Full Length Article

EMPIRICAL ASSESSMENT ON ADOPTION OF PROGESTERONE IMPREGNATED VAGINAL SPONGE BY THE DAIRY FARMERS OF TAMIL NADU

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ABSTRACT

The study was undertaken to ascertain the present status of adoption of progesterone impregnated vaginal sponge like complete adoption, partial adoption, discontinuance and rejection and its perceived attributes like relative advantage, compatibility, complexity, observability and trialability using the schedule developed for this purpose and its economic impact. Partial budgeting was done to assess the economic impact of adopting progesterone impregnated vaginal sponge. Farmers were aware about the progesterone impregnated vaginal sponge through the constituent units of TANUVAS like veterinary colleges, KVKs and VUTRCs (84%); veterinary officers (47%); extension workers (46%); friends and relatives (34%). Majority (80%) of the respondents reported to have completely adopted the innovation for treating infertility while the remaining (20%) had discontinued it. Majority of the dairy farmers (78%) were in the medium level of adoption behaviour about the innovation followed by low (12%) and high (10%) level. Most of the dairy farmers perceived that progesterone impregnated vaginal sponge was cheaper in price, exorbitantly profitable, time saving, situationally and culturally feasible, physically compatible, trialable, adoptable and the results are observable. Partial budgeting analysis revealed that net income of the dairy farmers was increased by Rs. 28,041.90 per dairy animal due to the adoption of progesterone impregnated vaginal sponge in their infertile dairy animals. The present status of adoption of innovation by farmers was positively correlated with land holding

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and dairy animal possession and change in net income at 1% level, while their adoption behaviour was positively correlated with education and change in net income at 1% level and with land holding and extension agency at 5% level of significance.

Key words: Adoption, Attributes, Behaviour, Progesterone, Sponge, Technology

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INTRODUCTION

Livestock entrepreneurs always expect productive and reproductive performance of animals at optimum level for enhancing cost benefit ratio. Adoption of recent and modern technologies in dairy farming is crucial to improve the productivity and welfare of farmers. However, most of the livestock technologies are not suitable or relevant to the farmers mainly due to difference in perception of researchers and farmers on the appropriateness and usability of livestock innovations vary significantly.

Another constraint for adoption is virtual absence of 'adaptive research' before propagating the technologies and recommendations. Further, variables related to innovation attributes, economic climate, structural constraints and technology suitability must also be included into the model to increase the predictability of adoption behaviour (Wadsworth, 1995).

Existence of research gap in understanding the role of attributes and limited validation of innovations in farmer field may be the reasons for poor uptake of dairy innovations. Technology generators need to focus on improving technology in terms of performance, ease of use and fit for farming situations (Thirunavukkarasu and Narmatha, 2016). Keeping this in mind, the research was undertaken to study the adoption behaviour of farmers about the progesterone impregnated vaginal sponge developed by Tamil Nadu Veterinary and Animal Sciences University and to assess its economic impact.

MATERIALS AND METHODS

Ex post facto research design was used for the study. A list of potential beneficiaries for the adoption of progesterone impregnated vaginal sponge was prepared in consultation with technology developers and other possible stakeholders and it served as the sampling frame. From the sampling frame, 50 respondents were randomly selected. Cross sectional data was collected using pre tested interview schedule; tabulated and analyzed by using SPSS software. The present status of the adoption of progesterone impregnated vaginal sponge was studied by using interview schedule developed by Rathod *et al.* (2016) with the score of 3, 2, 1 and 0 for complete adoption, partial adoption, discontinuance and rejection respectively. The different attributes of progesterone impregnated vaginal sponge perceived by the dairy farmers like relative advantage, compatibility, complexity, observability and trialability were studied. Partial budgeting was done to assess the

benefits of adopting progesterone impregnated vaginal sponge interventions and the change in net income was worked out by calculating difference between the positive financial changes like added income and reduced costs and negative financial changes like reduced income and added costs due to the adoption of the technology. The relationship between the dependent and independent variables were analyzed using Spearman's rank order correlation.

