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Impact of TANUVAS technologies on production, reproduction and health status of dairy cattle at Thuraiyur block in Tiruchirappalli district

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Abstract

The present study evaluated the impact of TANUVAS farmer-friendly technologies on the production, reproduction, and health performance of dairy cattle owned by Scheduled Caste (SC) women farmers in Thuraiyur block, Tiruchirappalli district. A total of 50 SC women farmers owning 175 dairy cattle were purposively selected, and their baseline knowledge on scientific dairy practices and TANUVAS technologies was assessed through a pre-exposure survey. A structured workshop on scientific dairy management and the use of TANUVAS Grand, TANUVAS Teat Protect, TANUVAS Mineral Mixture, and the Calf Kit was conducted, followed by distribution of inputs and a three-month field-level adoption period. Post-intervention assessment revealed a significant improvement in knowledge levels (0–36% to 82–98%) across major scientific practices. Supplementation of TANUVAS Grand resulted in a substantial decline in acidosis (42.86% to 3.42%), lameness (28.57% to 1.14%), and respiratory distress (37.14% to 4.00%), alongside improvements in oestrus regularity, conception rate, dung consistency, and average milk yield (7.2 ± 0.12 to 8.56 ± 0.22 L/day). Application of TANUVAS Teat Protect Spray led to a marked reduction in mastitis incidence (42.31% to 5.38%) and somatic cell count (3.92×10^5 to 0.05×10^5 cells/mL), with an associated increase in milk yield. Supplementation with TANUVAS Mineral Mixture improved milk fat (3.50% to 4.73%), SNF (7.15% to 8.25%), and reduced reproductive disorders such as repeat breeding (41.71% to 9.14%). Use of the Calf Kit enhanced calf management practices, reduced parasitic load (FAMACHA score 4 to 2), and lowered incidences of diarrhoea, pica, and umbilical infections. Overall, the study demonstrates that adoption of TANUVAS technologies significantly improves dairy herd productivity, udder health, reproductive efficiency, calf health, and reduces treatment expenses, thereby contributing to sustainable livelihood enhancement among SC women dairy farmers.

Keywords: TANUVAS technologies, Scheduled Caste women farmers, milk yield, TANUVAS Grand, Teat Protect, calf kit, somatic cell count, rural livelihood improvement

Introduction

Dairy farming plays a crucial role in the socio-economic development of Scheduled Caste (SC) communities in India. In Tamil Nadu, dairy farming is predominantly managed by women, who typically rear one or two crossbred dairy animals under semi-intensive systems. However, productivity among these farmers is often constrained by inadequate knowledge of scientific management practices, poor health care, and limited access to cost-effective technologies. To address these challenges, the Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) has developed several farmer-friendly technologies, including TANUVAS Grand (Gruel rooted additive nourishment drops) a complete feed supplement enriched with essential vitamins, chelated minerals, probiotics, and rumen buffers, TANUVAS Teat Protect (Mastiguard),

TANUVAS Mineral Mixture, TANUVAS Salt Lick, and Calf Kits. These technologies are designed to enhance milk yield and quality, improve reproductive efficiency, reduce disease incidence, and ultimately increase farmers' income. Despite their proven benefits, awareness and adoption of TANUVAS technologies among socially and economically disadvantaged farmers remain limited. Lack of scientific knowledge often leads to improper feeding practices, increased susceptibility to metabolic and infectious diseases, higher treatment costs, and reduced productivity. Enhancing farmers' knowledge and promoting the adoption of scientifically validated technologies are essential steps toward improving the sustainability and profitability of dairy farming. Therefore, the present study was undertaken to assess the impact of TANUVAS technologies on production, reproduction, and health performance of dairy

cattle owned by SC women farmers in Thuraiyur block of Tiruchirappalli district. The study evaluated changes in farmers' knowledge before and after training, along with improvements in milk yield, milk composition (fat and SNF), somatic cell count (SCC), reproductive performance, and calf health following the adoption of TANUVAS Grand, Teat Protect, Mineral Mixture, and Calf Kit. By documenting these outcomes, the study provides scientific evidence on the effectiveness of TANUVAS technologies in improving dairy productivity and reducing economic losses, thereby supporting livelihood enhancement among SC women dairy farmers.

