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Perception of dairy farmers towards attributes of sex sorted semen technology

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Abstract
An ex-post-facto exploratory research study was carried out in the state of Andhra Pradesh with the specific objective to know the perception of dairy farmers towards attributes of sex sorted semen technology. These attributes include relative advantage, compatibility, complexity, trialability, observability and predictability. It was found that majority of the dairy farmers (69.57%) in the study area had medium level of favourable perception towards sex sorted semen technology. This might be due to variations in socio-economic characteristics of the respondents across the study area. The study thus concludes that, attributes of sex sorted semen technology as perceived by dairy farmers must be duly considered for effective diffusion and adoption leading to improved quality and productivity in Indian dairy sector achieving sustainability.

Keywords: Andhra Pradesh, attributes, dairy farmers, perception, sex sorted semen technology, sustainability

Introduction
Today, India is the world's largest producer of milk, with 22 per cent of global production which is mainly due to the adoption of innovative technologies that are being diffused for adoption by the farmers through different channels. In recent past, the advanced reproductive technology i.e., sex sorted semen technology was diffusing at appreciable rate throughout India as its benefits were visible over the years in other countries. sex sorted semen technology comprises the separation of sperm into male/Y bearing and female/X bearing sperm cells and then artificially inseminating female with the desired sexed-sorted semen. Adoption of these advanced reproductive technologies has significant economic value in dairy performance (De Vries *et al.* 2008; Seidel 2014) [4, 11]. Farmer's adoption decision of these innovative technologies is affected by a number of socio-economic factors such as age, education, farm size, experience etc. Change-prone and progressive farmers are always on a look out for new technologies, yet on the contrary, many farmers show reluctance to change the age-old practices. There is steadily increasing amount of evidence which indicate that farmers do not adopt an innovation which they perceive as incompatible with their existing values. Many other attributes such as relative-advantage, complexity, compatibility, observability, trial ability too considerably affect the rate of adoption. It is the receiver's perception of the attributes of innovation that affect the rate of adoption. This study about the sex sorted semen technology in terms of its attributes as perceived by dairy farmers could help to further understand the dynamics of the status of farmers' technology adoption.

Materials and Methods
Stratified random sampling method was followed for the selection of the respondents. All the three administrative zones (Rayalaseema region, central coastal region, North-coastal region) of Andhra Pradesh (Fig. 1) were selected for the study and from the three zones together, 69 dairy farmers were selected (Fig. 2) in areas where the sexed semen distribution took place through random sampling with confidence level (90%) and Margin of error (10%). 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.

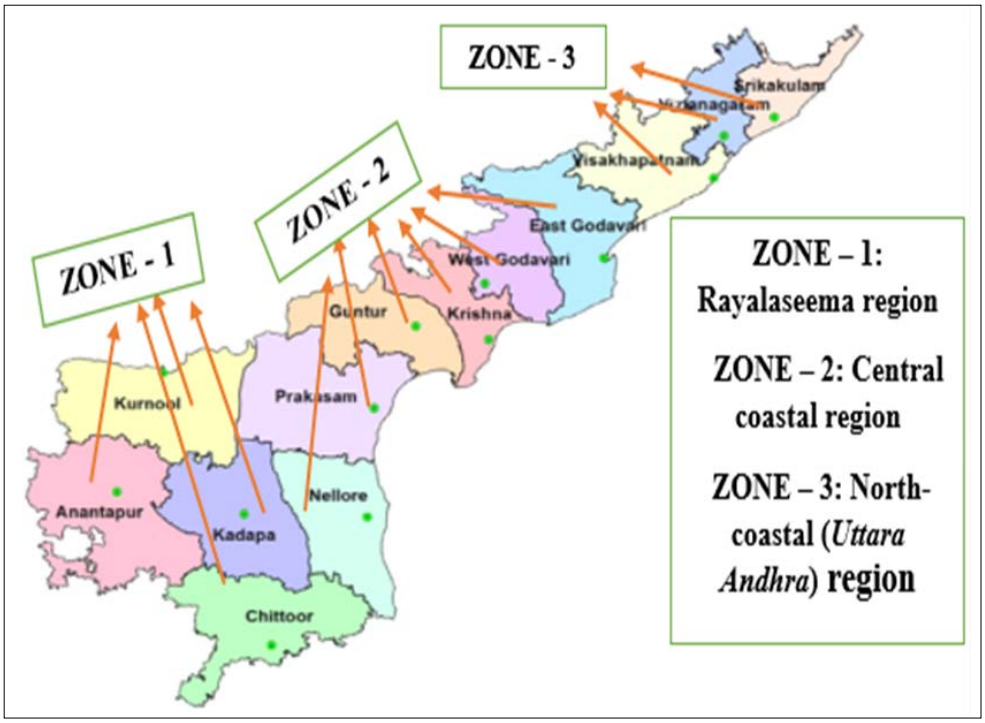

Fig 1: Map of Andhra Pradesh showing the three administrative zones selected for the study

