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Sustainability of Scientific Buffalo Husbandry Practices in Bihar and Haryana

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ABSTRACT

The present study was conducted in two purposively selected States, *i.e.* Bihar and Haryana, in order to compare the degree of perceived sustainability of scientific buffalo husbandry practices and to ascertain the perceptual differences among the experts and dairy farmers regarding various dimensions of sustainability. A total sample size of 160 dairy farmer respondents and 40 Subject Matter Specialist (SMS)/ Experts were selected. Data were collected by using personal interview method. The collected data were tabulated, analysed and interpreted with the help of appropriate statistical tools. Sustainability scores with respect to artificial insemination (A.I.), feeding green fodder, vaccination and deworming in buffalo obtained from both farmer and expert respondents were found to be more in Haryana than Bihar. The experts perceived significantly higher sustainability of practices in both States. There is a need to improve the A.I. services, marketing of green fodder and dissemination of technical know-how of vaccination and deworming.

Key words: Artificial insemination buffalo, deworming (dew), green fodder , sustainability, vaccination.

INTRODUCTION

India accounts for 16.7 per cent of world's human population, 15 per cent of cattle population, 57 per cent of buffalo population with 65 per cent share of buffalo milk production. The silent and concurrent white revolution in India, under the impact of Operation Flood programme, has resulted in projecting livestock as a commercially viable alternative, particularly in situations where the crop production is becoming less remunerative. However, the average milk productivity of Indian livestock in general and Indian buffalo in particular is very low as compared to those of developed countries(milk productivity of Indian buffalo,Turkian buffalo and Romanian buffalo are about 667, 800 and 1,150 kg/lactation/animal, respectively). This is due to the fact that unlike many developed countries, dairying in India is based on the bedrock of the smallholder dairy production system with low external input model. Also, there is widespread inter-regional disparity in milk production levels in the country. The states like Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil nadu are surplus in milk production, whereas Bihar, Jharkhand, Odisha, West Bengal, Himachal Pradesh and north-eastern states are deficient in milk production. Of the factors responsible for inter-regional and intra-regional production and productivity gaps, we find three major areas of concern-artificial insemination services, green fodder availability and animal health management. The national livestock breeding strategy envisages the genetic upgradation of cows and buffaloes through a combination of artificial insemination (A.I.) and natural service.

Sustainability has evolved a lot from its original meaning of 'ability to continue'. Brundtland commission's concept of sustainability referred to development that meets the needs of the present without compromising the ability of future generations to meet their needs. In the present day, it is of utmost importance that the sustainability dimensions of the developed and transferred dairy technologies should be looked into and each new technology needs to be developed for future should satisfy the concept and dimensions of sustainability (Chand and Gosain, 1998). Lal (2000) and Chand *et al.* (2004) studied sustainability of selected dairy practices, but no separate study for buffalo was conducted. Buffalo contributes about 55 per cent of total milk production in India. Sustainability of scientific buffalo husbandry practices in Bihar and Haryana had not been studied so far. Selected dairy technologies (e.g. artificial insemination, green fodder, vaccination and deworming) should fulfil the technological, economic, environmental, social and political facets of sustainability. There is an urgent need to make detail study on all these relevant issues. Thus, keeping in view, the importance of sustainability of scientific buffalo husbandry practices, the study was undertaken with the specific objectives to measure and compare the degree of perceived sustainability of scientific buffalo husbandry practices in Bihar and Haryana; and to ascertain the perceptual differences, if any, among SMS/Experts and dairy farmers regarding various dimensions of sustainability with respect to scientific buffalo husbandry practices.

