

## Differential Adoption of Improved Dairy Husbandry Practices in Hill and Valley Regions of Manipur (India)

Research Article

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### ABSTRACT

The study was carried out in the purposively selected Senapati and Thoubal districts of hill and valley regions of Manipur State of India. Two blocks from each of the above selected districts were selected randomly and further from each block four villages were also selected randomly. 30 dairy farmers from each village were selected randomly and thus collected data from 240 respondents through personal interview with the help of pre-tested structural schedule. An adoption index specifically for these regions was developed covering all aspects of improved dairy husbandry practices (IDHPs). The weight age of each practice was decided by the judges rating method. The data thus collected were processed and analyzed by using various statistical tools. It was found that, except the variables family education status, annual income and urban contacts all the twenty variables showed high significant difference ( $P < 0.01$ ) between the two regions. The majority (55.00%) of the respondents in the hill region were in the medium category of adoption of (IDHPs), whereas, most (43.34%) of them in the valley were belonged to high category. The hill sample revealed that age, education, social participation, land holding, subsidiary occupation, milk consumption, type of house, personal cosmopolite, mass media exposure and belief were highly significant ( $P < 0.01$ ) with adoption, whereas for valley sample, variables like subsidiary occupation, milk production, milk consumption, milk sale, annual income, urban contact, communication sources, personal localite, personal cosmopolitan and mass media exposure were significant at  $P < 0.01$ .

**KEY WORDS** adoption, hill and valley regions, improved dairy husbandry practices, Manipur.

### INTRODUCTION

According to the annual report of integrated sample survey of Manipur State, 2010-2011, total milk production of the state was 78000 tones, out of which 44.10 percent was contributed from hill region and 55.90 percent from the valley. Within the hill region, the Senapati district alone contributes 39.47 percent of total milk production (Anonymous, 2011). Similarly, in the valley region, Thoubal district alone contributes 31.31 percent of milk production. Though the situations of dairy in Senapati and Thoubal district were be-

tter than the rest of the four hill and three valley districts, still there are multiple scopes for future dairy development. Farmers' adoption of IDHPs, therefore, becomes a prerequisite for sustain growth and development of dairying in the regions.

The low production and productivity performance of dairy animals is directly related to adoption of recommended IDHPs. Hence, the study was conducted to ascertain adoption of recommended improved dairy husbandry practices and key socio - economic factors that influence in adoption practices.

## MATERIALS AND METHODS

### Area of the study

The present study was conducted in purposively selected hill and valley regions of Manipur State of India.

### Sampling technique, data collection and analysis

Multistage sampling technique was used for selection of districts, blocks, villages and respondents of the regions. A complete sampling frame for selection of block, village and dairy farmers were developed with the help of secondary data collected from village information centre, thus, two blocks each from Senapati and Thoubal were selected randomly. Further, two villages from each of the selected blocks were retained and finally 30 dairy farmers from each of the villages were selected through randomization method and hence, a total of sample size 240 dairy farmers were selected for the present study. An adoption index specifically for this region was developed to measure the adoption level in all aspects of IDHPs. Weightage of practices was decided by the judges rating method and the practice-wise adoption of IDHPs was measured as “adopted” and “not adopted” with score 1 and 0 respectively. Adequate numbers of independent variables were selected for the study under the socio economic, socio psychological and communication. The data were collected through personal interview method with the help of pre-tested structured scheduled. The data thus collected were computed and analyzed by various statistical methods such as mean, standard deviation, cumulative square root frequency method, Pearson correlation coefficient etc.

