Table 2: Livestock farmer's perceived availability of various SDAH livestock services

S. No.	Type of services	Livestock farmers (N= 120)		
		Always	Some	Never
A.	**Breeding services**			
1.	Artificial insemination	75.00	18.30	6.70
2.	Pregnancy diagnosis	75.80	18.30	5.80
B.	**Diagnostic services**			
1.	Laboratory diagnosis	2.50	50.80	46.70
2.	Post mortem	46.70	33.30	20.00
3.	Radiography	0 (0)	20.80	79.20
C	**Prophylactic services**			
1.	Deworming	76.70	20.00	3.30
2.	Vaccination	68.30	26.70	5.00
D.	**Curative services**			
1.	Medical treatment	73.30	24.20	2.50
2.	Minor surgical treatment	42.50	30.00	27.50
3.	Major surgical treatment	2.50	14.20	83.30
4.	Gynecological&Obstetrical treatment	60.80	19.20	20.00
E.	**Miscellaneous services**			
1.	Livestock advisory services	57.50	5.80	30.80
2.	Distribution of fodder seedlings	0 00	0.00	100
3.	Supply of publications	00	0.8	99.20
4.	Issue of health certificates	32.50	50.80	16.70
5.	Issue of post-mortem certificates	44.20	46.70	9.20

Table 3: Distribution of livestock farmers according to their perceived effectiveness on livestock services of SDAH

S. No.	Category	Livestock farmers (N=120)	
		Frequency	Percentage
1.	Poor (14- 20)	6	5
2.	Average (20- 26)	61	50.8
3.	Excellent (26- 32)	53	44.2

Table 4: Service wise perceived effectiveness of the livestock farmers

S. No.	Type of services	Livestock farmers (N = 120)				
		Excellent	Above average	Average	Below average	Poor
A.	**Breeding services**					
1.	Artificial insemination	5.00	5.00	68.30	21.70	0.00
2.	Pregnancy diagnosis	7.50	23.30	44.20	24.20	0.80
B.	**Diagnostic services**					
1.	Laboratory diagnosis	0.00	0.00	26.70	51.70	21.70
2.	Post-mortem	13.30	41.70	29.20	5.80	10.00
3.	Radiography	0.00	0.00	0.80	28.30	70.80
C	**Prophylactic services**					
1.	Deworming	21.50	10.80	55.40	8.30	3.30
2.	Vaccination	19.20	10.80	35.00	34.20	0.80
D.	**Curative Services**					
1.	Medical treatment	15.80	30.80	53.30	0.00	0.00
2.	Minor surgical treatment	6.70	16.70	45.80	20.00	10.80
3.	Major surgical treatment	0.80	5.80	8.30	37.50	47.50
4.	Gynaecologicaland Obstetricaltreatment	5.80	11.70	77.50	2.50	2.50
E.	**Miscellaneous services**					
1.	Livestock advisory services	0.80	0.00	70.80	11.70	16.70
2.	Distribution of fodder seedlings	0.00	0.00	0.80	4.20	95.00
3.	Supply of publications	0.00	0.00	0.80	26.70	72.50
4.	Issue of health certificates	5.80	0.80	57.50	5.80	30.80
5.	Issue of post-mortem certificates	9.20	4.20	51.70	12.50	22.50

Table 5: Distribution of livestock farmers according to their satisfaction towards livestock services of SDAH

S. No.	Category	Livestock farmers (N=120)	
		Frequency	Percentage
1.	Low satisfaction (3-7)	16	13.30
2.	Medium satisfaction (7-11)	96	80.00
3.	High satisfaction (11- 15)	8	6.70

Table 6: Service wise level of satisfaction towards livestock services

S. No	Types of services	Livestock Farmers (N= 120)	
		Satisfied	Not satisfied
A.	**Breeding services**		
1.	Artificial insemination	45.80	54.20
2.	Pregnancy diagnosis	95.80	4.20
B.	**Diagnostic services**		
1.	Laboratory diagnosis	22.30	77.50
2.	Post mortem	80.80	19.20
3.	Radiography	23.30	76.70
C.	**Prophylactic services**		
1.	Deworming	96.70	3.30
2.	Vaccination	90.00	10.00
D.	**Curative services**		
1.	Medical treatment	98.30	1.70
2.	Minor surgical treatment	65.80	34.20
3.	Major surgical treatment	5.80	94.20
4.	Gynecological &obstetrical treatment	95.00	5.00
E.	**Miscellaneous services**		
1.	Livestock advisory services	70.80	29.20
2.	Distribution of fodder seedlings	0 (0)	100
3.	Supply of publications	.80	99.20
4.	Issue of health certificates	50.00	50.00
5.	Issue of post- mortem certificates	87.50	12.50

Note: Figures indicate the percentage

CALPI, (2005)*Sustainable livelihood through small ruminant production: Critical issues and approach*. FAO, pp. 19.

Davidson, A.P. and Ahmed, M. (2002) *The J. Agr. Edu. and Ext.* **8**(3): 117-126.