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METHODOLOGY

The study was conducted in the selected states of Bihar and Haryana during 2005-06. Two progressive districts in terms of dairy development, *i.e.* Patna and Begusarai from Bihar, and Karnal and Kurukshetra from Haryana were purposively selected. Then, two blocks from each district; and from each block, two villages; and from each village, 10 dairy farmers were selected by using multi-stage random sampling technique. Those dairy farmers having at least one buffalo were considered as potential respondents. Besides farmers, 20 SMS/Experts from each state were also selected, thereby constituting a sample size of 160 dairy farmer respondents and 40 Experts. Important milch animal in terms of contribution to milk production, *i.e.* buffalo, was selected. Technologies recommended by scientists of particular region become scientific practice, when it is in regular use by farmers. Based on review of literature and experts' advice, four important scientific buffalo husbandry practices, namely, A.I., feeding green fodder, vaccination and deworming, were selected.

Degree of sustainability of selected scientific buffalo husbandry practices was operationalized as the extent to which selected practices were technologically appropriate, economically viable, environmentally sound, socio-culturally compatible, stable over long period of time, efficient in resource use, productive, locally adaptable, equitable and government policy in favour of its implementation. A suitable sustainability index was developed to measure the extent of sustainability of selected practices. Schedule was developed by using 10 dimensions and 22 indicators of sustainability. About 50 per cent of the indicators in each dimension were framed negatively worded and the remaining positively worded in order to get unbiased perception of respondents regarding sustainability of practices. Respondents should not feel that only positive answers are to be given for all the questions. Responses were taken from dairy farmers as well as expert respondents on three-point continuum, i.e., agree, undecided and not agree. A score two (2) for agree, one (1) for undecided and zero (0) for not agree were given. Scoring was reversed in case of negatively worded indicators. Total obtained score for each selected practice was calculated. This figure was divided by number of respondents, which gave mean sustainability score. Dimension-wise mean sustainability scores were also calculated. For a total of 10 dimensions of sustainability, maximum possible mean score was 44, out of which, for two dimensions, *viz.* technological appropriability and economic viability, the maximum possible mean score was 6, whereas for rest of them it was 4.

The responses from farmers and experts of Bihar and Haryana were obtained regarding sustainability of scientific buffalo husbandry practices with the help of an interview schedule. Mean sustainability scores were calculated for each selected practice against all 10 dimensions and 22 indicators and were analysed by using 'Z' test.

RESULTS AND DISCUSSION

Practice-wise sustainability of scientific buffalo husbandry practices revealed that among the practices studied, perceived sustainability of feeding green fodder was the highest for both farmer and expert respondents, and the lowest perceived sustainability was for artificial insemination (A.I.) in Bihar (Table 1). But in Haryana, the highest perceived sustainability for farmer and expert respondents was feeding green fodder and deworming, respectively, and the lowest perceived sustainability was for A.I.

The SMS/ Experts reported significantly higher level of sustainability of all the selected practices than the farmers in both the states.

Table 1: Sustainability of scientific buffalo husbandry practices in Bihar and Haryana.

Respondents	Mean Sustainability Score of Practices											
	A.I.			Feeding Green Fodder			Vaccination			Deworming		
	Bihar	Haryana	Z-Value	Bihar	Haryana	Z-Value	Bihar	Haryana	Z- Value	Bihar	Haryana	Z-Value
Farmer	27.05	29.98	7.31**	31.10	32.78	6.25**	27.53	32.39	12.5**	29.15	32.19	9.77**
Expert	29.80	34.10	6.09**	33.80	35.30	3.41**	30.70	35.25	5.35**	32.30	35.40	3.97**
Z-value	4.75**	7.26**		8.98**	5.93**		4.23**	5.12**		7.17**	4.49**	

* Significant at 0.05 level of probability. ** Significant at 0.01 level of probability.

The results of sustainability of each selected practice given here following sub-heads:

Sustainability of artificial insemination

Seasonal breeding (September to February) is a common phenomena in buffalo. Generally, it comes in heat in night hours. The data related to sustainability of artificial insemination (A.I.) are presented in Table 1, which reveal that the sustainability of A.I. was found significantly higher (0.01% level of probability) in Haryana than in Bihar. This is mainly owing to greater infrastructural facility of A.I. (quality of semen, storage facility, veterinary hospital, etc.), and more accessibility of common facility to dairy farmers of Haryana than those of Bihar.