Materials and Methods

The study was conducted at Thuraiyur block in Tiruchirappalli district of Tamil Nadu. The beneficiaries for the project were purposively selected from Scheduled Caste farmers those who have at least 3 to 4 dairy cows out of which two should be in same stage of lactation to minimize the effect of physiological variation associated with lactation stage. 50 women Scheduled Caste farmers having dairy animals with knowledge and experience were selected as beneficiaries for this study. Total number of animals involved in this study was 175. To maintain uniformity, only cows in similar stages of lactation were included in the study. Preliminary survey was conducted with the selected beneficiaries to assess the scientific knowledge level of the farmers in dairy farming, awareness of TANUVAS technologies and their adoption level was assessed along with the constraints faced by the women dairy farmers. Subclinical mastitis was screened using the California Mastitis Test (CMT) during periodic field visits. Positive cases were further evaluated by estimating the somatic cell count (SCC).

Workshop

One day workshop on the scientific rearing of dairy animals with special emphasis on TANUVAS technologies (TANUVAS GRAND, TANUVAS teat protect, TANUVAS mineral mixture, TANUVAS Calf kit) were conducted at Veterinary University Training and Research centre, Tiruchirappalli. Distribution of inputs mainly the TANUVAS technologies to each selected SC women beneficiaries in phased manner. All the (50) women beneficiaries who attended the workshop were given a book on "Dairy farming" in vernacular language which was purchased from the University Publication Division, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Madhavaram Milk Colony, Chennai – 600 051.

Inputs distribution

The 50 selected beneficiaries were given with 9 bottles of 600ml of TANUVAS GRAND each for a period of three months. The farmers reported that they give rice in their feed formulation and had no awareness about balanced feeding. The negative effects of rice leading to the decrease in milk production and reproduction efficiency were enriched to the farmers during the training programme. Knowledge on balanced feeding and introduction of TANUVAS GRAND to mitigate the effects of rice in feed and the methods of administration of GRAND was also

enriched during the training programme. It was instructed to supplement the GRAND for at least three months to a cow which is in lactation. Data sheet was given to the farmers to record the milk production and its health status for a period of three months. Pamphlets were distributed to the farmers about Do's and Don'ts with regard to TANUVAS GRAND. Mostly dairy farmers are used to purchase crossbred cows to receive high yield. High yielders are always prone to mastitis. Poor management and unhygienic practices in milking lead to mastitis. Mastitis prevention and control measures were dealt in the training classes and each farmer was provided with 4 numbers of TANUVAS Teat Protect (500 ml) and explained with demonstration. Pamphlets were distributed to the farmers about handling of this TEAT PROTECT.

Improper management of calves leads to increased mortality in calves, infertility in heifers and lesser milk production. Hence it is addressed among the farmers to better management of calves which are next generation cows and advised to protect them with scientific knowledge. This calf kit will be useful to nourish the calves. Demonstration cum explanation was made about the calf kit to the participants.

The calf kit contained the following items

- TANUVAS Mineral mixture - 2 kg procured from Veterinary College and Research Institute, Namakkal
- TANUVAS Calf starter - 10 kg procured from Veterinary College and Research Institute, Orathanadu
- TANUVAS Salt lick -3 Numbers procured from Institute of Animal Nutrition (IAN), Kattupakkam
- Medicines for calves – Groviplek - 500 ml (Growth supplement), deworming syrup – 4 numbers, Bolus for diarrhoea – 10 numbers from Cauvery Vet Pharmacy (Pharmaceuticals dealer), Tiruchirappalli
- Tools for Umbilical cord removal – sterilized blade, tincture iodine, cotton, nylon thread from Cauvery Vet Pharmacy (Pharmaceuticals dealer), Tiruchirappalli

Farmers were well explained about the usage of calf kit for calves on the importance of umbilical cord removal, deworming, TANUVAS salt lick and TANUVAS mineral mixture. Handling of growth supplement and emergency medicines viz., Oral Rehydration salts, bolus for diarrhoea were described. Pamphlets regarding use of calf kit were distributed. Follow-up of the implementation of this scheme was carried out through periodical visits and data collection. After a period of three months, the data were collected, tabulated and analysed using descriptive statistics and McNemar's Test.