To study the findings related to perception of dairy farmers towards sex sorted semen technology in terms of its attributes mentioned above, a schedule consisting of Agree/Disagree type of statements arranged in "26" individual items was developed. The schedule possess both positive and negative statements with respective scores 1, 0 for Agree and Disagree to the positive items and for negative items the reverse way of scoring was followed. Thus, an individual could get a maximum of "26" and minimum score of "0". Based on the scores obtained, perception of dairy farmers were categorized into low, medium and high level groups based on mean and standard deviation. The data collected from the respondents were coded, tabulated, analysed and presented in the form of Tables. The inferences were drawn in light of the results obtained, keeping in view the objectives laid in the study.

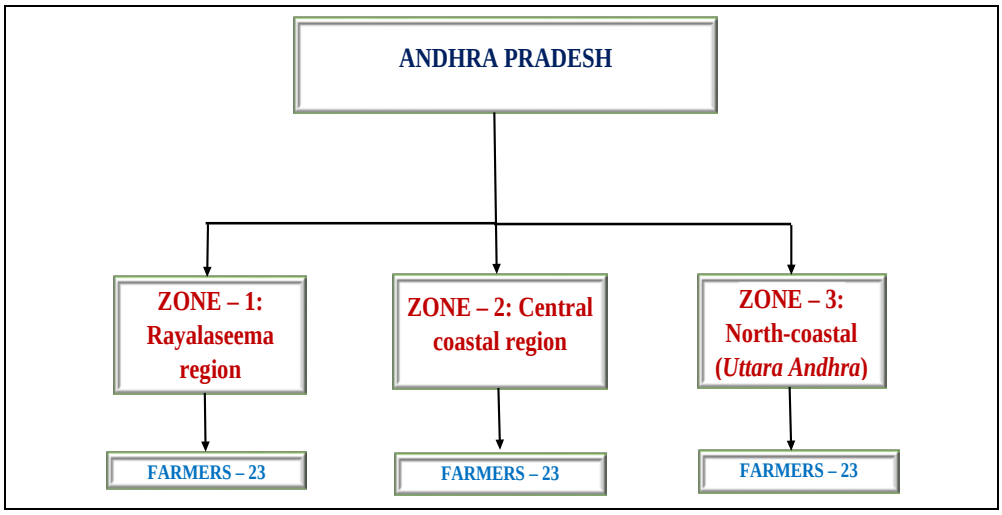

Fig 2: Selection of dairy farmers for the study

Results

Perception of dairy farmers towards sex sorted semen technology in terms of its attributes

As per Table 1, The study reported that three-fourth of dairy farmers (69.56%) had medium level of perception towards sex sorted semen technology in terms of its attributes indicating favourable situation for the adoption of an innovation (Naidu 2021, Triveni *et al.* 2014 and Rana *et al.* 2021) [7, 14, 9].

Table 1: Distribution of dairy farmers according to their level of perception towards sex sorted semen technology in terms of its attributes

S. No.	Category	Dairy farmers (N=69)	
		F	%
1.	Low level of perception (21.94)	09	13.04
2.	Medium level of perception (13.62-21.94)	48	69.56
3.	High level of perception (> 21.94)	12	17.40
	Total	69	100.00

Mean: 17.78
Standard Deviation: 4.16

With regard to relative advantage of sex sorted semen technology depicted in Table 2, though the cost of sex sorted semen was felt as expensive, the other factors mentioned in Table 1 might have made the dairy farmers to perceive the sex sorted semen technology as more relatively advantageous than the conventional semen (Balzani *et al.* 2020, Witjaksono *et al.* 2021 and Franks *et al.* 2003) [2, 15, 5].

Table 2 reveals that all dairy farmers perceived the sex sorted semen technology was in compatibility with the traditions, values and beliefs and also the needs and interests of dairy farmers (Janaka 2017) [6]. Need of female animal and the associated returns like sustainable production might made the dairy farmers to perceive sex sorted semen technology as compatible with the farming community (Seth *et al.* 2016) [12].

Dairy farmers perceived the sex sorted semen technology as complex as well as simple more or less on equal percentage basis as shown in Table 2 (Telford *et al.* 2003) [13]. Hence educational programmes should focus on massive awareness and knowledge building of farmers with regard to sex sorted semen technology.

Table 3 discusses that majority of the dairy farmers expressed that the benefits of sex sorted semen technology were observable and can try on a limited basis (Cabrera 2009) [3]. It was also found from the results that sex sorted semen technology is highly predictive (Norman *et al.* 2010) [8].

