Original Research Article

PERCEPTION OF VETERINARIANS TOWARDS CONSEQUENCESANDSUITABILITYOFSEXSORTEDSEMENTECHNOLOGY

Abstract

An ex-post-facto exploratory research study was carried out in the state of Andhra Pradeshwith the specific objective to know the perception ofthe veterinarians towards consequences andsuitabilityofsex-sortedsementechnology.TheseconsequencesincludeDesirablevsUndesirable, Anticipated vs Unanticipated, Direct vs Indirect and in addition suitability wasalso assessed in terms of sustainability, compatibility, socio-cultural and economic aspects.It was found that three-fourths of the veterinarians (76.67%) had a medium level of perceptiontowards sex-sorted semen technology in terms of its consequences and suitability to dairyfarmers.Thestudythus,revealsthatinnovationsthatarecompatibleandinaccordancewithfarmers'situationswillbeadoptedfollowingitsdiffusion.Consequencesandsuitabilityalsoneedto be taken careofwhile diffusinganyinnovation amongthefarmingcommunity.

KEYWORDS: Consequences,dairyfarmers,perception,sex-sortedsementechnology,Veterinarians,AndhraPradesh

INTRODUCTION

Today, India is the world's largest producer of milk, with 22 percent of global productionwhichismainlyduetotheadoptionofinnovativetechnologiesthatarebeingdiffusedforadoptionbythefarmersthroughdifferentchannels.Inthe recentpast,advancedreproductivetechnologyi.e., sex-sorted semen technology was diffusing at

anappreciable rate throughout India as itsbenefitswerevisibleovertheyearsinothercountries.Sex-sortedsementechnologycomprisesthe separation of sperm into male/Y bearing and female/X bearing sperm cells and thenartificiallyinseminatingfemalewiththedesiredsexed-sortedsemen.Adoptionoftheseadvancedreproductivetechnologieshassignificanteconomicvalue indairyperformance(DeVries*etal.*2008;Seidel2014).Farmer'sadoptiondecisionoftheseinnovativetechnologiesisaffectedbyanumberofdemographicandsocio-economicfactorssuchasage,education,farmsize, experience etc. The field veterinarians who are the middle level extension functionariesalso play a major role in the diffusion and adoption of an innovation among the farmingcommunity and also their perception and knowledge about an innovation play a major role ineducatingandmotivatingthefarmersintakingupthatparticularinnovation.Thus,theperception studies of veterinarians about innovations help to identify the barriers that mayface by the farmers.In this regard the study has been taken up in assessing the consequencesand suitabilityof sex-sorted semen technologyto dairyfarmers.

MATERIALSANDMETHODS

A Stratified random sampling method was followed for the selection of the respondents. All three administrative zones (Rayalseema region, central coastal region, North-coastal (*UttaraAndhra*) region) of Andhra Pradesh were selected for the study and from the three zonestogether, a total of 120 veterinarians were selected through random sampling with aconfidencelevel (90%) and Margin of error (10%). The data was collected from the veterinarians byadministering questionnaires through printed and digital forms (Google Forms). Appropriatestatistical procedures like frequency, percentage, mean and standard deviation were employedtoanalyzeand interpret thedata.

