Study on Adoption behavior of Various Category of Livestock Owners in Northern Hill Region of West Bengal, India

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Abstract—*Animal Husbandry practices in Hill region (Darjeeling district) of West Bengal is an age old tradition and only sustainable livelihood asset. So, adoption of improved animal Husbandry practices by the rural livestock owners of this area for better entrepreneurial venture is very much need based for present day agriculture. In this backdrop of fact, a study was carried out in selected only Hill district i.e. Darjeeling district of W.B. From, total 134 GP's of the district only 5% GPs i.e. 07 no's of GP selected and from this total 84 no's of villages randomly selected. From each village, 5 livestock owners were selected randomly of which 2 were large livestock owners, 02 small livestock owners and 01 was poultry farmer. In this way, 168 large, 168 small and 84 poultry farmers (total 420) were selected randomly which formed the sample of the study. The data were collected with the help of pre-tested structured interview schedule. The data thus analysed through various statistical methods such as–Frequency-percentage, correlation, multiple regression analysis, Path analysis, Factor analysis etc. The study explored that majority of selected Livestock owners (Dairy, Small animal & Poultry) belongs to young (31-40 yrs.) & middle aged (41-50 yrs.), male and under Hindu community. The maximum respondents were married, lower income group and belongs to SC & OBC category. Their livelihood sustained through cultivation, Business & labour occupational support system. Majority comes under marginal category &holding nuclear family having up to 5 members. They have maximum middle & high school as literacy status and reside in Kutcha house. There have significant relationship between adoption index & knowledge level in IAHP, mass media, personal localities, Cosmo politeness, communication sources, which comes to be key elements in adoption of improved practices by the Hill area respondents in WB.*
KEY WORDS: Livestock, Adoption, Behavior, Hill region, Category etc.

1. INTRODUCTION

Livestock farming plays key role in rural economy of India. This is an age old traditional practice and only sustainable livelihood asset especially in Hill area of West Bengal. Considering, the decreased agricultural production trends as well as much less changing climatic effect on livestock production system, scientific orientation of this sustainable farming practice makes its much more profitable, realistic entrepreneurial venture for rural socio-economic development of the only Hill area of the state of West Bengal i.e. Darjeeling district. So, adoption of improved animal Husbandry practices by the rural livestock owners of this area for better livelihood generation and entrepreneurship development is very much need based for present day agriculture. In this backdrop of fact, a study was carried out in selected only Hill zone i.e. Darjeeling district of W.B. to find out the knowledge & adoption level of various category of livestock & poultry owners in improved farming practices.

2. MATERIALS & METHODS

The study was conducted purposively selected Northern Hill Agro-climatic zone of Darjelling district of West Bengal. The district have 134 no's of GP from which 5% i.e. 07 no's of GP selected randomly considering its livestock population. So, from this 07 no's of GP all the villages i.e. 84 no's taken into consideration for sample study. From each village 5 livestock owners were selected randomly of which 2 were large livestock owners (cattle & buffalo owners), 2 were small livestock owners (sheep, goat & pig owners) and 01 was poultry farmer (Poultry, Duck owners). In this way, 168 large, 168 small and 84 poultry farmers (total 420) were selected randomly which formed the sample of the study. There were total 35 no's of selected independent variables in which 14 socio-economic, 16 socio-psychological, 02 communication and 03 administrative variables. In the present study, the adoption level was measured by adoption index method developed by *Dasgupta (1968)*. Pre-tested structured interview schedule was used to collect data by the researchers himself for the study. The collected data was computed and analyzed by various statistical methods including- percentage analysis,

Mean+SD, correlation coefficient and constraints analysis for better interpretation of the results.

3. RESULTS & DISCUSSION:

Relationship between Selected Independent & Dependent Variable (Adoption Index) Of Dairy, Small animal & Poultry Farmers in Hill Zone Of W.B. Expressed in Table-1.

The Tabular fact depicted that the composite adoption index of selected dairy farmers in Hill zone were positively and significantly correlated with pathology center, knowledge in colostrum feeding, milk productivity, vaccination, deworming, Green fodder cultivation, Green fodder feeding, attitude towards employment, dairy farming,, mass media sources, personal Cosmo politeness, localiteness, communication sources, marketing orientation at 1% level of significance whereas with communication skill & milk productivity at 5% level of significance. But, there have negative significant correlation with occupation at 1% level of significance.

The table explored that adoption index in IAHP of selected small animal owners in Hill zone were positively and significantly correlated with the variables like knowledge in milk & milk products, personal Cosmo politeness, and localiteness at 5% level and with communication source, mass media at 1% level of significance. In reverse, the variables like – house type, attitude in employment, income generation, and risk orientation at 1% level followed by the variables like milk productivity at 5% level of significance with adoption index in IAHP of selected small animal owners in Hill zone of West Bengal.

