Technological Change in Dairy Farming in Trans-Gangetic Plains and its Effect on Employment Generation

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ABSTRACT

The study was conducted in the trans-Gangetic plains to assess the technological change in dairy farming over 10 years. Technological change was measured by developing a test on various aspects (breeding, feeding, management and health care) of scientific dairy farming practices. It was observed that there was significant technical change in adoption of scientific dairy farming practices and it was increased over the period of time span from 61.37 per cent (in 2005-06) to 70.73 per cent (in 2015-16). Further, all the productive and reproductive parameters of dairy animals were improved by adoption of scientific dairy farming practices. Moreover, there was substantial increase in rural employment through dairying. In nutshell, in 2005-06 the total number of peoples was 146 who were engaged to different activities for their livelihood and they increased up to 259 over a period of ten. These changes reflect proper management of the dairy animals due to the effective mechanism of extension service and technological development by Agricultural research system in the Trans-Gangetic plains.

Key words: *Adoption; Dairy farming; Technological change; Animal productive; Reproductive parameters;*

Global dairy industry is split into commercial and private enterprises that range in size from just a single animal that produces milk to feed a family, to huge commercial farms that may include tens of thousands of animals. Whatever the size, commercial dairy farming today will inevitably relies on modern technologies for animal husbandry and welfare, milking, and waste management, and milk processing, along with local, regional, national or even international refrigerated transport and supply chains. The Trans-Gangetic Plain (TGP) is facing the challenge of sustaining crop productivity gains, improving rural livelihoods and securing environmental sustainability in recent years. While farmers especially youths are increasingly getting dissatisfied in practicing farming as an employment option. This calls for a better understanding of farming systems and of rural livelihoods and developing employment option in agricultural-allied sectors particularly with the rising advocacy for resource-conserving technologies. Dairy based farming is seen as having potential of both addressing the resource depletion problem and raising the income level of farmers thus will enhance the attract ability of this sector as an employment option. Given the continual evolution in technological field there is a need to extensively enquire the prevailing practices in this region as well as future trend for better technology generation and policy formulation to keep on enhancing the efficiency of dairy sector as employment option. Given the limited documentation of innovative and profitable dairy unit nurtured especially by rural youth and women it will be difficult to convince and motivate young people to venture into dairy based farming. Keeping view of above facts, a study *"Technological Change in Dairy Farming and its Effect on Rural Employment in Trans-Gangetic Plains"* was conducted.

METHODOLOGY

The study was conducted in the trans-Gangetic plains. This region (also called the Sutlej-Yamuna Plains)

extends over Punjab, Haryana, Chandigarh, Delhi and the Ganganagar district of Rajasthan. Majority of area fallen in two states i.e. Punjab and Haryana. Hence, two districts, one developed and one underdeveloped were selected purposively from each state. From each selected district two blocks (one block near to district head quarter and another one farthest) were selected purposively and same way from each block two villages were selected randomly. Complete enumeration of selected villages was done and based on land holding category a list was prepared for each selected village. Finally, proportionate random sampling was applied for selection of 15 respondents those were rearing at least one dairy animals from past ten years. In this way 240 respondents were interviewed to get first-hand information on technological change in dairy farming. The relevant test and schedules were developed to measure the change in various dimensions of dairy farming. Technological change was measured by developing a test on various aspects (breeding, feeding, management and health care) of scientificdairy farming practices. The maximum possible score of test was 96 and minimum could be '0'. This change was observed over period of ten years' time span (2005-06 and 2015-16) and Wilcoxon Signed Ranks test was applied by using the to observe the significant change during the period (SPSS-21). Further Change in productive and reproductive parameters of dairy animals was also recorded as per the standard methodology suggest by *Meena et al, 2015.*

RESULTS AND DISCUSSION

Technological changes in dairy farming practices: The data presented in the Table 1 represents the technological changes in adoption of scientific dairy farming practices by the farming community in Trans-Gangetic plain. It was observed that technology/ practicesadoption of breeding was 71.38 per cent in year 2015-16 as compared to 62.71 per cent in the year 2005-06. It could be inferred from above discussion that there was 8.67 per cent incremental technological change in breeding practices of dairy animals. Similarly, the change in adoption of feeding practices of dairy animals was 9.04 per cent in a span of ten years. Although it is upward movement in technical change in adoption of feeding practices however, there is urgent need to aware the farmers about the balance feeding of dairy animals.

Further it was observed from the same table that the extent of adoption of healthcare practices of dairy animals was 65.73 per cent in the year 2005-06 and it reached up to 79.15 per cent in the year 2015-16. During the investigation it was observed that farmers were adopting recommended practices of healthcare and avoiding village quack. A similar upward movement of technological change i.e. 6.34 per cent was also observed in adoption of management practices of dairy animals (from 59.36% to 65.70% in ten years). The overall technological change in a period of ten year was 9.36 per cent in adoption in dairy farming. The Wilcoxon signed rank test shows that the observed difference between both measurements in two different years is significant. Thus, we can reject the null hypothesis that both samples are from the same population, and it may be concluded that extension machinery doing very good job in the field of dairy farming and it was well reflected in the Trans-Gangetic plains.