GOI (2012) *Report of The Working Group on Animal Husbandry & Dairying 12th Five Year Plan 2012-17*; Executive summary and major recommendations, Planning commission, New Delhi.

GOI (2013) National Livestock Policy, Ministry of Agriculture, Department of Animal Husbandry, Dairying & Fisheries

GOR (2012) Rajasthan state Livestock development Policy, State Department of Animal Husbandry, Dairying and Fishery, Government of Rajasthan.

http://www.fao.org/wairdocs/lead/ae761e/ae761e00.htm#top.

Kumar, S.R. *et al.* (2006) *Indian J. Ani. Res.* **40**: 143-146.

Linder-Pelz, S. (1982) *Int. J. Health Care Assurance.***8**(6): 32.

M. Jothilakshmi, *et al.* (2011) *Asian J. Agri. Res.***5**: 98-108.

N.G. Hegde, working paper for discussion of the sub-group for xii five year plan .

Parthasarathy, R.P. and Birthal, P.S. (2002) Crop livestock systems in India: Research and policy issues. Policy Brief No. 1, Strategic Assessments and Development Pathways for Agriculture in the Semi-Arid Tropics, No. 1, pp: 14 http://oar.icrisat.org/4503/.

Ravikumar, S. (2007) *Livestock Service delivery by state department of Animal Husbandry in Andhra Pradesh- A critical analysis*. Ph.D Thesis, Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh.

ECONOMIC LOSSES DUE TO *PESTE DES PETITS RUMINANTS* (PPR) DISEASE IN GOATS: A POST OUTBREAK SAMPLE STUDY IN AURAIYA DISTRICT OF UTTAR PRADESH

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ABSTRACT

Data collected from 20 PPR affected farm households (HHs) of Jaganpur village of Auraiya district of Uttar Pradesh where outbreak of *Peste des petits ruminants* (PPR) disease was reported. The findings from the household survey indicated that out of total households (210) in the village, about 85% households (HHs) reared goats with an average flock size of five goats. However, study HHs reared 266 goats with an average flock size of 13. Majority of the HHs (70%) reared goats under extensive management system. The average age of the respondents was 40 years and average family size was of 6. About 35% goat farmers were landless and most of goat farmers belonged to schedule cast social group. The contribution of goats to family income was about 17%. The overall incidence rate was 57.52% however, the rate was found slightly higher in young stock than adults. Similarly, mortality rate in goats in study households was 42%. It was high due to delay in diagnosis and unavailability of veterinary services during the outbreak, as revealed by the goat farmers. Economic loss due to mortality was estimated to be Rs. 12320 per HH. Total morbidity loss due to reduction in yield, weight loss and reduction in market value was Rs.1567. The opportunity cost which include expenses on veterinary care, extra labour and other charges was estimated to be Rs. 269. The total economic loss due to disease was Rs. 14156.00 (Rs.1064.36 per goat). Unavailability of vaccines, medicines, timely veterinary services, high cost medicines and poor knowledge of diseases and their symptoms were to be found major constraints. Study suggests that there is need to organize capacity strengthening programmes on important goat diseases and their vaccination schedule.

***Key words*:** PPR, mortality, opportunity cost, constraints

Introduction

Peste des petits ruminants (PPR) is an acute febrile viral disease of small ruminants (Singh *et al.,* 2004). This disease is endemic in India and considered to be a major constrain in the development of goat industry due to high morbidity (50-90%) and case fatality (50-85%) rates (PDADMAS, 2011). Up to 90% of the sheep and goats on a farm may die within few days which have a severe economic impact (Anderson and McKay, 1994; Shaila *et al*., 1996). Soni *et al.* (2013) also found young animals are more susceptible than adult. The estimated value of economic losses due to PPR alone at country level was 1800 million Indian rupees every year in India (Balamurugan, 2011). The present study focuses on post outbreak assessment of economic losses due to PPR in Jaganpur village of Auraiya district where outbreak occurred.

Materials and Methods

This sample study was conducted in the Jaganpur village of Auraiya district of Uttar Pradesh, where PPR outbreak was reported during 2012-13. Out of 70 PPR affected households (HHs), 20 HHs (29% of PPR affected households)were selected randomly to study socio-economic profile of the goat rearing households, production system, disease incidence, and mortality, direct and indirect losses which also include opportunity cost incurred due to disease. Though the goat rearing households was small however, the goat population in these households was sizable in number. The collected data were tabulated, classified and further categorized for systematic and suitable analysis. Morbidity rate was measured as proportion of number of infected goats to population of goats. Similarly, mortality rate was calculated as a proportion of number of goats died to population of goats in study households. The case fatality rates measured as proportion of number of goat died due to disease to total number of goats infected. Garrett's ranking technique has been used to analyse the goat farmers' perception about the major constraints in goat production.

