

Friedman based analysis of perceived constraints among dairy farmers affected by national calamity in India

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Abstract: The present study was conducted to study the perceived constraints faced by victims of the national calamity, i.e., Kosi flood that occurred in Bihar state of India way back on 18th August, 2008. Eight independent constraints were taken for the study based on secondary data and reconnaissance, which were later classified as 4 broad constraints. The study revealed that most severe constraint perceived by dairy farmers was 'lack of knowledge regarding preparedness of natural calamity for livestock protection'. Asymptotic significance obtained from the Friedman test was 0.000 ($p < 0.01$) with chi-square value of 84.457 with 3 degrees of freedom. Significance value showed, Monte Carlo Significance at 99 per cent confidence interval (CI) and hence, it could be interpreted that there was significant difference among the broad constraints faced by the dairy farmers. Friedman test identified that the most severe broad constraints perceived by dairy farmers was technical constraints followed by 'economical constraints', 'physical constraints', and 'social constraints'. The study concluded that capacity building of the farmers regarding preparedness for the natural calamity is quintessential and in order to provide better and ensured remuneration of the milk and milk products, village co-operatives should be established soon.

Keywords: Constraints, Friedman ANOVA test, Monte Carlo test, natural calamity

Kosi flood of 2008 was the most disastrous floods in the history of Bihar, India, which was declared as "National Calamity" in India (Lal et al., 2015). The floods affected livestock severely as it is well evident that during and after flood it is very difficult to save the livestock, as a result 10,000 milch animals, 3000 draught animals, and 2500 small ruminants were perished (Government of Bihar report to World Bank, 2010). No follow-up study was carried out in the study locale to record the consequences of the natural calamity in the life of the dairy farmers with relevance to the perceived constraints faced by them. Hence, in this study an attempt was made to delineate the constraints faced by dairy farmers and suggest strategies to sort these out.

The present study was conducted in the purposively selected '2008 flood' affected region of Bihar State of India. Five districts were affected by flood in Bihar, out of which, two districts viz. Supaul and Madhepura were severely affected and hence, were purposively selected for the study. Two affected blocks from each district and from each block, two villages were selected randomly. From each village 20 respondents were selected randomly making a final sample size of 160 respondents from eight villages. "Ex-post facto research design" was used to study the 4 broad constraints perceived by dairy farmers in the form of economical constraints, technical constraints, social constraints and physical constraints and within each of the broad constraints 2 statements signifying and supporting broad constraints were taken. The responses to these constraints were recorded on a three point-continuum of 'most severe, severe and not severe' with the respective weightage of 3, 2 and 1. Plausible constraints were selected on the basis of secondary data released by Government of Bihar after the flood and subsequently report was submitted to World Bank (2010); in addition, reconnaissance was also done in the study locale. Nonparametric test i.e. Friedman two-way ANOVA by ranks test, as elucidated by (Tripathi, 2014) was also used to identify the most severe constraints among the four broad constraints faced by dairy farmers by using the following formula of difference between treatments or conditions:

$$x^2 r1 = \frac{12}{Nn(n+1)} \times \Sigma R1^2 - 3N(n+1) \text{ at } df = n-1$$

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Table 1: Response of the dairy farmers on extent of severity of constraints faced after national calamity (n=160)

Constraints	Response of dairy farmers				
	Most severe	Severe	Least severe	(\bar{X}) Mean Score	Overall Rank
Economical Constraints (Friedman Mean Rank Value Score= 3.18)					
Low price for milk in the market	114(71.25)	29(18.12)	17(10.63)	2.61	III
Delay in getting incentive money in case of livestock death due to natural calamity	85 (53.12)	42(26.25)	33(20.62)	2.33	VII
Technical Constraints (Friedman Mean Rank Value Score= 3.61)					
Lack of knowledge regarding preparedness of natural calamity for livestock protection	131(81.88)	17(10.62)	12(7.50)	2.74	I
Information chasm about Animal Husbandry Schemes/Subsidy	101 (63.12)	34 (21.25)	25(15.63)	2.48	IV
Social Constraints (Friedman Mean Rank Value Score= 1.97)					
No co-operative to assured procurement of milk on a daily basis	93(58.12)	37(23.13)	30(18.75)	2.39	V
Lack of social recognition for doing dairy farming	73 (45.62)	44(27.50)	43(26.88)	2.19	VIII
Physical Constraints (Friedman Mean Rank Value Score= 2.93)					
Non availability of high quality semen supply for AI at the farmers door steps	116 (72.50)	34 (21.25)	10(6.25)	2.66	II
Derisory availability of medicines and vaccines	86 (53.75)	43(26.88)	31(19.37)	2.34	VI