RESULTS AND DISCUSSION

Source of awareness of progesterone impregnated vaginal sponge

It can be inferred from the Table 1 that overwhelming majority of the dairy farmers (84%) were aware of progesterone impregnated vaginal sponge and its potential implications through the faculty and scientists of TANUVAS office call and on farm trials. Nearly half of the dairy farmers (47%) were made aware by the practicing veterinarians. Further, 46% of the respondents opined that the awareness regarding the progesterone impregnated vaginal sponge was also received from field level extension workers. One-third of the dairy farmers (34%) reported that they were aware about the sponge from their relatives and friends who have directly witnessed the success results of sponge technology. Only TANUVAS, personal cosmopolite and personal localite communication channels were actively involved in propagating the progesterone impregnated vaginal sponge and mass communication methods were not used by the research organization to increase the awareness. Similar findings were reported by Sia *et al.* (2001), Srivastava *et al*. (2002), Narayana *et al*. (1994) and Subbareddy and Channagowda (1982).

Table 1. Source of awareness of progesterone impregnated vaginal sponge

Sl. No.	Source of awareness	F	Percentage
1	Friends and relatives	17	34
2	Veterinary officers	37	47
3	Extension workers	23	46
4	TANUVAS	42	84
5	Radio/ Television	0	0
6	Newspaper	0	0
7	Journals / Magazines	0	0
8	Social Media	0	0

Present status of the adoption of progesterone impregnated vaginal sponge

It is evident from the Table 2 that majority (80%) of the respondents completely utilized the progesterone impregnated vaginal sponge as alternative to other infertility treatment options while 20% of the respondents have discontinued the adoption of progesterone impregnated vaginal sponge. All the dairy animals with progesterone impregnated vaginal sponge were suffering from either anestrum or repeat breeding

problem. The average calving interval of the dairy animals before the intervention was 2.08 years. Almost majority of the farmers opined that they have completely adopted the sponge intervention based on the suggestions made by the practicing veterinarian and 78% of the respondents confirmed that their infertile animals conceived successfully after the intervention which had resulted in better adoption among the farmers. Farmers also reported that less cost involvement while comparing to CIDR and hormone therapy was also a reason to choose this innovation.

Table 2. Present status of the adoption of progesterone impregnated vaginal sponge

Sl. No.	Adopter category	Frequency	Percentage
1	Complete Adoption	40	80%
2	Partial Adoption	0	0%
3	Discontinuance	10	20%
4	Rejection	0	0%

Perceived attributes of progesterone impregnated vaginal sponge

The results of progesterone impregnated vaginal sponge innovation attributes as perceived by the respondents were presented in Table 3 and the discussion based on the indicators regarding the five attributes of innovations i.e., relative advantage, compatibility, complexity, observability and trialability are as follows:

a. Relative advantage: Overwhelming majority of the dairy farmers (90%) stated that the initial cost involved in adoption of progesterone impregnated vaginal sponge technique was cheap. The average cost involved in this technique is Rs.867.50 inclusive of sponge cost, veterinarian fee and insemination charges which was comparatively cheaper than hormone therapy and CIDR. Eighty per cent of the farmers perceived that adopting the technology was exorbitantly profitable because it has resulted in successful pregnancy which increased the value of the animal and lactation yield. Majority of the farmers (82%) opined that adopting progesterone impregnated vaginal sponge technique had considerably saved the time because the resultant conception had drastically reduced the dry period, service period and calving interval in the affected dairy animals. Majority of the farmers (94%) did not perceive any additional benefits apart from treating anestrum and repeat breeding conditions because none of the farmers adopted for oestrus synchronization in their dairy farm.

b. Compatibility: Majority of the respondents perceived that the progesterone impregnated vaginal sponge technology was situationally feasible (98%), culturally acceptable (100%) and physically compatible (96%) with the needs of the farmers because they had spent considerable amount of time, money and energy on various interventions like deworming, supplementation of mineral mixture and sprouted grains, repeated inseminations and intra uterine antibiotic therapy for their infertile animals before opting for progesterone impregnated vaginal sponge. However, all the respondents perceived that the technology was highly dependent on various factors like availability of veterinarian, purchase of

