*, 18(2), 185-187.
- [9] Kohila, P., Malathi, G., & Sriram, N. (2021). Efficacy of Mastiguard and treatment of subclinical mastitis in dairy cattle. *Journal of Krishi Vigyan*, 10(1), 325-327.