## RESULTS AND DISCUSSION

### Adoption of improved breeding practices

The results presented in Table 1 highlighted that out of the six recommended improved breeding practices, the majority of the hill dairy farmers (93.33%) had the highest adoption about ‘Practicing artificial insemination (AI) in the animals at the proper time of heat’ followed by ‘heat detection in animals’ and ‘service the cow within 60-90 days after calving’ with their respective adoption score of 91.67 and 86.67 percent. The lowest (26.67%) adoption was about ‘treatment of anestrus and repeat breeding cases by the veterinarian’. Similarly, in case of the valley, the highest adoption was about ‘Practicing AI in the animals at the proper time of heat’ and lowest (40.83%) in ‘Maintaining 62% crossbred blood’. The pooled sample also showed the highest (91.25%) adoption in ‘Practicing AI in the animals at the proper time of heat’. From this we may conclude that the highest adoption in both the sample group was about ‘Practicing AI in the animals at the proper time of heat’.

It implies that the adoption range of various practices of improved dairy breeding was between 93.33 to 26.67%, 89.17-40.83% and 91.25-35.00% respectively in the hill, the valley and pooled sample which was in agreement with [Singha et al. \(2011\)](#).

### Adoption of improved feeding practices

A closer look at the Table 2 shows that cent- percent respondents in both the regions had adopted about ‘Providing clean and fresh drinking water to animals’ whereas the lowest adoption was about ‘Feeding of balanced concentrate mixture on the basis of milk yield’ in the hill (26.67%) and ‘Feeding of calves on the body weight basis’ in the valley (0.83%). This indicates that there was a wider variety of adoption between hill and valley regions. In hill region, the variation of adoption of recommended dairy feeding practices ranges between 100.00 and 26.55 percent, whereas in the valley it was 100.00 and 0.83 percent. [Aulakh and Singh \(2012\)](#) also reported that the respondents had the highest adoption in ‘The practices of adequate supply clean drinking water’. The low adoption in the case of the feeding of balanced concentrate mixture on the basis of milk yield may be due to unavailability of balance concentrate mixture in the regions and also the respondents reported that there is a high price of available market concentrate mixture. The findings were in conformity with [Sathiadhas et al. \(2010\)](#) and [Singha et al. \(2011\)](#) with regards to other statements of improved dairy feeding practices.

### Adoption of improved management practices

It is apparent from the Table 3 that out of the seven recommended management practices, three practices viz., ‘Washing hands and udder before milking’, ‘Maintenance of cleanliness in animal shed’ and ‘Practices of full hand milking’ were fully adopted in case of hill region, whereas in valley regions two recommended improved management practices viz. ‘Washing hands and udder before milking’ and ‘Maintenance of cleanliness in animal shed’ were fully adopted. The lowest adoption in both the regions was about ‘Use of sterilize blade / scalpel for cutting of naval cord and application of tincture iodine after cutting of naval cord’ with the respective adoption rate 33.33 and 15.83 percent in hill and valley regions. [Aulakh and Singh \(2012\)](#) and [Bainwad et al. \(2007\)](#) also reported in their study that 100% respondents adopted the practice of cleaning of hands and udder before milking.

### Adoption of improved healthcare practices

Table 4 clearly indicates that among the six recommended practices of improved healthcare practices, only two practices viz., ‘Isolation of sick animals from the healthy one’ (98.33% hill and 86.67% valley) and ‘Timely and regularly

vaccination against contagious diseases eg. HS, BQ, FMD, Anthrax, Brucellosis' was adopted by a large percentage of respondents (88.33% in hill and 85.83% valley region), whereas, the remaining practices were adopted only by very few farmers. Comparatively, the adoption about 'Treatment of sick animals by veterinary doctors' and 'Practicing deworming in calves' was much higher in valley than the hill region. It is seen in the same table that the lowest adoption in the hill (3.33%) was about 'Practicing deworming in calves' whereas, in the valley (34.17%) was 'Diagnosis for

control and eradication of diseases' respectively. In general the deworming of calves is considered as one of the most important part of scientific calf rearing practices, but in the study area this practice was neglected by the hill respondents. Hill region was very poor as compared to valley region and most probable reasons could be less healthcare facilities and distant location of animal health centres, problem in transport of sick animals due to hilly terrain, bad road conditions and non-availability of doctors in animal health centres.