N= number of subjects, respondents or groups

n= number of treatments or broad constraints

$\sum R_i^2$ = row ranks summed up in each column, squared and then added

Table 1 signified that the most severe constraint perceived by dairy farmers after calamity was ‘lack of knowledge regarding preparedness of natural calamity for livestock protection’. This was due to the fact that despite being flood affected region, sparse effort was put for capacity building of the farmers. ‘Non availability of high quality semen supply for AI (Artificial Insemination) at the farmers’ door steps’ was found to be next major constraint. The 3rd major constraint was found to be ‘low price for milk in the market’ as after calamity many farmers switched their attention towards dairy farming but market didn’t grow in that proportion (Lal et al. 2015). Due to ‘derisory availability of medicines and vaccines’ vaccination, deworming and health care services were hampered and it was perceived as 6th major constraint. The most common constraint such as shortage of fodder was not evident in the study area, as after calamity, Kans grass (*Saccharum spontaneum*) and Bamboo leaves (*Bambusa balcoa*) were available in plenty as green fodders for the livestock (Lal et al. 2015). Housing for livestock was made through Bamboo framework with thatches of Kans grass. Further,

Table 1 depicts all other constraints perceived by dairy farmers in the study area.

Table 2 showed that asymptotic significance obtained from the Friedman test was 0.000 ($p < 0.01$) and chi-square value was 84.457 with 3 degrees of freedom. Significance value showed, Monte Carlo Significance at 99 percent Confidence Interval. Hence, it can be interpreted that there was significant difference between four different sub-dimensions of constraints faced by the dairy farmers after the national calamity.

Table 1 further revealed that the mean ranks obtained by the use of Friedman test was highest for technical constraints, which means that it was most severe constraint among all the four broad constraints. The result is obvious because the study locale is flood prone and even then no concrete step have been taken regarding the capacity building of the farmers so that they could be prepared for the problem of livestock protection during natural calamity and in addition ‘information chasm’ further aggravated the situation as the flood partially or fully damaged the information source. The second most severe constraint was the ‘economical constraints’, which might be due to the combined effect of ‘low price for milk in the market’ and delay in getting incentives. Third most severe constraint was physical constraints followed by social constraints, which implied that it was the least severe broad constraints. This might be due to the fact that under the social

Table 2: Test Statistics of Friedman test

Test Statistics	Values
N	160
Chi-Square	84.457
df	3
Asymp. Sig.	.000
Monte Carlo Sig.	Sig. .000
99% Confidence Interval	Lower Bound .000
	Upper Bound .000

constraint, the problems were broad and not individual-centric in the study area.

Conclusions

The aim of the study was to investigate perceived constraints among dairy farmers due to aftermath of flood in Bihar, India. The four broad constraints with two statements under each constraint have been investigated. Friedman test was used to identify the most severe constraints, while appropriateness of the test was confirmed with the asymptotic and Monte Carlo significance level. The present study concludes that most severe broad constraint among dairy farmers' was technical constraints as result revealed that 'lack of knowledge regarding preparedness of natural calamity for livestock protection' and 'information

chasm about animal husbandry schemes' were the major independent constraints consequently ranked 1st and 4th in the independent category. This pointed out the fact that capacity building of the dairy farmers with respect to preparedness, response, recovery and mitigation strategies to be done. The study recommends establishment of dairy co-operatives to fetch remunerative price of the dairy products as well as developing alternative livelihood options in the non-farming sector should be promoted because dairy farming alone couldn't give much social recognition to the dairy farmers.

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