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## Profile of dairy farmers, the adopters of sex sorted semen technology: A study in Andhra Pradesh

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### Abstract

A study was carried out among the dairy farmers of Andhra Pradesh who adopted the advanced reproductive technology i.e. Sex Sorted Semen Technology (SSST) to assess their profile. An ex-post-facto exploratory research design was used for the study among dairy farmers with regard to sex sorted semen technology. Middle aged dairy farmers with graduation to secondary level of school education and with average herd size of five dairy animals adopted the innovation sex sorted semen technology. Farmers were found with medium experience in dairying and milk production. Nearly cent percent (98.55%) of farmers possessed medium to high level of innovativeness. However, it was observed that only 16 percent of farmers received training in the area of SSST. Farmers were seeking information mostly from progressive farmers, veterinary extension workers, News Papers and television which might be contributing towards medium knowledge possession by majority about sex sorted semen technology. Focus on the timely training and strengthening of farmer networks and enrichment of mass media plays a significant role in effective diffusion and adoption of this advanced reproductive technology i.e., sex sorted semen technology.

**Keywords:** Andhra Pradesh, dairy farmers, information seeking behaviour, profile, sex sorted semen technology

### Introduction

The total livestock population in India is 535.78 million (20<sup>th</sup> livestock census, 2019) and ranks first among the world's milk producing nations since 1998. This sustained growth leading to dairy development is mainly because of various scientific reproductive technology programmes undertaken by Government of India and dairy development organizations from past few decades. Among various scientific reproductive technologies, Artificial Insemination was first successfully applied to cattle in the early 1900s which has become one of the most important techniques for genetic improvement of farm animals (Johnson and Ruttan, 1997) [2]. Sex sorted semen technology which is the process of inseminating with desired calf sex semen is an innovative reproductive technology which is suggested to have a wider adoption and impact in the near future (Weigel, 2004; De Vries *et al.* 2008) [9, 8]. In India, Government of West Bengal organisation, Paschim Banga Go Sampad Bikash Sanstha (PBGSBG) installed high speed semen sorter or flow cytometer under Rashtriya Krishi Vikas Yojana (RKVY) at Frozen Semen Bull Station, Haringhata and first male calf Shreyas was born on 1st Jan 2011 by using sexed semen and after that, female calves were also successfully born using sex sorted semen technology. By application of sexed semen, female calves are ensured in about 90 percent of the cases in contrast to the 49 percent average frequency obtained with conventional semen. Johnson and Ruttan (1997) [2] also found these advanced reproductive technologies as the most significant factor contributing to farm productivity in the livestock sector. Farmer's adoption decision of innovative technologies is affected by a number of demographic and socio-economic factors such as age, education, farm size, experience etc.

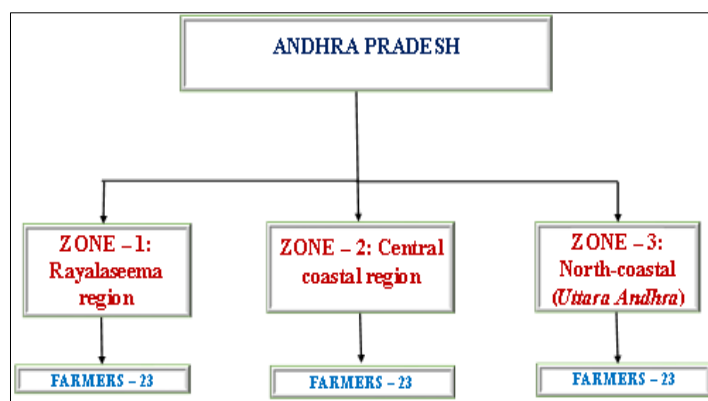
In Andhra Pradesh, the state Livestock Development Agency (APLDA) initiated the distribution of sexed semen to dairy farmers from 2017 onwards to all the 13 districts of Andhra Pradesh through Veterinary Dispensaries (VD), Rural Livestock Units (RLU) and Area veterinary Hospitals (AVH). In this regard, a study has been carried out to assess the profile of dairy farmers who adopted the innovative reproductive technology, sex sorted semen technology.