**Table 1** Adoption of improved breeding practices

Statements	Hill (N=120)		Valley (N=120)		Pooled (N=240)	
	A	NA	A	NA	A	NA
Practicing artificial insemination (AI) in the animals at the proper time of heat	112 (93.33)	8 (6.67)	107 (89.17)	13 (10.83)	219 (91.25)	21 (8.75)
Service the cow within 60-90 days after calving	104 (86.67)	16 (13.33)	102 (85.00)	48 (40.00)	176 (73.33)	64 (26.67)
Heat detection in animals	110 (91.67)	10 (8.33)	102 (85.00)	18 (15.00)	212 (88.33)	28 (11.67)
Treatment of anestrus and repeat breeding cases by the veterinarian	32 (26.67)	88 (73.33)	69 (57.50)	51 (42.50)	101 (42.08)	139 (57.92)
Keeping animals in advanced stage of pregnancy indoors	52 (43.33)	68 (56.67)	74 (61.67)	46 (38.33)	126 (52.50)	114 (47.50)
Maintaining 62% crossbred blood	35 (29.17)	85 (70.83)	49 (40.83)	71 (59.17)	84 (35.00)	156 (65.00)

Figure in parentheses indicate percentage.

A: adopted and NA: not adopted.

**Table 2** Adoption of improved feeding practices

Statements	Hill (N=120)		Valley (N=120)		Pooled (N=240)	
	A	NA	A	NA	A	NA
Feeding colostrum to newly born calves	112 (93.33)	8 (6.67)	88 (73.33)	32 (26.67)	200 (83.33)	40 (16.67)
Feeding of balanced concentrate mixture on the basis of milk yield	32 (26.67)	88 (73.33)	42 (35.00)	78 (65.00)	74 (30.83)	166 (69.17)
Providing clean and fresh drinking water to animals	120 (100.00)	0 (0.00)	120 (100)	0 (00.00)	240 (100.00)	0 (0.00)
Green fodder production round the year	110 (91.67)	10 (8.33)	40 (33.33)	80 (66.67)	150 (62.50)	90 (37.50)
Green fodder preservation practices	111 (92.50)	9 (7.50)	20 (16.67)	100 (83.33)	131 (54.59)	109 (45.41)
Treatment of straw with 1: 40 urea	98 (81.67)	22 (18.33)	27 (22.50)	93 (77.50)	125 (52.09)	115 (47.91)
Feeding of calves on body weight basis	92 (76.67)	28 (23.33)	1 (0.83)	119 (99.17)	93 (38.75)	147 (61.25)
Preservation of dry fodder / straw	111 (92.50)	9 (7.50)	102 (85.00)	18 (15.00)	213 (88.75)	27 (11.25)

Figure in parentheses indicate percentage.

A: adopted and NA: not adopted.

**Table 3** Adoption of improved management practices

Statements	Hill (N=120)		Valley (N=120)		Pooled (N=240)	
	A	NA	A	NA	A	NA
Washing hands and udder before milking	120 (100.00)	0 (0.00)	120 (100.00)	0 (0.00)	240 (100.00)	0 (0.00)
Maintenance of cleanliness in animal shed	120 (100.00)	0 (0.00)	120 (100.00)	0 (0.00)	240 (100.00)	0 (0.00)
Use of sterilize blade / scalpel for cutting naval cut and on the naval and application of tincture iodine on the cut and on the naval cord.	40 (33.33)	80 (66.67)	19 (15.83)	101 (84.17)	59 (24.59)	181 (75.41)
Practicing full hand milking	120 (100.00)	0 (0.00)	99 (82.50)	21 (17.50)	219 (91.25)	21 (8.75)
Practicing castration of male calves	44 (36.67)	76 (63.33)	98 (81.67)	22 (18.33)	142 (59.17)	98 (40.83)
Daily grooming of animals with dandy brush	112 (93.33)	8 (6.67)	69 (57.50)	51 (42.50)	181 (75.41)	59 (24.59)
Avoid slippery floor	112 (93.33)	8 (6.67)	81 (67.50)	39 (32.50)	193 (80.41)	47 (19.59)

Figure in parentheses indicate percentage.