Table 3. Perceived attributes of progesterone impregnated vaginal sponge

Sl. No.	Attribute	Indicators	Opinion	F	%	Opinion	F	%
1	**Relative Advantage**	Initial Cost	Cheap	45	90%	Expensive	5	10%
		Profitability	Exorbitant	40	80%	Meagre	10	20%
		Time consumption	Time saving	41	82%	Time consuming	9	18%
		Multiplicity of use	Yes	3	6%	No	47	94%
2	**Compatibility**	Situational	Feasible	49	98%	Unfeasible	1	2%
		Cultural	Acceptable	50	100%	Not Acceptable	0	0%
		Physical	Compatible with needs	48	96%	Incompatible with needs	2	4%
		Relational	Independent	0	0%	Dependent	50	100%
3	**Complexity**	Cognitive	Easy	19	38%	Complex	31	62%
		Application	Adoptable	49	98%	Unadoptable	1	2%
		Resource	Abundant	22	44%	Scare	28	56%
		Labour	Saving	28	56%	Consuming	22	44%
4	**Observability**	--	Visible	41	82%	Invisible	9	18%
5	**Trialability**	--	Trialable	49	98%	Not trialable	1	2%

sponge; subsequent follow-up and need for inseminators or veterinarians to do artificial insemination at the immediate expression of estrus signs within the stipulated window period of 48 -72 hours of sponge removal.

c. Complexity: Nearly two-third of the respondents (62%) expressed that the cognitive aspects of progesterone impregnated vaginal sponge technology was highly complex and hence they simply followed the instructions of the veterinarians. Overwhelming majority of the respondents (98%) reported that the technology was adoptable because there was no technical requirement for the farmers. More than half of the respondents (56%) reported that availability of progesterone impregnated vaginal sponge was scarce; while the remaining (44%) farmers expressed that the resources were readily available because veterinarians used to purchase all the inputs. More than half of the respondents (56%) perceived that the technology was labour saving because it has reduced the unproductive labour to maintain and feed the infertile dairy animals.

d. Observability: Majority of the respondents (82%) reported that results of the technique was highly visible in nature because all the anoestrus animals had clearly exhibited overt oestrus signs within 48 to 72 hours of removal sponge and successful conception was reported in the subsequent 1 or 2 inseminations. However, 18 % of the dairy farmers opined that the technology was not observable due to failure in conception, sporadic incidence of vaginitis and expulsion of sponge by the animals.

e. Trialability: Almost all the farmers (98%) perceived this technique as trialable because use of sponge in this technology created an impression among the farmers that the intervention was simple and less harmful to their animals when compared to multiple hormone injections. Some of the farmers received this technology as part of on-farm trial of KVK in their area which they readily accepted. Further, the cost of single piece of progesterone impregnated vaginal sponge is Rs.325/- which is very less when compared to the other hormonal preparations used for infertility treatments.

Overall adoption behaviour regarding progesterone impregnated vaginal sponge

From the Table 4 it can be observed that majority of the dairy farmers (78%) were in the medium level of adoption behaviour followed by low (12%) and high (10%) level of adoption behaviour. Most of the dairy farmers perceived that the progesterone impregnated vaginal sponge was cheaper in price, exorbitantly profitable, time saving, situationally and culturally feasible, physically compatible, trialable, adoptable and the results are observable. Similar findings were reported by Bhise *et al.* (2018) and Rathod and Chander (2015) regarding the attributes of the innovations.

Partial budgeting on adoption of progesterone impregnated vaginal sponge

Results of the partial budgeting analysis of progesterone impregnated vaginal sponge were presented in the Table 5 which clearly indicates that adoption of progesterone impregnated vaginal sponge had increased the farmers income by Rs. 29,894.00 per dairy animal. (Rs.18,604.00 by milk production in

subsequent lactation + Rs.2,370.00 by selling their calves born + Rs.8,920.00 by the increased selling price). Further, farmers reduced their expenses by Rs.775.40 per dairy animal by the way of treatment, repeated inseminations, feeding of nutritional supplements. The farmers reported to incur an additional expense of Rs. 867.50 per dairy animal in the form of purchasing sponges; travel cost; insemination charges and treatment charges for veterinarian. Few farmers also reported a decrease in their income by Rs. 1760.00 by means of decreased selling price of their dairy animals due to failed conception. Hence, it was found that net income of the dairy farmers increased by Rs. 28,041.90 per dairy animal due to the adoption of progesterone impregnated vaginal sponge.