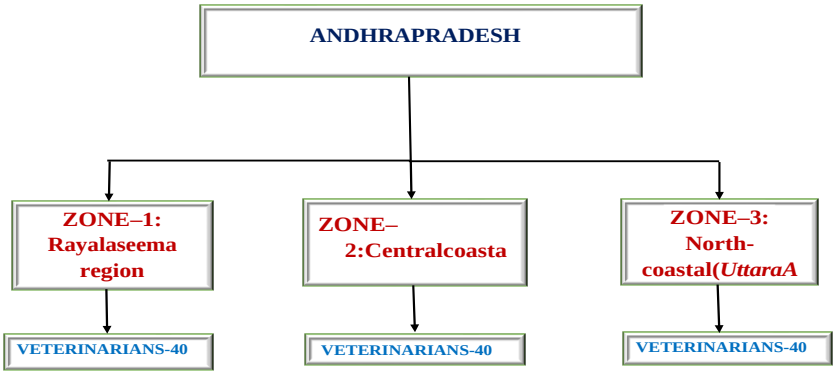
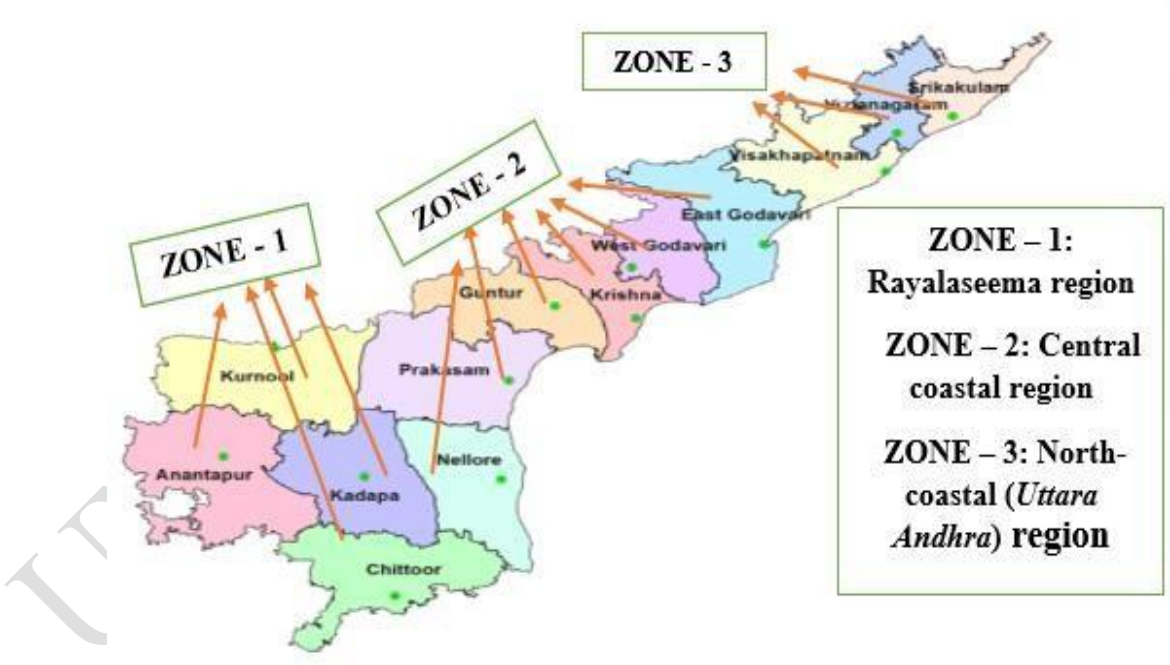


Fig.1selectionof veterinariansforthestudy

Tostudythefindingsrelatedtotheperceptionofveterinarianstowardssex-sortedsementechnology in terms of its consequences and suitability to dairy farmers mentioned above, aschedule was developed consisting of Agree/Disagree type of statements arranged in "18"individual items. The schedule possesses both positive and negative statements with respectivescores1,0forAgreeandDisagreetothepositiveitemsandfornegativeitemsthereverseway ofscoringwasfollowed.Thus,anindividualcouldgetamaximumof"18"andaminimumscoreof "0". Based on the scores obtained, perceptions of dairy farmers were categorized into low,mediumandhigh-levelgroupsbasedonmeanandstandarddeviation.Thedatacollected fromthe respondents were coded, tabulated, analyzed and presented in the form of tables. Theinferences were drawn in light of the results obtained, keeping in view the objectives laid inthestudy.

Fig.2Mapof AndhraPradeshshowingthethreeadministrativezonesselectedforthe study



RESULTS AND DISCUSSION:

The results from the study (table 1) indicate that 76.67 percent of veterinarians had amedium level of perception followed by high (13.33%) and low levels (10%) of perception towards sex-sorted semen technology in terms of its consequences and suitability to dairy farmers.

Table 1: Distribution of veterinarians according to their level of perception towards sex sorted semen technology in terms of its consequences and suitability

S.No.	Category	Veterinarians (N=120)	
		F	%
1.	Low level of perception (<9.95)	12	10.00
2.	Medium level of perception (9.95-16.71)	92	76.67
3.	High level of perception (>16.71)	16	13.33
	Total	120	100.00

Mean: 13.33 **Standard Deviation: 3.3**

Outofthevariousconsequencesexpressedbyveterinarianswithrespecttosex-sortedsementechnology, though there are desirable consequences like more female calves and improvedgeneticdistributionwhichfulfillstheneedofimprovingmilkproduction(Bhalakiya*etal*.2018and Cooke *et al*. 2014), there is need to improve the skills and manpower to further facilitatethe adoption of this technology (Khanal et al. 2010 and Kumar et al. 2016). This may alsoreducethecost and improvefertilityrate depicted from table 2.

