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PERCEIVED EFFECT OF CLIMATE CHANGE ON PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF DAIRY ANIMALS IN CHATTISGARH

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ABSTRACT

Livestock in India is an integral component for the livelihood resource of poor farmers. Majority of the milk production in India is contributed by the small and marginal farmers who are very prone to face brunt of undesirable's effects of climate change. Change in climate affects the livestock in many ways such as retardation of animal growth, low quality animal products including hides and skins and increase in livestock diseases. Livestock productivity has been severely affected by vector-borne livestock diseases such as trypanosomiasis, theileriasis, and R.V. fever etc also known as climate sensitive diseases[6]. Reproductive performance of animals is highly affected by climate variability. Long duration of summer causes heat stress in animal, effect the ova formation in animal and causes sterility. High variations in environment temperatures may compromise reproductive efficiency of farm animals in both sexes and hence negatively affect reproductive performance of livestock. Data were collected personally through interview schedule from 120 tribal respondents of 6 villages of Bodla block of Kabirdham district of Chhattisgarh state. The study revealed that more than 50 per cent respondents perceived reduction in milk yield as well as its persistency due to change in climate attributes. Majority of respondents perceived decrease in length and intensity of estrous period, increase in number of services per conception, age of first calving interval, service period, anestrous and repeat breeding.

Keywords : Reproductive and Productive Performance, Climate change, Dairy animals.

In recent years there is variation in number of rainy, summer and winter days which produce a great effect in livestock performances. Change in climate affects livestock in many ways such as retardation of animal growth, low quality animal products including hides and skins and increase livestock diseases. Even certain species of animals are likely to become extinct as a result of climate change[13]. Change in climate attributes especially hot environment impairs productive, reproductive performance, metabolic and health status of animals. A series of studies carried out in dairy cows indicated a higher incidence of mastitis during periods of hot weather [4, 7, 8, 15]

MATERIALS AND METHODS

The present study was carried out in state of Chhattisgarh, 26th state of India. The state comprises a total of 27 districts. Out of these Kabirdham district was selected purposively because the climate in this district varies to a

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large extent every year as per the available sources and records. Moreover, no study on impact of climate variability specifically on livestock and crop has been carried out in this region. Kabirdham district comes under plain zone and agriculture contingency plan for district (10.08.2012) also revealed regular drought and varying rainfall. Kabirdham district constituted 4 blocksand out of 4, one block, Bodla was selected purposively. This block has more number of Schedule Tribes' population (39.62%) who were actual respondents of the present study.This block constituted 345 villages, out of these, 6 village namely Amanara, Ghongha, Usarwahi, Bokkarkhar, Tenduaadih, Minminiya maidan were selected randomly. A list of livestock owning tribal farmers was prepared for each village. From each of the 6 villages; ten female and an equal number of male respondents were selected randomly. Thus from each of the selected village, 20 tribal farmers (10 female + 10 male respondents) were selected. Final data was collected personally from interview schedule from 120 livestock owing tribal families from 6 different villages of Kabirdham district of Chattisgarh state.

RESULTS AND DISCUSSION

i) Perceived effect on production performance of dairy animals due to change in climate attributes:

The investigation revealed that majority of the respondents (51.67%) perceived that climate change had negative effect on milk production and 22 per cent revealed no change due to changes in climate attributes. Milk yield of crossbred cows in India (e.g., Karan Fries, Karan Swiss and other Holstein and Jersey crosses) was negatively correlated with temperature and humidity index[9, 12]. According to Upadhaya (2010), the estimated annual loss due to heat stress among cattle and buffaloes at the all- India level was 1.8 million tones, which was nearly two per cent of the total milk production in the country[14]. Milk yield decreased due to increased environmental stress and lack of the required amount of the nutrient and dry matter for the dairy animals in Bundelkhand region of Uttar pradesh[10]. High-producing dairy cows were affected more than low-producing cows, because the zone of thermal neutrality shifts to lower temperatures as milk yield, feed intake and metabolic heat production increase[5]. Few more studies also reported the negative effects on milk quality due to increase in environmental temperature[1, 2]. Table 1 further showed that majority of the respondents (60.83%) perceived decrease in persistency of milk yield and 19.17 per cent perceived no change. None of respondent revealed positive impact on yield persistency. More than 50 per cent respondents perceived negative impact on lactation length due to change in climate attributes. Significant change in average lactation length and yield of dairy animals due to the effect of draught revealed in Bundelkhand area[10]. Further the present study revealed the increase in length of dry period perceived by 70 per cent respondents whereas 21 per cent respondents perceived no change in dry period due to change in climate attributes. Increase in the length of service period and dry period of all dairy animals from normal to drought conditions[10].

ii) Perceived effect on reproductive performance of dairy animals due to change in climate attributes:

Table 2 indicates that 63.33 per cent respondents perceived increase in length and intensity of estrus period of animals followed by 22 per cent who did not yield any response. Dairy animals especially buffaloes had different rate of conceiving due to high sensitivity to increase in temperature. Thermal stress on Indian livestock particularly cattle and buffaloes were reported to decreased the estrus expression and conception rate[10]. Conception rates reduced by 20-27 per cent due to summer in livestock[3]. Exposure to elevated ambient temperature decrease the fertility[11]. Majority of tribal livestock owners (45%) perceived increase in age of first calving and 28.33 per cent

respondents had no idea on it. About 22 per cent respondents perceived no change in age of first calving due to changes in climate attributes. Thus adverse climatic conditions might lead to anestrous and lower down the rate of conception, ultimately effect on increase in service period. More than 60 per cent respondents perceived increase in services period. Heat stress might reduce the fertility of dairy cows in summer. Present study also revealed that 36.67per cent respondents perceived increase in problem of estrous.