A: adopted and NA: not adopted.

**Table 4** Adoption of improved healthcare practices

Statements	Hill (N=120)		Valley (N=120)		Pooled (N=240)	
	A	NA	A	NA	A	NA
Timely and regularly vaccination against contagious diseases eg. HS, BQ, FMD, Anthrax, Brucellosis	106 (88.33)	14 (11.67)	103 (85.83)	17 (14.17)	109 (45.42)	131 (54.58)
Prompt reporting of outbreak of epidemic to the local veterinary doctor	31 (25.83)	89 (74.17)	78 (65.00)	42 (35.00)	109 (45.42)	131 (54.58)
Treatment of sick animals by veterinary doctors	40 (33.33)	80 (66.67)	96 (80.00)	24 (20.00)	136 (56.67)	104 (43.33)
Isolation of sick animals from the healthy one	118 (98.33)	2 (1.67)	104 (86.67)	16 (13.33)	222 (92.50)	18 (7.50)
Practicing deworming in calves	4 (3.33)	116 (96.67)	93 (77.50)	27 (22.50)	97 (40.42)	143 (59.58)
Diagnosis for control and eradication of diseases	32 (26.67)	88 (73.33)	41 (34.17)	79 (65.83)	73 (30.42)	167 (69.58)

Figure in parentheses indicate percentage.  
A: adopted and NA: not adopted.

Moreover, the majority (74.17% and 66.67%) of the respondents are not reporting prompt about the outbreak of epidemic to the local veterinary doctor' and 'Treatment of sick animals by veterinary doctors'. So, in general, it may be concluded that the adoption of healthcare practices in The respondents had reported that they were not getting any assistance from the government regarding.

#### Adoption of improved marketing practices (IMPs)

It is also clear from Table 5 that 100 percent of respondents in hill region had adopted the practice of 'Selling milk to the milk cooperatives' whereas 95.83 percent of the respondents not obtained loans from banks instead of village moneylenders. It implies that there is wide variation in adoption of improved marketing practices, but a close look at the table shows that respondents had higher adoption in all the practice. In case of valley region, although adoption in all the items were low, but there was less variation as seen in the table that the highest adoption was 64.17 percent and the lowest 39.17 percent.

#### Extent of adoption of IDHPs in the hill and the valley regions

It is seen in the Table 6 that the majority of the respondents in the hill region belonged to the medium (55.00%) category of adoption with an adoption score ranges from 15.6 to 20.9 which was followed by 30.00 percent and 15.00 percent in high and low category respectively. A perusal of the data presented in same table reveals that most of the dairy farmers in the valley (43.34%) were in the high adoption category with an adoption score above 20.9 which was followed by 35.83 percent in medium and only 20.83 percent in the low adopter category. Similarly, in the case of pooled sample, it is clearly seen that 45.42 percent had a medium level of adoption, whereas, 36.67 percent and 17.92 percent had high and low level of adoption. Similar findings were also reported by Singh and Chauhan (2009), Aulakh and Singh (2012) and Rathore *et al.* (2009).

#### Differential adoption of IDHPs in the hill and the valley regions

On the basis of mean score of adoption presented in Table 7 it could be seen that respondents in the hill had highest adoption practices in feeding, followed by management, breeding, healthcare and marketing. Whereas in the valley, the mean score adoption was observed to be higher in the case of management followed by health care, breeding, feeding and marketing practices. In order to validate the significance of these differences between the hill and valley region, 'z-test' was applied.