Table 2: Perceived attributes of dairy farmers on sex sorted semen technology in terms of relative advantage, compatibility and complexity

Perceived attributes		Farmers (N=69)		
		Frequency (F)	Percentage (%)	Total Frequency (%)
A. Relative advantage				
1. Sex sorted semen technology have high chance of getting a female progeny compared with conventional semen.	Agree	57	82.61	69(100.00)
	Disagree	12	17.39	
2. Increase of productive animals	Yes	60	86.96	69(100.00)
	No	09	13.04	
3. Increased income/Assured income	Yes	59	85.51	69(100.00)
	No	10	14.49	
4. Farmers viewed sex sorted semen technology more positive/advantageous than conventional semen	Yes	55	79.71	69(100.00)
	No	14	20.29	
5. High quality female progeny can be achieved	Agree	50	72.46	69(100.00)
	Disagree	19	27.54	
6. Government officials actively involved in sex sorted semen technology implementation by dairy farmers	Agree	42	60.87	69(100.00)
	Disagree	27	39.13	
7. Sex sorted semen technology changed the profitability of the farm	Agree	68	98.55	69(100.00)
	Disagree	01	01.45	
B. Complexity				
1. Information and services of sex sorted semen technology available to farmer	Easy	61	88.41	69(100.00)
	Difficult	08	11.59	
2. Since A.I has only 50% success rate, how can farmers trust another technology which has even less success rate	Agree	69	100.00	69(100.00)
	Disagree	00	00.00	
3. Sex sorted semen technology involves skill and knowledge in understanding	Agree	65	94.20	69(100.00)
	Disagree	04	05.80	
4. Describe your understanding of sex sorted semen technology	Easy	52	75.36	69(100.00)
	Difficult	17	24.64	
C. Compatability				
1. Need of female animal over male animal.	Agree	69	100.00	69(100.00)
	Disagree	00	00.00	
2. Male calf born is of very less value to farmer	Agree	69	100.00	69(100.00)
	Disagree	00	00.00	
3. Sex sorted semen technology can fit to personal beliefs/values/norms of the farmer	Agree	60	86.96	69(100.00)
	Disagree	09	13.04	
4. Sustainability in production is achieved	Agree	67	97.10	69(100.00)
	Disagree	02	02.90	
5. Sex sorted semen technology socially accepTable by all the people in a social system	Agree	57	82.61	69(100.00)
	Disagree	12	17.39	
6. Sex sorted semen technology will meet the needs and interests of wide range of farmers	Agree	61	88.41	69(100.00)
	Disagree	08	11.59	

Table 3: Perceived attributes of dairy farmers on sex sorted semen technology in terms of trailability, observability and predictability

Perceived attributes		Farmers (N=69)		
		Frequency (F)	Percentage (%)	Total Frequency (%)
A. Trailability				
1. Sex sorted semen technology can be tried on few animals initially	Agree	69	100.00	69(100.00)
	Disagree	00	00.00	
2. Same as A.I with respect to precautions and care to be taken	Agree	69	100.00	69(100.00)
	Disagree	00	00.00	
3. The high cost of sex sorted semen may burden the farmers if	Agree	69	100.00	69(100.00)

animal doesn't conceive in fewer attempts	Disagree	00	00.00	
B. Observability				
1. Benefits of sex sorted semen technology in the society are observable	Yes	60	86.96	69(100.00)
	No	09	13.04	
1. Sex sorted semen technology has successfully diffused into society	Agree	53	76.81	69(100.00)
	Disagree	16	23.19	
2. Sex sorted semen technology has resulted in increase of productive animals (production)	Observable	67	97.10	69(100.00)
	Not observable	02	02.90	
C. Predictability				
1. Sex sorted semen technology is highly predictive.	Agree	69	100.00	69(100.00)
	Disagree	00	00.00	
2. Sex sorted semen technology can lead to huge demand/impact in near future	Agree	69	100.00	69(100.00)
	Disagree	00	00.00	
3. Improves socio-economic status of farmer and farm sustainability in future	Agree	69	100.00	69(100.00)
	Disagree	00	00.00	

Discussion

As per the findings of the study, following are presented for discussion

1. Keeping in view of the raising demand for sex sorted semen technology, there is a need to encourage farmer by making them aware of technology.
2. There exists a need towards providing trainings to the dairy farmers related to advanced
3. Reproductive technologies.
4. On farmer's feedback, Incentives need to be provided to the farmers to bear the high cost of sex sorted semen.

Conclusion

The study thus concludes that, attributes of sex sorted semen technology as perceived by dairy farmers must be duly considered for effective diffusion and adoption leading to improved quality and productivity in Indian dairy sector achieving sustainability (Rathod P and Chander M 2016) [12].

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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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