Results and Discussion

The current study identified the impact of TANUVAS technologies on production, reproduction and health status of dairy cattle.

Knowledge level of dairy farmers on TANUVAS technologies

Before the training programme, pre-exposure and post exposure knowledge were tested to all the 50 beneficiaries. They had very limited awareness about TANUVAS technologies such as TANUVAS grand (0%), TEAT protect (8%), TANUVAS mineral mixture (26%), TANUVAS Salt

lick (22%) and practices like deworming, umbilical cord removal, supplementation of calf starter and vitamin syrup for growth. Table 1 shows that none of the dairy farmers have knowledge about the TANUVAS grand. Prior to training, only basic practices like deworming (36%) were

adopted, and even this are irregular. Beneficiaries are not aware about the importance of vitamin supplementation (14%) and starter feed of calves. After the intervention, adoption of all key technologies increased evidently.

Table 1: Knowledge level of dairy farmers on TANUVAS technologies/practices (n=50)

S. No.	Technologies/practices	Pre exposure knowledge (%)	Post exposure knowledge (%)
1.	Usage of TANUVAS GRAND	Nil	49 (98.00)
2.	Usage of TANUVAS Teat protect spray	4 (8.00)	48 (96.00)
3.	Knowledge of Sterile Umbilical cord removal	7 (14.00)	47 (94.00)
4.	Usage of TANUVAS Mineral mixture	13 (26.00)	49 (98.00)
5.	Usage of TANUVAS salt lick	11 (22.00)	48 (96.00)
6.	Knowledge of Deworming	18 (36.00)	46 (92.00)
7.	Usage of Vitamin supplement	07 (14.00)	42 (84.00)
8.	Calf starter	09 (18.00)	46 (92.00)
9.	Usage of ORS	Nil	41 (82.00)
10.	Usage of diarrhoeal bolus	17 (34.00)	47 (94.00)

Table 2: Impact of TANUVAS GRAND supplement on production, reproduction and health parameters

S. No.	TANUVAS Grand Supplement (N=175)	Units/observation	Before adoption	After adoption
1.	Feeding of rice / rice products	Yes/No	Yes	Yes
2.	Acidosis incidence	In per cent	75 (42.86%)	6 (3.42%)
3.	Lameness incidence	In per cent	50 (28.57%)	2 (1.14%)
4.	Respiratory Distress signs	Clinical observation - In per cent	65 (37.14%)	7 (4.00%)
5.	Treatment expenditure for acidosis	Farmers observation	High	Nil
6.	Signs of acidosis	Visual observation	Noticed	Not noticed
7.	Exhibit of oestrus signs	Visual observation	Silent oestrus and Irregular	Exhibit signs at regular interval, 21 days once
8.	Regularity of estrum	Visual observation	Not regular	At Regular interval
9.	Conception rate	Farmers observation	4 to 5 inseminations/ conception	1-2 inseminations/ conception
10.	Skin and Hair coat	Visual observation	Rough and dull	Smooth and shiny
11.	Overall Treatment expenses	Farmers observation	1500/month	100/month
12.	Average Milk yield (Same stage of lactation)	Litres/day	7.2 ± 0.12	8.56 ± 0.22
13.	Dung consistency	Farmer scoring (1-5 scale)	1.9	4.3

Milk samples were collected before supplementation of TANUVAS grand and after supplementation TANUVAS grand supplement for a period of 3 months in dairy cattle. Collected samples were analysed in Veterinary University Training and Research Centre, Tiruchirappalli to know the alteration in the milk yield, SNF and fat content. Collected data were analysed by using descriptive statistics.