**Materials and Methods**

Stratified random sampling method was followed for the selection of the dairy farmers from all the three administrative zones of Andhra Pradesh (Andhra Pradesh Wikipedia) and from the three zones together, a total of 69 dairy farmers were selected with confidence level (90%) and Margin of error (10%). (Fig.1) from the areas where the sexed semen distribution took place the efforts were made to select an equal number of respondents from the three Zones of Andhra Pradesh. The data was collected through interview from the dairy farmers. Appropriate statistical procedures like frequency, percentage, mean and standard deviation were employed to analyze and interpret the data.

To study the socio-economic characteristics of dairy farmers; schedule on Age, Gender, Education, Social status, Experience in dairy farming (years), Dairy herd size, Milk production (lit/day), Trainings received, Information seeking behaviour, Innovativeness was prepared and grouped into different categories based on class intervals, mean and standard deviation mentioned in table 1 and 2.

The knowledge level of dairy farmers was also assessed by a schedule consisting of 29 thus, the dairy farmer could get a maximum score of 29 and a minimum score of 0 based on the knowledge possessed about the sex sorted semen technology.



**Fig 1:** Selection of Dairy Farmers and Veterinarians for the Study

**Results**

**Socio-economic profile of dairy farmers:** Majority of the dairy farmers in the study area (Table 1) were middle aged (Bhuva 2014, Harisha *et al.* 2015) [4, 10] and were male (Ingabire *et al.* 2018 and Deepa Narayana *et al.* 2015) [11, 7]. Most of the dairy farmers had education up to intermediate level (Kumari 2016) [13] and were from open category. The

study also indicated that majority of the respondents had medium level of experience (Kumari 2016) [13] and with medium milk production (Badodiya *et al.* 2017 and Chaurasiya *et al.* 2016) [3, 5]. However, majority of the farmers haven't receive any training in the area of advanced reproductive technologies.

**Table 1:** Profile of Dairy farmers adopted SSST (N=69)

Variables	Categories	Frequency (%)	Mean ± S. D
Age	Young age (22-38)	14 (20.29%)	
	Middle age (39-55)	48 (69.57%)	
	Old age (56-72)	07 (10.14%)	
Gender	Male	62 (89.85%)	
	Female	07 (10.15%)	
Education	Illiterate	07 (10.15%)	
	Primary education	03 (04.34%)	
	Middle school	06 (08.70%)	
	High school	16 (23.19%)	
	Intermediate	23 (33.33%)	
	Graduation	14 (20.29%)	
Social status	Open Category	40 (57.97%)	
	Backward Caste	25 (36.23%)	
	Scheduled Caste	02 (02.90%)	
	Scheduled Tribe	02 (02.90%)	
Dairy herd size	Small (2-12)	24 (34.78%)	
	Medium (13-23)	36 (52.17%)	
	Large (24-34)	09 (13.05%)	
Experience in dairy farming (Years)	Low level (<12.71)	09 (13.05%)	21.02 ± 8.31
	Medium level (12.71-29.33)	52 (75.36%)	
	High level (>29.33)	08 (11.59%)	
Milk production (lit/day)	Low level (<12)	06 (08.69%)	37.10 ± 25.25
	Medium level (12-62)	56 (81.16%)	
	High level (>62)	07 (10.15%)	
Trainings received	Received	11 (15.95%)	
	Not received	58 (84.05%)	

**Table 2:** Distribution of dairy farmers according to innovativeness and knowledge

Dairy Farmers (N=69)			
Character	Level	Frequency (%)	Mean $\pm$ S. D
Knowledge	Low level (<16.22)	15 (21.74%)	19.94 $\pm$ 3.72
	Medium level (16.22-23.66)	42 (60.87%)	
	High level (>23.66)	12 (17.39%)	
Innovativeness	Low level (<22.96)	01 (01.45%)	25.07 $\pm$ 2.11
	Medium level (22.96-27.18)	58 (84.06%)	
	High level (>27.18)	10 (14.49%)	

It's appreciable that more than 75 percent of dairy farmers had medium to high levels of knowledge about the advanced reproductive technology i.e. sex sorted semen technology and

almost cent percent of dairy farmers (99%) possess innovativeness (Table 2).