Relationship between independent and dependent variable regarding progesterone impregnated vaginal sponge

It can be concluded form the Table 6 that the present status of adoption of progesterone impregnated vaginal sponge by the dairy farmers was found to have a significant positive correlation at 1% level with the independent variables like land holding and dairy animal possession and change in net income due to adoption of technology by the dairy farmers. Also, the adoption behaviour of the dairy farmers was found to have a significant positive correlation with the independent variables like education, change in net income at 1% level whereas significant positive correlation at 5% level was noticed with independent variables like land holding and extension agency contact. Further, it can be inferred from Table 6 that there is a significant positive correlation at 1% level between the present status of adoption of progesterone impregnated vaginal sponge by the dairy farmers and their adoption behaviour which clearly defined the role of perceived attributes in adopting the progesterone impregnated vaginal sponge by the farmers. Valier *et al.* (2008), Adesina and Zinnah (1993), Palacpac *et al.* (2022) and Dibaba and Goshu (2019) also concluded that attributes of technologies were the most powerful predictor variables in determining the adoption decisions of the farmers.

CONCLUSION

Increasing the awareness among the stakeholders about the innovation in social media and other mass media channels is highly recommended for wider diffusion of technology. It can be concluded that perceived attributes of progesterone impregnated vaginal sponge technology was associated with adoption of the dairy farmers. Majority of the dairy farmers were in the medium level of adoption behaviour and they perceived that progesterone impregnated vaginal sponge was cheaper in price, exorbitantly profitable, time saving, situationally and culturally feasible, physically compatible, trialable, adoptable and the results are observable. The net income of the dairy farmers was increased by Rs. 28,041.90 per dairy animal. Hence, the government should make necessary arrangements to produce the vaginal sponge at cheaper price and ensure the availability of progesterone impregnated vaginal sponge in veterinary dispensaries, district co-operative milk unions and for the practicing veterinarians in order to reduce the incidence of anestrum and repeat breeding among the dairy animals and make the dairy enterprise as a profitable venture.

Table 4 Overall adoption behaviour regarding progesterone impregnated vaginal sponge

Sl. No	Categories	Frequency	Percentage	Mean & SD
1	Low	6	12%	
2	Medium	39	78%	8.78 ± 1.81
3	High	5	10%	

Table 5. Partial budgeting on adoption of progesterone impregnated vaginal sponge

Positive financial changes		Negative financial changes	
Added income (Rs)	29,894.00	Added costs (Rs)	867.50
Reduced costs (Rs)	775.40	Reduced income (Rs)	1760.00
Sub-total (A)	30,669.40	Sub- total (B)	2,627.50
		Change in net income (A – B)	**28,041.90**

Table 6. Relationship between independent and dependent variable regarding progesterone impregnated vaginal sponge

Independent variables	Present status of adoption	Adoption behaviour
1. Age	-0.149	-0.226
2. Education	0.196	0.380**
3. Land holding	0.406**	0.320*
4. Area under fodder cultivation	0.194	0.093
5. Primary occupation	0.104	-0.078
6. Experience in dairy farming	-0.069	-0.272
7. System of rearing dairy animals	0.086	-0.186
8. Dairy animal possession	0.433**	0.244
9. Extension agency contact	0.076	0.305*
10. Mass media exposure	0.083	0.246
11. Change in net income	0.631**	0.456**
12. Present status of adoption	1.000	0.679**
13. Adoption behaviour	0.679**	1.000

** *Correlation is significant at the 0.01 level*

* *Correlation is significant at the 0.05 level*

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