Initially farmers used rice porridge, wasted food, and garbage as cattle feed, it led to acidosis (42.83%), lameness (28.57%), respiratory distress (37.14%), rough coat, poor digestion and reproductive problems (Table 2). Farmers reported that high expenditure for treating acute acidosis and frequent signs of ill health, including silent oestrus and irregular oestrus. After the introduction of TANUVAS grand supplement and balanced feeding, the incidence of acidosis (3.42%), lameness (1.14%) and respiratory distress (4.00%) was decreased substantially and it leads to shiny coats to dairy cows. Animals showed clear oestrus sign at regular interval and increased conception rate. This reduction was based on farmer's reports and observations made during periodic follow up visits. These observations are coincided with the reports of Arulnathan *et al.*, 2023 [1]. Watery dung containing undigested feed particles typically

indicates inadequate rumen microbial activity and the onset of sub clinical acidosis (SARA) a condition commonly observed in cattle fed with carbohydrate rich with less fibre diet such as rice gruel. After supplplantation of TANUVAS grand for 3 months, the improvement in dung consistency suggested that enhanced rumen microbial activity and better utilization of dietary nutrients. Same results observed by Ramakrishnan and Sendur kumaran, 2025 [7]. In the present study, the average daily milk yield of dairy cattle is increased from 7.2 ± 0.12 to 8.56 ± 0.22 litres per day/animal was observed among animals with same stage of lactation. Therefore this improvement is less likely to be influenced by differences in lactation stage and may be attributed to the nutritional benefits of TANUVAS GRAND supplementation. Similar findings were reported by Saravanan *et al.*, 2025 [8] the average milk yield of an animal increased from 7.36 liters/day/animal to 8.72 liters/day/animal after supplementation of TANUVAS GRAND. Overall, the treatment expenses are reduced from 1500 to 100 rupees. The overall improvement in production, reproduction and health status of dairy animals highlighted the importance of adopting TANUVAS GRAND supplement.

Table 3: Effect of TANUVAS Teat Protect Spray on Mastitis Incidence, Udder Health and Milk Productivity in Dairy Cattle

S. No.	TANUVAS Teat protect spray (N=130)	Pre intervention (0 th day)	Post intervention (At 3 months)
1.	Incidence of Mastitis	55 (42.31%)	7 (5.38%)
2.	Expenditure for treatment of animals	Rs.5000/incidence	Rs. 0
3.	Clinical signs of Mastitis	35(26.92%)	0%
4.	Average Milk production litres per day	7. 45 ± 0.19	8. 91 ± 0.24
5.	Average somatic cell count lakhs/mL	3.92 ± 0.34	0.05 ± 0.02

In this study, TANUVAS teat protect spray was applied for a period of 3 months across 130 dairy animals belonging to 50 SC women farmers, produced a marked improvement in udder health and milk performance indicators (Table 3). The proportion animals showing incidence of mastitis declined markedly from 42.31 to 5.38 per cent after intervention. The average milk yield also increased from 7. 45 ± 0.19 litres to 8. 91 ± 0.24 litres. This was in agreement with the observations of Sukumar *et al.*, 2019 ^[11] who observed the mean ±SD of the average daily milk yield (liters) showed a significant ($P < 0.01$) increase from 10.76 ± 1.986 to 11.35 ±

0.2013. Moreover, the average somatic cell count (SCC), a key indicator of subclinical mastitis showed a dramatic reduction from 3.92 ± 0.34 ×10⁶cells/mL to 0.05 ± 0.02 ×10³ cells/mL. This was in agreement with the findings of Jayalalitha and Shibi Thomas (2020) ^[3] who reported that the average SCC was decreased from 3.51 ± 0.29×10⁶ at 0th day trail to 0.07 ± 0.05×10² cells/mL after 6 weeks of application of TANUVAS Mastiguard. The study suggested that the use of TANUVAS teat protect leads to the effective control of clinical and sub clinical mastitis.