**Table 3:** Distribution of dairy farmers according to their information seeking behaviour

S.No	Information sources	Degree of contact Farmers (N=69)			
		Frequently	Occasionally	Never	Total
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
<b>A. Personal Localite</b>					
1.	Family members/relatives/ Friends	00 (00.00)	00 (00.00)	69 (100.00)	00 (00.00)
2.	Progressive farmers	45 (65.21)	04 (05.80)	20 (28.99)	69 (100.00)
3.	Milk cooperative society	00 (00.00)	00 (00.00)	69 (100.00)	00 (00.00)
<b>B. Personal Cosmopolite</b>					
1.	Extension Worker/Veterinarian	60 (86.96)	09 (13.04)	00 (00.00)	69 (100.00)
2.	Scientists	00 (00.00)	00 (00.00)	69 (100.00)	00 (00.00)
3.	NGOs	00 (00.00)	00 (00.00)	69 (100.00)	00 (00.00)
<b>C. Impersonal Cosmopolite</b>					
1.	Newspaper	60 (86.95)	04 (05.80)	05 (07.25)	69 (100.00)
2.	Radio	06 (08.69)	05 (07.25)	58 (84.06)	69 (100.00)
3.	Television	59 (85.51)	04 (05.80)	06 (08.69)	69 (100.00)
4.	Magazine	05 (07.25)	00 (00.00)	64 (92.75)	69 (100.00)
5.	Internet	03 (04.35)	01 (01.45)	65 (94.20)	69 (100.00)

Among the various personal *localite* channels (Table 3), the frequently used information sources were progressive farmers (65.21%), whereas, the frequently used personal cosmopolite channels by dairy farmers were extension worker/veterinarian (86.96%). The frequently used impersonal cosmopolite information sources by the dairy farmers were newspaper

(86.95%) and Television (85.51%). These findings are in accordance with Ali (2011)<sup>[1]</sup>, Hanumanaikar *et al.* (2011)<sup>[9]</sup>, Kavithaa *et al.* (2014)<sup>[14]</sup>, Chauhan *et al.* (2015)<sup>[6]</sup>, Ranjit Kumar *et al.* (2015)<sup>[16]</sup>, Nirmal Singh *et al.* (2016)<sup>[15]</sup>, Sabapara *et al.* (2016)<sup>[17]</sup> and Venkata Deekshit (2015)<sup>[18]</sup>.

## Discussion

1. The findings revealed that middle age group dairy farmers are mostly practicing sex sorted semen technology. Hence, trainings should be imparted to this age group so that they can act as catalysts in motivating other dairy farmers also to take up this technology. As most of the farmers were middle aged and hence the medium level of dairy farming experience.
2. Majority of the respondents were male. Women also need to be encouraged through exposure to the innovative reproductive technologies to go for adoption.
3. In the study area, majority of the dairy farmers had intermediate education; hence, government agencies should try to educate other illiterate farmers through education programmes on advanced reproductive technologies like A.I, sex sorted semen technology by focusing on their advantages.
4. Most of the farmers in the study area belonged to open category (OC), so, there is a need to encourage farmers from other categories also to take up sex sorted semen technology by providing incentives.
5. Majority of the respondents in the study area were having medium level of innovativeness which is indicating the favourable situation for adoption of innovations.
6. The medium level of milk production might be due to possession of small and medium dairy herd sizes by majority of farmers and still the whole herd not being covered with new insemination techniques.
7. Majority of the dairy farmers didn't receive trainings in the areas of advanced reproductive technologies. Hence, there exists a need towards providing trainings to the dairy farmers related to advanced reproductive technologies.
8. The channels which are most frequently used by the dairy farmers like progressive farmers, veterinarians and mass media like newspapers and television need to be enriched with the more information so that farmers will be benefitted with the timely information.
9. In the study area, most of the dairy farmers had medium level of knowledge regarding sex sorted semen technology. Hence, farmers should be encouraged to utilise the information sources regularly to update and improve upon their knowledge for better dairy farming.

## Conclusion

Innovations which directly benefit farmers will always show appreciable adoption among the farming community. However, farmers' personal and psychological characteristics influence the adoption behaviour of farmers. Hence, farmers should be reached through a combination of extension teaching methods in order to create interest in the innovation which leads to enthusiasm about the technology and thereby better knowledge thus leading to adoption.

## Conflict of Interest

I did not face any issue during my research work in all aspects. As the research topic is very new and interesting no chance of conflict been given chance.

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