Results and Discussion

Village Jaganpur of Auraiya district has 210 households. Out of which 85% of households were having goats. The goat population in the village was 950 with an average flock size of 5.34 goats. 370 goats were infected with PPR in the village. As per respondents, about 70% goat owning households were found to affect with PPR. The majority of goats in the village were reared under extensive and semi-intensive management system with other livestock. The socio-economic attributes of goat farmers indicated that the average age of goat farmers was about 40 years. It was also noted that the majority of goat farmers were educated up to middle and high school level (70%). The average family size of the goat farmers was 6 members. The major source of income was wages, followed by agriculture. Goat rearing contributes about 17% to total family income. However, this income often fluctuates due to various diseases in goat production. Composition of goat flock mainly constituted with adult (55%) and kids/young stock (45%). The average flock size of study households was 13 goats.

It could be observed from Table 2 that overall morbidity, mortality and case fatality rate across the functional categories of goats was 57.5%, 42.1% and 73.2%, respectively. These findings are in agreement with Thombare and Sinha (2009); Hossain *et al.* (1996). The average economic loss per study

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Table1: Epidemiology and economic losses in the study households (Rs./HH)

Particulars	Value
Epidemiology	
Morbidity (%)	57.5
Mortality (%)	42.1
Case fatality (%)	73.2
Economic Losses (Rs./HH)	
Mortality loss	12,320.00 (926.32)
Morbidity loss:	
Milk loss due to reduction in yield	374.42(28.15)
Losses due to weight loss, reduction in market value etc.	1192.68(89.68)
Total morbidity losses	1567.1(117.83)
Opportunity cost	
Expenses on veterinary care on survive goats	164.50(12.37)
Extra labour charges	63.44(4.77)
Other charges	41.00 (3.08)
Total opportunity cost	268.94 (20.22)
Total losses due to disease	**14156.04 (1064.36)**

(Figures in parentheses indicate per animal losses)

Table 2: Constraints in goat production

Constraints	Mean Scores	Rank
Unavailability of vaccines	12.19	I
Unavailability of medicines	10.48	II
Lack of veterinary services	9.12	III
High cost of services and medicines	8.88	IV
Poor knowledge of diseases and their symptoms	7.23	V
Poor knowledge of home remedies/Ayurveda/Herbal medicines	5.30	VI
Lack of transportation and other infrastructure	4.27	VII

household was estimated to be Rs. 14156.04. Out of which Rs. 12320 was loss due to mortality of affected goats. This loss accounted for 87% of total economic loss, possibly due to high rate of case fatality (73%). Moreover, no vaccination against PPR before outbreak, delay in diagnosis and unavailability of veterinary services during the outbreak were also the important reason for high magnitude of mortality loss. The high severity of the disease was reported by the goat farmers first time as they recalled their memories. The morbidity loss was estimated to be Rs. 1567.10. This includes loss due to reduction in milk yield and reduction in market value due to weight loss of Rs. 374.42 and Rs.1192.68, respectively. The reduction in market value due to body weight loss alone constituted about 9% of total economic losses due to PPR outbreak. The average opportunity cost born by the household was Rs.268.94. This includes expenses on veterinary care on survived goats (Rs.164.5), extra labour charges (Rs.63.44) and other charges (Rs.41.00). Considering average flock size of study household is 13.3 goats, the loss per goat due to PPR disease was estimated to be Rs.1064.36.

Unavailability of vaccines, medicines and lack of veterinary services were found to be the most important constraints in goat production with their mean scores of 12.19, 10.48 and 9.12, respectively (Table 2). Knowledge gap on goat diseases, home remedies with herbal medicines and poor infrastructure like transportation and market were the other constraints in goat farming as revealed by the goat farmers.

The sample study has estimated the economic losses loss due to outbreak of *peste des peste ruminants* disease in goat. Though the number of study goat farmer is small but the population of goats reared by these farmers were good in number. The major losses accrued due to mortality followed by reduction in market value of animals. The magnitude of losses seems to be large because of post outbreak estimates. Studies done in the past revealed that if the annual preventive goat health calendar been adopted, losses could have been reduced by about 70% (Kumar *et al.,* 2002). There is need to made goat farmers aware about important diseases in goat and their vaccination schedule.

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References

Anderson, J. and McKay, J.A. (1994) *Epidemiol. Infect.* **112**: 225-231.

Annual Report (2011-12) Project Directorate on Animal Disease Monitoring and Surveillance Hebbal, Bengaluru - 560 024. Karnataka, India.

Balamurugan, V. *et al.* (2011) *Rev. Sci. Tech. Off. Int. Epiz*. **30**: 889-896.

Hossain, M.A. *et al.* (1996) *Bangladesh J. Ani. Sci.* **25**: 11- 17.

Kumar, S. *et al.* (2003) *Small Rumin. Res.* **47**: 159-164.

Shaila, M.S. *et al.* (1996) *Virus Res*. **43**: 149-153.

Singh, R.P. *et al.* (2004) *Revue Scentifique ettechnique Office International Des Epizooties.* **23**: 807-19.

Soni, A.K. *et al.* (2013) *Vet. Pract.* **14**(1): 157-158.

Thombarea, N.N. and Sinha, M.K. (2009) *Maharashtra Agri. Economics Res. Rev.* **22**: 319-322.