As per the results cited in table 3, Veterinarians were of the opinion that the innovativesex-sorted semen technology willdefinitelybringrevolutionarychangeslikethatofArtificialInsemination(A.I)asitisthemosteffi cient way to increase the female population leading to farm sustainability (Patel and Jethva2019). In addition, sex-sorted semen technology offers advantages in terms of meeting thescope of increasing milk production, having the potential to produce a large number of heifers in aherd as compared to conventional semen and thereby resources spent on female

calves givesbetter returns than on male calf (Balzani *et al*. 2020 and Campanile *et al*. 2011). Hence, thistechnology is more suitable for Indian farmers who were mostly small and marginal farmers andtherebycompatiblewithIndian farmingcommunity(Malloryet al. 2013).

It was observed from the study that the need for female animal over male animal is achievedthroughsex-sortedsementechnologywhichwasmainlydevelopedtohavefarmer'schoicei.e.,femalecalf (Herbst *et al*.2009 and Joshi*et al.* 2021).

Table2:Consequencesofsex-sortedsementechnologyasperceivedby veterinarians

Consequences		**Veterinarians(N=120)**		
		Frequency (F)	**Percentage (%)**	**TotalFrequency (%)**
A.DesirablevsUndesirableconsequences				
1.Production ofonlyfemalecalves is muchdesirable	**Agree**	90	75.00	120 (100.00)
	Disagree	30	25.00	
2.Sex-sorted sementechnologyoffers greatergeneticdistribution	**Agree**	73	60.83	120 (100.00)
	Disagree	47	39.17	
	Agree	56	46.67	

3.Sex-sorted sementechnologynot suitabletoIndianconditionswhichismostlymixed farming	**Disagree**	64	53.33	120 (100.00)
4.Lackoftrainedtechnicians affecting sortingandefficiencyaccuracy	**Agree**	110	91.67	120 (100.00)
	Disagree	10	08.33	
1.High costs and low fertility havelimitedtheuseofsex-sortedsemen technology	**Agree**	111	92.50	120 (100.00)
	Disagree	09	07.50	
B.Anticipatedvs Unanticipatedconsequences				
1.Sex-sorted semen isarevolutionary technologyforIndian cattlebreeding	**Agree**	100	83.33	120 (100.00)
	Disagree	20	16.67	
2.Well established policies have apositiveimpactonthe adoptionrateof sexsorted semen technology	**Agree**	105	87.50	120 (100.00)
	Disagree	15	12.50	
3.Farmersacceptanceon sex-sorted semen technologyis still improving	**Agree**	106	88.33	120 (100.00)
	Disagree	14	11.67	
4.There is a need for standardization ofsex-sorted semen technologyin Indianconditions	**Agree**	108	90.00	120 (100.00)
	Disagree	12	10.00	
C.DirectvsIndirectconsequences				
1.Changeinthesocial statusoffarmers	**Agree**	79	65.83	120 (100.00)
	Disagree	41	34.17	
2.Changeintheself-sufficiencyof farmers	**Agree**	92	76.67	120 (100.00)
	Disagree	28	23.33	

3.Moredemandforgoodqualitysex-sortedsemen-borncalvesinthemarket	**Agree**	89	74.17	120 (100.00)
	Disagree	31	25.83	

Table3:Suitabilityof Sex-sortedsementechnology asperceivedbyveterinarians

Suitability		**Veterinarians(N=120)**		
		Frequency (F)	**Percentage (%)**	**Total Frequency (%)**
A.EconomicSuitability				
1.Sex-sorted semen technology has thepotential to produce a large number ofheifersinaherdascomparedto usingconventional semen	**Agree**	90	75.00	120 (100.00)
	Disagree	30	25.00	
2.Sex-sorted semen technology meetsthescopeofincreasingmilk production	**Agree**	103	85.83	120 (100.00)
	Disagree	17	14.17	
3. Resourcesspentonfemale calf givesbetterreturnsthanonmalecalf	**Agree**	107	89.17	120 (100.00)
	Disagree	13	10.83	
B.Sustainability				
1.Sex-sorted semen technology is themostefficientwaytoincreasefemal epopulationleadingtofarm sustainability	**Agree**	111	92.50	120 (100.00)
	Disagree	09	07.50	
C.Socio-culturalsuitability				