Table 1. Technological changes in adoption of scientific dairy farming practices

Dairy farming practices Test	Adoption of scientific dairy farming Technology		Difference Mean Score %	Wilcoxon Signed Ranks	
	2015-16 Mean Score ±SE	2005-06 Mean Score ±SE		Z values	P Values
Breeding practices	14.28 ± 0.116 (71.38)	12.54 ± 0.151 (62.71)	8.67	-9.259	0.00
Feeding practices	16.01 ± 0.176 (66.70)	13.84 ± 0 .205 (57.66)	9.04	-9.085	0.00
Health care practices	19.00 ± 0.182 (79.15)	15.77 ± 0.197 (65.73)	13.42	-11.068	0.00
Management practices	18.40 ± 0 .183 (65.70)	16.62 ± 0.144 (59.36)	6.34	-10.197	0.00
Pooled	67.67 ± 0 .041 (70.73)	58.78 ± 0.445 (61.37)	9.36	-12.352	0.00

Figure in parenthesis indicate percentage

Table 2. Change in productive and reproductive parameters of dairy animals

Parameters	Indigenous Cow			Cross breed cow			Buffalo		
	2015-16	2005-06	Change	2015-16	2005-06	Change	2015-16	2005-06	Change
Age at first calving (months)	40.44	54.72	14.28	30.76	35.42	4.66	40.29	43.15	2.86
Service period (days)	183.68	226.95	43.26	175.33	222.09	46.75	152.13	225.83	73.69
Service/ Conception (no.)	1.56	1.74	0.17	2.14	3.16	1.02	1.37	1.84	0.47
Peak yield (l /day)	7.32	5.16	2.15	15.15	11.93	3.22	11.72	9.64	2.08
Lactation Length (days)	254.81	248.88	5.94	242.34	244.49	2.14	346.02	413.97	67.96
Dry Period (days)	83.75	103.77	20.02	212.99	257.60	44.61	103.29	109.34	6.05
Calving interval (days)	463.68	506.95	43.26	455.33	502.09	46.75	451.04	524.69	73.64

Technological changes in productive and reproductive parameters of dairy animals: Productive and reproductive parameters are indispensable to the growth of dairy animals as profitability of dairying has direct relation with the performance productive as well as reproductive performance of animals (*Meena et al. 2015*). Proper management of the dairy animals can helps in improvement of the health of animals and development of productive as well as reproductive parameters. A cursory look on Table 2 reveal that age at first calving (in months) is one of the important reproductive parameter of the animal; here in the study area in case of Indigenous cow it has drastically changed (from 54.72 months to 40.44 months) rather than crossbreed cow and buffalo. Service period has changed radically in the case of buffalo (73.69 days).In case of number of service per conception the changes in case of all type of animals are more or less same.

If we talk about peak yield, this is one of the important parameter among all other. Peak yield is one of the parameter which helps in economic perspective also. In case of cross breed and buffalo the peak yield was more compare to indigenous cow, even *Singh et al. 2011* reported that descriptive breed of buffaloes were having peak yield 10.5+/- 0.3 kg. Optimum lactation length is expected as a result of proper management of the animals, here in the study area lactation length (days) were 254.81, 242.34 and 346.02 days/animal in case of indigenous cow, CB cow and buffalo respectively.

The similar type of finding were also reported by *Meena et al., 2017* in Karnal, Haryana and also supported by *Raja et al., 2012* who concluded that average lactation were similar in West Bengal as 224.88±6.72 and 232.00±2.00 for indigenous and crossbreed cowrespectively.Over the time it has found that dry period and calving interval of dairy animals has reduced in case of all types of animals (indigenous cows, crossbreed cows and buffalo). Even *Bohrai et al., 2007* reported that average dry period of dairy animals like cows and buffaloes were 8 months and 4 months for buffalo in Uttarakhand state. Higher dry period showed the poor conception rate of the animals. *Clay Centre, 1993* revealed that average dry period was 188 days in Ongole cattle. May be effective extension service and proper management of the dairy animals this kind of improvement was possible.

Table 3. Contribution of dairy farming in rural employment in study area

Particular	2015-16	2005-06
No. of milk venders	91	54
No. of para-vets	66	37
No. of input suppliers	17	09
No. of Halwais	19	09
Milk collection units	29	15
A.I centre	19	15
Animal traders (sale / purchase)	12	05
No. meat/ egg/ shop	06	02
Total	259	146

The Table 3 represents contribution of dairy farming in rural employment. Total numbers of milk venders in the study area in the year 2005-06 were 54 and in the year 2015-16 there were 91 among the respondent. As far as number of para-vets in the study area there were 37 in the year 2005-06 and 66 in the year 2015-16. There were Nine input supplier in the study area during 2005-06 and increased up to 17 in the year 2015-16. In case of number of Halwais (milk product preparation) in the study area there were nine in the year 2005-06 and 19 in the year 2015-16. There were 15 milk collection units in study area during 2005-06 and they reached up to 29 in the year 2015-16. In the year 2005-06 there

were 15A. I centre in study area, it raise up to 19 in the year 2015-16. Animal traders (sale / purchase)in the study area was only five in the year 2005-06 and raise up to 12 in the year 2015-16. There were two meat/ egg/ shop in the study area during the year 2005-06 and they increased up to six in the year 2015-16. It is evident from above table that there is substantial increase in rural employment through dairying.

CONCLUSION

It is safe to conclude that there was significant technical change in adoption of scientific dairy farming practices and it was increased over the period of time span from 61.37 per cent (in 2005-06) to 70.73 per cent (in 2015-16). Further all the productive and reproductive parameters of dairy animals were improved by adoption of scientific dairy farming practices. Moreover, there was substantial increase in rural employment through dairying. In nutshell, in 2005-06 the total number of peoples was 146 who were engaged to different activities for their livelihood and they increased up to 259 over a period of ten. This change reflect proper management of the dairy animals due to the effective mechanism of extension service and technological development by Agricultural research system in the Trans-Gangetic plains.

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