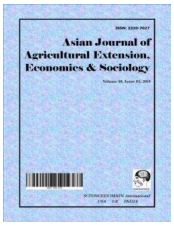

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Assessing the Economic Losses to Buffalo Owners Due to Late Diagnosis of Pregnancy in Their Milch Buffaloes

Rekha Yadav[1*], Hema Tripathi[2], Parveen Kumar[3] and Nukala Ramesh[4]

[1]Department of Animal Husbandry and Dairying, Haryana, India.
[2]Technology and Entrepreneurship Unit, ICAR-CIRB Hisar, India.
[3]Department of Veterinary Microbiology, LUVAS, Hisar, India.
[4]Division of Extension Education, ICAR-IVRI, Izatnagar Bareilly, India.

Authors' contributions

This work was carried out in collaboration among all authors. Authors RY and HT designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author PK was involved in data collection and analyses and author NR managed the literature searches and data interpretation part. All authors read and approved the final manuscript.

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ABSTRACT

Aim: The present study was conducted purposively to measure the economic losses to buffalo owners due to late diagnosis of pregnancy in their milch buffaloes.
Research Design: Ex-post facto and exploratory research design was used.
Place of the Study: Hisar and Jind districts of Murrah buffalo breeding tract in Haryana, India. Data were collected between June 2017 to December 2017.
Methodology: Data were collected through structured interview schedule from 37 buffalo owners who were taking artificial insemination services from State Department of Animal Husbandry and taking their buffaloes for the pregnancy diagnosis after three months of artificial insemination.

**Corresponding author: E-mail: rekha04yadav@gmail.com;*

Results: The study revealed that the average per day per buffalo loss was found of Rs. 702 in study area. Average loss incurred by respondents per buffalo on feed was Rs. 5918, on labour Rs. 4155, on milk Rs. 13640 and total economic loss was Rs. 3925 due to late diagnosis of pregnancy.
Conclusion: Thus there is need to create awareness among the farmers regarding advantages of timely pregnancy diagnosis in their animals to minimize these losses in order to get maximum revenue from the animals.

Keywords: Economic losses; buffalo; late diagnosis of pregnancy.

1. INTRODUCTION

Timely pregnancy diagnosis in animals after the artificial insemination (AI) is an important criterion for better reproductive management to boost the reproductive efficiency of animals and maximizing profits of the owners. Delay in diagnosis to confirm whether animal is pregnant or not leads to many serious consequences and farmer bear huge economic loss each day. Each extra day of calving interval costs to buffalo owner depending on the milk yield and number of days open. This is hidden loss and farmers are generally unaware about this loss. So to make their enterprise profitable and sustainable it is necessary to attract the farmers' concentration towards these losses. Keeping in view the present study has been carried out to understand the actual losses each day in monetary terms, a farmer bear if he does not diagnose his animal to confirm its pregnancy at correct time.

2. MATERIALS AND METHODS

An ex-post facto and exploratory research design was used to carry out the study purposively in Hisar and Jind districts of Murrah buffalo breeding tract of Haryana. Hisar and Jind districts comprise a network of 85 and 62 Government Veterinary Hospitals (GVH) respectively. From each of the selected districts, six Government Veterinary Hospitals (GVH) were selected purposively. A list of buffalo owners was obtained separately from each selected GVH (total number 12), who had taken some benefits of breeding services essentially of artificial insemination (AI) service during 2014-17. From each list, 20 buffalo owners were selected randomly as respondents making a total of 240 respondents from 12 villages**.** Data were collected through interview schedule on various parameters to calculate the losses in monetary terms and presented in frequency and percentage.

Economic losses due to late diagnosis of pregnancy have been operationalized as losses to farmers due to wrong perception of considering the non pregnant buffalo as pregnant after artificial insemination. Respondents were asked to mention whether they take their buffalo for pregnancy diagnosis (PD) or not after AI and if answerwas yes then after how many days of AI. Under field conditions, PD is generally carried out after 3 months of date of AI. So, after 90 days, each extra day was calculated as open days.