Table 4: Influence of TANUVAS Mineral mixture on milk yield and quality and reproductive parameters

S. No.	TANUVAS Mineral mixture (N = 175)	Before supplementation (At 0 th day)	After supplementation (After 3 months)
1.	Milk yield (litre/day)	6.90 ± 0.26	8.76 ± 0.18
2.	Milk fat in per cent	3.50 ± 0.17	4.73 ± 0.13
3.	Milk SNF in per cent	7.15 ± 0.28	8.25 ± 0.33
4.	Repeat breeding	73(41.71%)	16 (9.14%)

In this study, it was observed that the supplementation of TANUVAS mineral mixture for a period of 3 months resulted in a notable improvement in milk yield and milk quality (Table 4). The average milk yield increased significantly from 6.90 ± 0.26 L at the start of supplementation to 8.76 ± 0.18 L after three months of post supplementation. A remarkable improvement is noticed in the milk fat and SNF from 3.50 ± 0.17% and 7.15 ± 0.28% to 4.73 ± 0.13% and 8.25 ± 0.33% respectively. This is in accordance with the findings of Jayalalitha *et al.*, 2019 ^[4]

and Chitra 2021 ^[2] who reported that significant improvement in milk yield, SNF and Fat% noticed in TANUVAS mineral mixture supplemented group compared to the control group. And also, in this study it was observed that reproductive issues like repeat breeding 41.71% is decreased to 9.14% after supplementation of TANUVAS Mineral mixture. Similar study was reported by Senthilkumar (2018) ^[9] that incidence of repeat breeding was lower after adoption of TANUVAS Mineral mixture by NABARD farmers of Tirunelveli district in Tamil Nadu.

Table 5: Impact of calf kit utilization on health and management practices in calves

S. No.	CALF KIT (N = 120)	Before usage	After usage
1.	Date of first deworming	No deworming practiced	At 15 th day after that at regular interval
2.	Feeding concentrate for calves	0 (0%)	120 (100%)
3.	FAMACHA score	4	2
4.	Umbilical infection	36 (30.0%)	5 (4.2%)
5.	Incidence of PICA	28 (23.3%)	4 (3.3%)
6.	Incidence of diarrhoea	40 (33.3%)	8 (6.7%)

In this study, the usage of calf kit brought a substantial improvement in the overall health and management of calves (Table 5). Before the intervention, essential practices like deworming and calf starter ration feeding were not practiced. SC women farmers were well explained about the usage of calf kit for calves on the importance of umbilical cord removal, deworming, mineral salt lick and calf starter. However, after intervention deworming was practiced at regular intervals, calf starter also started to provide indicated the awareness and adoption of recommended management practices. Anaemia in calves was assessed using the FAMACHA® scoring system, which grades the colour of the lower eyelid conjunctiva on a scale of 1 to 5, where Score 1 indicates non-anaemic animals and Score 5 indicates severe anaemia. The FAMACHA CHART score

reduced from 4 to 2 reflecting the reduced parasitic load and improved physiological status of the animal. Additionally, the incidence of common calfhoo ailments such as umbilical infections, pica and diarrhoea, which were initially high, reduced considerably following the use of CALF kit. These improvements suggested the overall calf kit proved effective in strengthening the calf health management by promoting timely deworming, improved nutrition and reduction in disease incidence, ultimately supporting healthier and roust calf growth.

Conclusion

In this study, it was concluded that integration of TANUVAS technologies to scheduled community women dairy farmers which had a great impact in the production,

reproduction and health status of dairy cattle and also improved the socio-economic status of SC women farmers. So, expanding this practice of using TANUVAS technologies could greatly enhance the socio-economic status of Scheduled community farmers with limited resources.

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Conflict of Interest

None

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