Table 1: Distribution of respondents as per their perceived effect on the production performance parameters of dairy animals due to change in climate attributes

Perceived effect on productive performance in dairy animals	(N= 120)	
	F	%
Milk yield		
Increasing	18	15.00
Decreasing	62	51.67
Constant	27	22.50
No idea	13	10.83
Persistency of yield		
Increasing	-	-
Decreasing	73	60.83
Constant	23	19.17
No idea	24	20.00
Lactation length		
Increasing	-	-
Decreasing	63	52.50
Constant	28	23.33
No idea	29	24.17
Dry period		
Increasing	84	70.00
Decreasing	07	05.83
Constant	26	21.67
No idea	03	02.50

Table 1: Distribution of respondents as per their perceived effect on the reproductive performance parameters of dairy animals due to changes in climate attributes

Perceived effect on reproduction performance in dairy animals	(N=120)	
	F	%
Length and intensity of estrus period		
Increased	-	-
Decreased	78	65.00
No change	17	14.17
No idea	27	22.50
Number of services per conception		
Increased	68	56.00
Decreased	-	-
No change	22	18.33
No idea	30	25.67
Age of first calving		
Increased	54	45.00
Decreased	08	06.00
No change	28	23.67
No idea	34	28.33
Calving interval		
Increased	55	45.83
Decreased	-	-
No change	26	21.67
No idea	39	32.50
Service period		
Increased	38	28.33
Decreased	-	-
No change	13	10.80
No idea	74	61.67
Anestrus / repeat breeder		
Increased	44	36.67
Decreased	-	-
No change	28	23.66
No idea	68	41.67

CONCLUSION

This study was carried out to find out the local perception of tribal respondents on productive and reproductive parameter of dairy cattle. Tribal respondents perceived that climate change produced negative effects on productive as well as on breeding efficiency of dairy animals. Change in weather pattern caused alteration in milk yield. Hot environment caused repeat breeding especially in buffalo.

REFERENCES

1. Bernabucci, U., Calamari, L. (1998). Effects of heat stress on bovine milk yield and composition. Zoot. Nutriz. Anim. 24: 247–257.
2. Calamari, L. and Mariani, P. (1998). Effects of hot environment conditions on the main milk cheese making characteristics. Zoot. Nutriz. Anim. 24: 259–271.
3. Chebel, R.C., Santos, J.E.P., Reynolds, J.P., Cerri, R.L.A., Juchem, S.O. and Overton, M. (2004). Factor affecting conception rate after artificial insemination and pregnancy loss in lactating dairy cows. Anim. Rep. Sci. 84: 239–255.
4. Chirico, J., Jonsson, P., Kjellberg, S. and Thomas, G. (1997). Summer mastitis experimentally induced by Hydrotaea irritans exposed to bacteria. Med. Vet. Entomol. 11: 187–192.
5. Coppock, C.E., Grant, P.A., Portzer, S.J., Charles, D.A. and Escobosa, A. (1982). Lactating dairy cow responses to dietary sodium, chloride, and bicarbonate during hot weather. J. Dairy Sci. 65: 566–576.
6. Ford, J. and Katondo, K.M., (1977). Maps of tsetse flies (Glossina) distribution in Africa. Bulletin of Animal Health and Production in Africa. 2: 187–193.
7. Giesecke, H.W. (1985). The effect of stress on udder health of dairy cows. Onderstepoort. J. Vet. Res. 52: 175–193.
8. Hogan, J.S., Smith, K.L., Hoblet, K.H., Schoenberger, P.S., Todhunter, D.A., Hueston, W.D., Pritchard, D.E., Bowman, G.L., Heider, L.E., Brockett, B.L. (1989). Field survey of clinical mastitis in low somatic cell count herds. J. Dairy Sci. 72: (1547–1556). J. Vet. Res. 52: 175–193.
9. Kabubo-Mariara, J. (2008). Climate change adaptation and livestock activity choices in Kenya: an economic analysis. Nat. Resour. Forum. 32: 131-141.
10. Kulkarni, A.A., Pingle, S.S., Atakare, V.G. and Deshmukh, A.B. (1998). Effect of climatic factors on milk production in crossbred cows. Indian Vet. J. 75 (9): 846–847.
11. Maurya, R.K. (2010). Alternate dairy management practices in draught prone areas of Bundelkhand region of Uttar Pradesh, M.V.Sc. Thesis, Indian Veterinary Research Institute, Izatnagar, India.
12. Nardone, A., Ronchi, B., Lacetera, N., Ranieri, M.S. and Bernabucci, U. (2010). Effects of climate changes on animal production and sustainability of livestock systems. Livest. Sci. 130: 57-69.
13. Shinde, S., Taneja, V.K., Singh, A. (1990). Association of climatic variables and production and reproduction traits in crossbreds. Indian Journal of Animal Sciences, 60 (1): 81–85
14. Turpie, J. Wrinkler, H., Spalding-Fecher, R. and Midgley, G. (2002). Economic impacts of climate change in South Africa: A preliminary analysis of unmitigated damage costs. Southern Waters Ecological Research and Consulting and Energy and Development Research Centre, University of Cape Town, Research paper, *pp:*1-56.
15. Upadhyay, R.C., Singh, S.V., Kumar, A., Gupta, S.K and Ashutosh, A. (2007). Impact of Climate change on milk production of Murrah buffaloes. Italian Journal of Animal Science, 6 (2s): 1329- 1332.

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