Three different costs were included to calculate the losses per buffalo due to late diagnosis of pregnancy. It included feed cost (Green fodder cost + Dry fodder cost + cost of concentrate), value of family labour and value of loss of milk. Total loss per buffalo was calculated based on number of open days. Consequently per day per buffalo losses was also found out. Each type of costs was further categorized in 3 categories viz; less, medium and high using equal class interval methods between the minimum and maximum expenditure incurred by the respondents using equal class interval.

Total loss: (Extra feed cost + Extra labour cost + Extra value of losses of milk)

Per day losses: (Per day costs of feed+ Per day costs of labour + Per day costs of losses of milk)

Wherein extra feed cost included the cost of green fodder, dry fodder and concentrate offered by respondents to their buffalo and calculated for per buffalo and per day. Extra feed cost was calculated as:

Per day feeding cost/ buffalo * Number of open days

To calculate the green fodder cost, respondents were asked about type of green fodder available in their area and quantities of green fodder offered by them to their lactating animals per day. Berseem and Jawar were the major green fodder available and offered by the respondents. Market price of each fodder was enquired and

accordingly average price was calculated andfound to be Rs. 1.7 per kilogram. Based on it, per day cost of green fodder was calculated by following formula:

Quantity of green fodder offered to per buffalo /day* Average price of green fodder

Dry fodder cost was calculated by asking quantity of dry fodder offered to lactating animals and its price were asked from the respondents. Main dry fodder offered to animals in studied area was wheat straw at the time of data collection. Average price of dry fodder was Rs. 2.5 per kilogram. Accordingly per day cost of dry fodder fed to animals was calculated by following formula:

Quantity of dry fodder offered to per buffalo/day* Price of dry fodder

To calculate the cost of concentrate, farmers were again asked about quantity of concentrate offered to lactating animal per day. Wheat and cotton seed were two major ingredients of concentrate, which were fed by the farmers to the animals. Cost of concentrate was computed by taking the weighted prices of ingredients used in the concentrate. Average price of per kilogram concentrate was calculated as: Price of wheat/kg*2/3+ Price of cotton seed/kg*1/3

Thus price of wheat was multiplied by 2/3 and price of cotton seed was multiplied by 1/3. The rational was that for making one kg concentrate two third parts of energy rich ingredient and one third part of protein rich ingredients are required. Average price of one kilogram concentrate was found Rs. 19 per day cost of concentrate was calculated using the following formula:

Quantity of concentrate offered to per buffalo/day* Average price per kilogram

ii) Labour cost per buffalo: Labour cost was calculated based on existing permanent hired labour cost in studied area. Farmers were asked about number of buffaloes they had and duration of working hour of family member to carry out different activities of animals. As per the current labour rate of Haryana (Labour law reporter, 2017) Rs. 326 per worker for 8 working hours. Accordingly family labour cost was calculated taking base of labour rate of Haryana. While for permanent hired labour, the actual amount paid by the respondents in cash was taken. Accordingly labour cost per buffalo /day was calculated as:

(Labour wages per day* Duration of working hr. of member)/ (Number of buffaloes*8)

Extra labour cost/buffalo*:* Labour cost per day /buffalo * Number of open days

(iii) Value of milk loss: To calculate the value of milk loss, average quantity of milk produced by buffalo per day and average price of milk was calculated. Average quantity of milk produced by buffalo per day was calculated as:

(Early lactation yield/day * Number of days in early lactation + Mid lactation yield/day *

Number of days in mid lactation + late lactation yield/day * Number of days in late lactation)/ Number of days in early lactation+ Number of days in mid lactation+ Number of days in late lactation

Average price of milk: {(Price of milk in winter+ Price of milk in summer)/ 2}

The average price of milk sold by respondents was Rs. 45 per kilogram and thus was taken as base for calculation. Accordingly value of loss of milk per animal per day was calculated as:

Average quantity of milk produced by buffalo per day* Average price of milk

Extra value of losses of milk/buffalo: Value of loss of milk per day/buffalo * Number of open days

3. RESULTS AND DISCUSSION

3.1 Distribution of the Respondents with Respect to Timing of Taking their Animals for PD from Date of Artificial Insemination

A perusal of the Table 1 reveals that out of 240 respondents, 171(71.3%) were taking their animals at 90 day and 37 respondents (15.4%) after 90 days for confirming the pregnancy from date of AI. Rest 32 (13.3%) respondents denied for taking their animals for PD. Thus economic losses were calculated only for 37 respondents who had taken their animals after 90 days.

3.2 Distribution of the Buffalo Owners as per the Various Parameters of Economic Losses Occurred Due to Late Diagnosis of Pregnancy from Date of Artificial Insemination (After 90 days)

3.2.1 Distribution as per the number of open days

Open days were classified in to three categories based on scores equal class interval as short (15-40 days), medium (41 – 65 days) and long (66-90 days). Table 2 indicates that animals owned by 28 respondents' had open days between 15-40 days and belonged to short category followed by 7 and 2 respondents who fell under medium and long days categories respectively. Average open days were found to be 34 ± 20 days.

3.2.2 Distribution as per the value of extra incurred per buffalo

Table 2 further shows that 73 per cent of the respondents fell in low category of extra feed cost and bared the loss between Rs. 2130- 6820 per buffalo. Nearly 22 per cent respondents had incurred loss between Rs. 6821 - 11510 thus were placed under medium category whereas about 5 per cent respondents incurred loss on extra feed cost even more and placed under high loss (Rs. 11511-16200) category. Average loss due to extra feed cost was found Rs. 5918 per buffalo.

3.2.3 Distribution as per the value of extra labour cost incurred

The average value on extra labour cost in studied area was Rs. 4155 per buffalo. Nearly 76 per cent respondents were spending extra rupees on labour between Rs. 1830- 4880 per buffalo and placed under lowest category. Medium value of extra labour cost category was between Rs. 4881 – 7930 per buffalo wherein about 19 per cent respondents belonged to it. About 5 per cent of respondents still had huge loss between Rs. 7931-10980 per buffalo due to late diagnosis of pregnancy from date of AI in their milch buffaloes.

3.2.4 Distribution as per the quantity of milk loss per buffalo

Table 2 reveals that 81 per cent of respondents lost milk between 93- 362 litres/ buffalo due to late diagnosis of pregnancy. Nearly 14 per cent belonged to medium category (363 – 631 litres) followed by 5.4 per cent who fell in high category between 632-900 litres of quantity of milk loss per buffalo. Average quantity of milk loss per buffalo was 308 litres in the studied area.

3.2.5 Distribution as per the value of milk loss per buffalo

The average value of milk loss per buffalo was found to be Rs. 13640 ± 8356 in studied area. Nearly 78 per cent of respondents had incurred loss of milk value between Rs. 4185- 16290 followed by 16.2 per cent respondents who has beard the loss between Rs. 16291 - 28395 and belonged to medium loss category. Nearly 5 per cent respondents belonged to high loss category (Rs. 28396-40500).

3.2.6 Distribution as per the total economic loss per buffalo

Nearly 76 per cent respondents were bearing the loss between Rs. 8618-28305 per buffalo followed by (18.9%) and (5.4%) respondents who had total loss between Rs. 28306 – 47993 and Rs. 47994-67680 as revealed in Table 2. Average total loss was found to be Rs. 23925 per buffalo.

3.2.7 Distribution according to per day per buffalo economic loss

An equal per cent of respondents (40.5%) beard the loss between 628 – 728 Rs. and Rs. 729-828 per day and were placed under medium and high loss categories. Nineteen per cent respondents came under less loss category and had the loss between Rs. 527-627 per day per buffalo (Table 2).