It revealed that z-value showed high significant difference ( $P < 0.01$ ) which indicates the significant difference between hill and valley with respect to their different aspects adoption of IDHPs.

#### Correlation matrix between adoption and selected variables

The selected traits of hill and valley respondents along with the pooled sample were subjected to correlation analysis with the adoption of improved dairy husbandry practices which is as shown in Table 8.

It was found that in case of respondents from the hill region, there was a significant relationship ( $P < 0.05$ ) between adoption and variables like milk production, milk sale and communication sources, whereas, highly significant relationship ( $P < 0.01$ ) between adoption and age, education, social participation, land holding, subsidiary occupation, milk consumption, type of house, personal cosmopolite, mass media exposure and belief.

It is also seen in the table that family education status, family size, herd size and urban contact showed significant but negative correlation, whereas, main occupation showed highly and negative significant correlation ( $P < 0.01$ ). Sahu *et al.* (2011) also reported that milk production was found significant ( $P < 0.05$ ) and a positive correlation whereas mass media exposure also found similar to the present study.

**Table 5** Adoption of improved marketing practices

Statements	Hill (N=120)		Valley (N=120)		Pooled (N=240)	
	A	NA	A	NA	A	NA
Selling of milk to the milk cooperatives	120 (100.00)	0 (0.00)	77 (64.17)	43 (35.83)	197 (82.08)	43 (17.92)
Purchasing animals from reliable sources after veterinary check up	111 (92.50)	9 (7.50)	53 (44.17)	67 (55.83)	164 (68.33)	76 (31.67)
Obtained loan from banks instead of village moneylenders	5 (4.17)	115 (95.83)	68 (56.67)	52 (43.33)	73 (30.42)	167 (69.58)
Buying and selling of animals with necessary record of milk production, calving, service, vaccination etc	98 (81.67)	22 (18.33)	47 (39.17)	73 (60.83)	145 (60.42)	95 (39.58)

Figure in parentheses indicate percentage.

A: adopted and NA: not adopted.

**Table 6** Extent of adoption of IDHPs in hill and valley regions

Category	Hill (N=120)		Valley (N=120)		Pooled (N=240)	
	n	%	n	%	n	%
Low (<15.6)	18	15.00	25	20.83	43	17.92
Medium (15.6-20.9)	66	55.00	43	35.83	109	45.42
High (>20.9)	36	30.00	52	43.34	88	36.67

**Table 7** Differential adoption of IDHPs in hill and valley regions

Sl. No	IDHPs	X <sub>1</sub> for Hill	Variance	X <sub>2</sub> for valley	Variance	X <sub>1</sub> -X <sub>2</sub>	z-value
1	Breeding	3.74	2.17	3.89	2.68	0.15	4.11**
2	Feeding	6.60	2.46	3.67	1.06	2.93	34.23**
3	Management	5.57	1.25	5.04	0.91	0.53	7.86**
4	Healthcare	2.85	1.97	4.30	2.86	1.45	0.04 <sup>ns</sup>
5	Marketing	2.80	0.34	2.02	2.68	0.78	9.80**
6	Overall adoption	21.44	26.58	18.90	27.56	2.54	7.55**

IDHPs: improved dairy husbandry practices.

\*\* (P&lt;0.01) and \* (P&lt;0.05).

NS: non significant.