Table 2 Dimension-wise sustainability of artificial insemination

Dimensions of sustainability	Maximum possible score	Bihar		Haryana	
		Farmers	Experts	Farmers	Experts
Technological appropriability	6	4.18	4.80	4.75	5.10
Economic viability	6	3.56	3.70	4.16	4.50
Environmental soundness	4	2.25	2.60	2.31	2.95
Socio-cultural compatibility	4	3.51	2.30	3.40	3.75
Stability	4	3.78	3.90	3.75	3.90
Resource-use-efficiency	4	1.90	2.00	2.03	2.40
Productivity	4	2.38	2.50	2.46	2.70
Local adaptability	4	3.00	3.90	3.11	4.00
Equity	4	1.20	2.20	2.00	2.60
Government policy	4	1.30	1.90	2.00	2.20
Overall	44	27.05	29.80	29.98	34.10

Dimension-wise analysis (Table 2) indicated that artificial insemination (A.I.) in buffalo was found more stable (*i.e.* no downward trend on result of A.I. in a long run), socio-culturally compatible, locally adaptable, but less equitable. Farmer and experts of both the States reported that more government support or facilities were needed for A.I. (such as availability of quality semen in veterinary hospitals, trainings regarding A.I. to rural youths, etc.)

The sustainability against all dimensions was found to be perceived differentially by the experts and farmers. In both the states, experts perceived higher sustainability against all dimensions except socio-cultural compatibility. This was one of dimensions, in which experts of the Bihar scored less than farmers. Many experts of Bihar were of opinion that farmers were giving preference to natural service than A.I. in buffalo, because of less compatibility of A.I. to their culture.

Sustainability of feeding green fodder

Green fodder requirement varies according to the body weight of the animal. It was observed from Table 1 that mean sustainability scores of both farmer and expert respondents with respect to feeding green fodder were found to be significantly higher at one percent level of significance in Haryana than in Bihar. This is mainly because of less availability of land for green fodder cultivation due to small land holding size, lack of marketing facility for purchasing and selling green fodder etc. in Bihar. Sustainability of this practice was found to be perceived differentially by experts and farmers. The scientists reported significantly higher sustainability in both the States.

Dimension-wise analysis indicated that feeding green fodder in buffalo husbandry was more stable, socio-culturally compatible, productive and environmentally sound, but less equitable (Table 3). Farmers of Bihar and Haryana were expecting more governmental support regarding availability of high yielding variety (HYV) fodder seeds at cheaper price at right time, technical knowledge for scientific fodder cultivation, etc. It might be suggested that marginal farmers should be sensitized to grow fodder crops *(e.g. jowar, bajra, etc.)* on border rows of food crops. It would not only protect the crop, but also ensure green fodder availability.

Table 3: Dimension-wise sustainability of feeding green fodder

Dimensions of sustainability	Maximum possible score	Bihar		Haryana	
		Farmers	Experts	Farmers	Experts
Technological appropriability	6	5.25	5.50	5.60	5.60
Economic viability	6	3.85	3.90	4.18	4.40
Environmental soundness	4	3.00	3.00	2.90	3.00
Socio-cultural compatibility	4	4.00	4.00	3.95	4.00
Stability	4	4.00	4.00	4.00	4.00
Resource-use-efficiency	4	2.73	3.00	3.18	3.30
Productivity	4	3.35	3.50	3.39	3.50
Local adaptability	4	2.38	2.20	2.74	2.60
Equity	4	1.93	2.10	2.28	2.30
Government policy	4	0.63	2.60	0.58	2.60
Overall	44	31.10	33.80	32.78	35.30

Sustainability of vaccination

Although it is not possible to adopt vaccines for all infectious diseases, foot and mouth disease (FMD), haemorrhagic septicemia (HS), black quarter (BQ), etc. are important diseases for vaccination. The data indicated that sustainability of vaccination was found significantly higher (1% level of significance) in Haryana than in Bihar. It was mainly due to insufficient infrastructural facility (*e.g.,* availability of vaccines, veterinary doctor, hospital *etc*.) in Bihar. Perceived

sustainability scores of this practice for the experts were significantly (P<0.01) higher (based on 'Z' value) than those of farmers.