Table 1. Distribution of the respondents with respect to timing of taking their animals for PD from date of artificial insemination

SL.NO.	Number of days	F (%) (N=240)
1	At 90 days	171(71.3)
2	After 90 days	37(15.4)
3	Not taking their animal for PD	32 (13.3)

Table 2. Distribution of the farmers as per the various parameters of economic losses occurred due to late diagnosis of pregnancy from date of artificial insemination (After 90 days)

Sl. No.	Parameters	f (%) (N=37)
I	**Number of open days**	
	Short (15-40)	28(75.7)
	Medium (41 - 65)	7(18.9)
	Long (66-90)	2(5.4)
	Mean ± S.D.	34 ± 20
II	**Value of extra feed cost per animal (In Rs.)**	
I	Low (2130- 6820)	27(73.0)
ii	Medium (6821 - 11510)	8(21.6)
iii	High (11511-16200)	2(5.4)
	Mean ± S.D.	5918 ± 3310
III	**Value of extra labour cost per animal (In Rs.)**	
I	Low (1830- 4880)	28 (75.7)
ii	Medium (4881 - 7930)	7(18.9)
iii	High (7931-10980)	2(5.4)
	Mean ± S.D.	4155 ± 2465
IV	**Quantity of milk loss per animal (In litre)**	
I	Low (93- 362)	30(81.1)
ii	Medium (363 - 631)	5(13.5)
iii	High (632-900)	2(5.4)
	Mean ± S.D.	308 ± 200
V	**Value of loss of milk per animal (In Rs.)**	
I	Low (4185- 16290)	29(78.4)
Ii	Medium (16291 - 28395)	6(16.2)
Iii	High (28396-40500)	2(5.4)
	Mean ± S.D.	13640 ± 8356
VI	**Total loss per animal (In Rs.)**	
I	Low (8618-28305)	28(75.7)
Ii	Medium (28306 - 47993)	7(18.9)
Iii	High (47994-67680)	2(5.4)
	Mean ± S.D.	23925 ±14555
VII	**Per day per animal loss (In Rs.)**	
I	Low (527-627)	7(19.0)
ii	Medium (628 - 728)	15(40.5)
iii	High (729-828)	15(40.5)
	Mean ± S.D.	702 ± 75

Earlier studies conducted by many researchers [1,2,3] reported the losses due to per day open period of animals was between Rs. 220 to Rs. 372, Rs. 311 and Rs. 455.34 respectively in USA, Iran and Pakistan. Another study conducted by [4] in Livestock Research Centre, NDRI, Karnal on cattle reported each day loss to farm due to increase in one day open period in Sahiwal breed and Karan fries was Rs. 281 and Rs. 368 who had an average milk production of 7.3 litres and 10.5 litre respectively. In present study the average per day loss per animal has been calculated as Rs. 702 due to high producing animals. The differences may also be due to differences in selling price of milk of cattle and buffaloes, quantity of feed required and offered to cattle and buffaloes as well as quantity of milk production. Besides our study has been carried out in gap of four years and cost of most of the ingredients, labour etc might have changed. The present study has been carried out in 12 villages having top most Government

Veterinary Hospitals which have achieved the target of 100% AI thus beneficiaries or the respondents had high yielding animals and farmers spent much money on feed and other management practices for the maximum production and returns thus the high economic loss to the respondents is obvious due to late diagnosis of pregnancy based on number of open days.

4. CONCLUSION

Farmers were undergoing huge production; feeding and labour losses due to late diagnosis of pregnancy over 90 days and it had a significant effect on the income generation and returns to the owners from their enterprise. So, there is need to create awareness among the farmers regarding advantages of pregnancy diagnosis and also there is need to motivate and encourage the farmers to take their animals for confirmation of pregnancy timely; to minimize these losses in order to get maximum revenue from the animals. The livestock farmers should be encouraged to adopt novel early pregnancy detection methods like utlrasonography and detection of progesterone hormone in milk and faecal samples [5]. There is also need to encourage service providers for arranging more extension programs and infertility camps for creating awareness specifically on need of timely diagnosis of pregnancy after artificial insemination to reduce the economic losses.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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