1.Useof sex-sorted semen will not have an effect on the socialvalues/culture/normsofthefarmer	**Agree**	76	63.33	120 (100.00)
	Disagree	44	36.67	
D.Compatabilitywithneeds				
1.Needforfemaleanimalovermale animalisachievedthroughsex-sorted sementechnology	**Agree**	109	90.83	120 (100.00)
	Disagree	11	09.17	

CONCLUSION

Sex-sortedsementechnologyisrelativelynewerandstilldiffusingtechnologyondairyfarmsand is suggested to have a wider adoption and impact in the near future (Weigel, 2004; DeVries *et al.* 2008). Thus, the study reveals that innovations that are compatible and inaccordancewithfarmers'situationswillbeadoptedfollowingitsdiffusion.Consequencesandsuitability also need to be taken care of while diffusing any innovation among the farmingcommunity(Bhuva2014).

Highlights:

- StateDepartmentofAnimalHusbandryhastoputmoreeffortsintrainingallveterinariansto servethefarmingcommunityin timeto enhancelivestock production

REFERENCES

BalzaniA,DoAmaralC AVandHanlon A2020.Aperspectiveontheuseofsexedsementoreduce the number of surplus male dairy calves in Ireland: A pilot study. *Frontiers inVeterinaryScience, 7*.

Bhalakiya,Haque,Patel,Chaudhari,Patel,MadhavatarandKumarR2018.Spermsexingandits application in livestock sector. *International Journal of Current Microbiology andAppliedScience, 7*, 259-272.

Bhuva R M 2014. Consequences of Scientific Management of Pregnant Dams and Calves forStrengthening Livelihood among Livestock Beneficiaries of RKVY Project (*DoctoralDissertation,ExtensionEducationdept.,NMcollegeofAgriculture,Navsariagriculturaluniversity, Navsari).*

CampanileG,GasparriniB,VecchioD,NegliaG,SenatoreEM,BellaAandZicarelliL2011.PregnancyratesfollowingAIwithsexedsemeninMediterraneanItalianbuffaloheifers(Bubalusbubalis). *Theriogenology*, *76*(3), 500-506.

Cooke R F, Bohnert D W, Cappellozza B I, Marques R S, DelCurto T and Mueller C J 2014.Incorporationofsexedsemenintoreproductivemanagementofcow–calfoperations.*LivestockScience,163, 165-171*.

De Vries A, Overton M, Fetrow J, Leslie K, Rogers G et al., 2008. Exploring the impact ofsexedsemenonthestructureofthedairyindustry. JournalofDairyScience,91(2):47-856.

HerbstBK,AndersonDP,OutlawJL,RichardsonJWandBilbyT2009.TheEffectsofSex-SortedSemen on Southern DairyFarms(No. 1369-2016-108678).

Joshi, S., Bhave, K., Potdar, V., Gaundare, Y., Punde, N., Shirsath, T., & Swaminathan, M.(2021). Performance of sex sorted semen under Indian Small Holder Dairy FarmingSystems.*Int. J. Curr. Microbial. App. Sci*, *10*(02),1335-1343.

Khanal A R 2010. Adoption of Breeding Technologies in the US Dairy Industry and theirinfluencesonFarm Profitability.

Kumar A, Vineeth M R, Sinha R, Singh R K, Thakur A and Gupta S K 2016. Current status,scopeandconstraintsofsexedsemen-AnIndianperspective.*AgriculturalReviews*,*37*(3), 240-244.

MalloryDA,LockSL,WoodsDC,PoockSEandPattersonDJ2013.Hottopic:Comparisonofsex-sortedandconventionalsemenwithinafixed-timeartificialinseminationprotocoldesigned fordairyheifers.*Journal of dairyscience*, *96*(2), 854-856.

Naidu Baadireddy S 2017. Status of Organic Dairy Farming-An Exploratory Study in AndhraPradesh(*DoctoralDissertation,SriVenkateswaraVeterinaryUniversityTirupati-517*
502.(Ap)India).

PatelSBandJethva PC2019.Useof SexedSemeninIndianDairy Cattle:ACaseStudy.*Indian Journalof Veterinary Sciences&Biotechnology*, *14*(3).

Weigel K A 2004. Exploring the role of sexed semen in dairy production systems. *Journal ofDairyScience, 87*, E120-E130