Dimension-wise analysis (Table 4) revealed that vaccination was more socio-culturally compatible, stable, productive, but less equitable. Farmers in Bihar were expecting more governmental support for timely vaccination against all major diseases.

Table 4: Dimension-wise sustainability of vaccination

Dimensions of sustainability	Maximum possible score	Bihar		Haryana	
		Farmers	Experts	Farmers	Experts
Technological appropriability	6	3.41	3.60	4.33	4.60
Economic viability	6	3.84	4.20	5.03	5.30
Environmental soundness	4	2.39	2.50	2.71	2.60
Socio-cultural compatibility	4	3.84	3.80	3.95	3.85
Stability	4	3.55	3.65	3.39	3.60
Resource-use efficiency	4	2.05	2.55	2.44	3.10
Productivity	4	3.41	3.50	3.40	3.50
Local adaptability	4	2.63	3.20	2.93	3.70
Equity	4	1.30	1.70	1.83	2.30
Government policy	4	1.11	2.00	2.40	2.70
Overall	44	27.53	30.70	32.39	35.25

Sustainability of deworming:

Many parasitic organisms live inside the animal body. Deworming is done to get rid of these worms. A cursory look of data revealed that the experts perceived significantly higher sustainability of deworming than farmers. As evident from the data that sustainability scores of this practice obtained from both respondents were found to be significant by higher (based on 'Z' value) in Haryana than that of Bihar. This is mainly due to insufficient infrastructural facility, less purchasing power of farmers and accessibility of medicines to less number of people in Bihar.

It could be observed from Table 5 that deworming in buffalo was more socio-culturally compatible, stable and productive (*i.e.* giving performance as per expectation), but less equitable (*i.e.* accessible to less number of dairy farmers). Farmers in Bihar also reported about less governmental support in making medicine available for deworming through veterinary hospital. It is suggested that relevant medicines should be made available to all the farmers through veterinary hospitals.

Table 5: Dimension-wise sustainability of deworming

Dimensions of sustainability	Maximum possible score	Bihar		Haryana	
		Farmers	Experts	Farmers	Experts
Technological appropriability	6	4.74	5.10	5.10	5.50
Economic viability	6	4.56	5.00	5.10	5.40
Environmental soundness	4	2.98	2.30	2.46	2.40
Socio-cultural compatibility	4	3.83	3.80	3.85	3.80
Stability	4	3.79	3.80	3.60	3.80
Resource-use-efficiency	4	1.93	2.30	2.44	2.60
Productivity	4	3.60	3.70	3.65	3.70
Local adaptability	4	2.58	2.80	2.71	3.50
Equity	4	1.16	1.60	1.80	2.30
Government policy	4	0.59	1.90	1.48	2.40
Overall	44	29.15	32.30	32.19	35.40

CONCLUSION

It can be concluded that among the scientific buffalo husbandry practices studied, perceived sustainability of feeding green fodder was highest for farmer respondents of both selected states. However, perceived sustainability of deworming was the highest for expert respondents of Haryana. Perceived sustainability of A.I. was the lowest for both farmer and expert respondents in both selected states. Sustainability of all the selected practices in Haryana was significantly higher than that in Bihar. Further, the sustainability of all the selected practices was found to be perceived differentially by the SMS/experts and the farmers. The experts reported significantly higher sustainability of practices in both States. Need of research for improving the success rate of A.I., marketing of green fodder, dissemination of technical knowledge of vaccination and deworming were the important suggestions given by the respondents were: to improve sustainability of A.I., green fodder, vaccination and deworming, respectively, in both States.

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