**Table 8** Correlation matrix between adoption and selected variables

Variable no	Variables	Pearson correlation (r)		
		Hill (N=120) region	Valley (N=120) region	Pooled (N=240)
χ <sub>1</sub>	Age	0.277**	0.224*	0.300**
χ <sub>2</sub>	Education	0.354**	-0.235**	0.012
χ <sub>3</sub>	Family education status	-0.199*	-0.097	-0.041
χ <sub>4</sub>	Family size	-0.198*	0.166	0.075
χ <sub>5</sub>	Social participation	0.539**	0.098	0.384**
χ <sub>6</sub>	Land holding	0.316**	-0.282**	-0.073
χ <sub>7</sub>	Herd size	-0.207*	-0.365**	-0.133*
χ <sub>8</sub>	Main occupation	-0.365**	-0.522**	-0.498**
χ <sub>9</sub>	Subsidiary occupation	0.349**	0.557**	0.511**
χ <sub>10</sub>	Milk production	0.220*	0.744**	0.553**
χ <sub>11</sub>	Milk consumption	0.239**	0.488**	0.403**
χ <sub>12</sub>	Milk sale	0.208*	0.743**	0.543**
χ <sub>13</sub>	Annual income	0.168	0.579**	0.408**
χ <sub>14</sub>	Type of house	0.257**	0.220*	0.144*
χ <sub>15</sub>	Urban contact	-0.225*	0.256**	0.045
χ <sub>16</sub>	Communication sources	0.219*	0.618**	0.497**
χ <sub>17</sub>	Personal localite	-0.172	0.525**	0.325**
χ <sub>18</sub>	Personal cosmopolite	0.445**	0.558**	0.524**
χ <sub>19</sub>	Mass media exposure	0.271**	0.403**	0.186**
χ <sub>20</sub>	Belief	0.346**	-0.361**	-0.060

\*\* (P&lt;0.01) and \* (P&lt;0.05).

A detail observation of the same table depicted that the respondents from valley region showed significant relationship (P<0.05) between adoption and variables like age and

type of house, whereas, high significant (P<0.01) between adoption and subsidiary occupation, milk production, milk consumption, milk sale, annual income, urban contact,

communication sources, personal localite, personal cosmopolite and mass media exposure. From this, we may infer that respondents, who preferred subsidiary occupation, would lead to higher adoption. This may be due to the fact that in the study area main occupation for the majority of the respondents was agriculture. The respondents those who are more milk producer, consumer and milk sale also influence positively on adoption of IDHPs. It may also infer that urban contact, personal localite, personal cosmopolite, mass media exposure and communication sources need to be more and more broaden to increase the adoption of IDHPs. In the study area, most of the selected respondents were crossbred rearers and had less than 3 crossbred cows, whereas those respondents who own more animals were mostly local cattle, which may be the result of lesser adoption with an increase in herd size. The Pearson correlation analysis in case of pooled sample found that age, social participation, main occupation, subsidiary occupation, milk production, milk consumption, milk sale, annual income, communication sources, personal localite, personal cosmopolite and mass media exposure showed positive correlation and highly significant ( $P < 0.01$ ) with the adoption of IDHPs.

Which can be inferred that increased with age, social participation, subsidiary occupation, milk production, milk consumption, milk sale, annual income, communication sources, personal localite, personal cosmopolite and mass media exposure etc. would increase in adoption of IDHPs. On the hand main occupation was found negative and highly correlated at  $P < 0.01$ , whereas herd size was found negative and significant at  $P < 0.05$ . It can be inferred that increased in these variables would lead to decreased in adoption of IDHPs. Sahu *et al.* (2011) also reported that milk production was found significant ( $P < 0.05$ ) and a positive correlation whereas mass media exposure also found similar to the present study.

## CONCLUSION

Adoption of improved dairy farming practices is very essential for successful dairy farming. The study analyzed the practice-wise adoption of IDHPs and it was found that the adoption of improved healthcare practices was very poor as

compared to improved practices of breeding, feeding, management and marketing. So, the extension workers of the concerned extension and veterinary agencies working in the study area may give more emphasis on animal health care practices and activities of the state veterinary department may also need to gear up for further growth of the dairy sector in the region. Further, the study ascertained that education and social participation for hill and social participation and urban contact for valley regions were the most important variables which determined the adoption of improved dairy husbandry practices. So, to increase the adoption about IDHPs for sustainable dairy production, strengthening of dairy farmer's education, social participation and urban contact are most recommended for both the regions.

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