A detail observation in the table revealed that the adoption index in IAHP of selected poultry owners in Hill zone were positively and significantly correlated with the variables like Marital status, pathology center, economic motivation, attitude towards productivity at 5% level whereas with mass media, personal Cosmo politeness, localiteness, communication sources, communication skill, attitude towards income generation at 1% level of significance. In reverse, the composite adoption index of selected poultry owners in Hill zone had negative significant correlation with the variables like- knowledge in goattery, piggery, Green fodder cultivation, concentrate feeding at 5% level but with knowledge in deworming at 1% level of significance in the study.

The following previous observations will support some of the present study to get better understanding. Singh (1982) reported that age had no significant relationship with adoption of improved dairy innovations. Gupta (1978) found no significant impact of income with the adoption of improved A.H. technology. Sayeedi (1983) and Dana et. al. (1998) found significant relation of family educational status with adoption of dairy innovations. Sharma (1994) also worked on various independent variables relating to relationship with the adoption of different A. H. practices. Teklewold et. al. (2006), Goswami (2007) etc. also reported different observations on adoption behaviour related to different variables which supported the present findings. Daipuria et. al. (2001) reported that age, education, house type, social participation, risk orientation, mass media, marketing orientation, knowledge etc. were significantly associated with the adoption of dairy practices.

Path analysis showing first 05 important factors of Direct & Indirect effects of selected independent variables & adoption Index of Dairy, S. Animal & Poultry farmers in Hill zone of W.B. are shown in Table-2.

First five important factors on the basis of Path coefficient in relation to the Dairy, Small animal & Poultry farmers under study is provided for making comparative assessments about the importance of the factors influencing the adoption index in dairy, small animal & Poultry farming in Hill zone situations. The study depicted that Various communication sources viz. Personal Cosmo politeness, personal localiteness & Mass media sources have shown greater direct effects on adoption Index of IAHP of selected dairy , Small animal & Poultry farmers followed by knowledge level, total income & education also played key role in adoption of improved practices by the selected stakeholders in the zone. Similarly, communication source, income generation, occupation & knowledge level also indirectly influence adoption index of various group of selected entrepreneurs in the zone. *Goswami (2000)* in his findings reported that the first five factors having largest direct effect on adoption of selected A. H practices in case of saline belt livestock owners were social participation, Knowledge about cultivation of green fodder, personal localite, family educational status and age while mass media communication, communication skill, risk orientation, knowledge about deworming and attitude towards dairy farming exerted first five largest indirect effects.

Different Information Sources utilization in Adoption of IAHP by Selected Dairy, Small animal & Poultry Farmers in Hill Zone of W.B. are expressed in Table-3.

The Tabular findings depicted that maximum selected small animal owners (42.85%) utilize various mass media sources regarding adoption of improved farming practices, followed by the Dairy (38.09%) & Poultry owners (44.05%) were utilize various mass media (Such as- Radio, TV, Newspaper, Poster, exhibition etc.) as information sources regarding adoption of improved farming practices in rank wise descending order.

Similarly, considering personal cosmopolite information sources utilization, higher no of selected Dairy owners(51.19%) used the personnel cosmopolite sources (Viz. BLDO, University Ext. Personnel, Bank personnel, Input dealers etc.) regarding adoption of improved A.H. practices, whereas the small animal (34.52%), & Poultry respondents(52.38%) were sequentially utilize several

personal cosmopolite sources for adoption of improved farming practices.

Concomitantly, majority of selected dairy stakeholders in Hill zone(55.36%) utilized personnel localite sources in adoption of improved A.H. farming practices whereas the small animal(51.79%) & Poultry entrepreneurs(65.48%) were chronologically utilize personal localite channels(Such as-neighbors, friend & Relatives etc.) as information sources for adoption of improved farming practices in the study area.

Knowledge & Adoption level of different category of Animal Husbandry owners (Dairy, Small animal & Poultry) about improved farming Practices in Hill zone of W.B. are depicted in Table-4.

The Table revealed that level of knowledge of different category of selected animal Husbandry owners (Dairy, Small animal & Poultry) about improved farming practices in Hill zone of West Bengal. The fact explored that majority of selected dairy farmers (63-79%), small animal owners (62-72%) & Poultry owners (60-75%) have medium level of knowledge on improved farming practices in the zone & only few have high and low level of knowledge on improved recommended practices. The Table also depicted the adoption level of various category of selected livestock owners (Dairy, Small animal & Poultry) about improved farming practices in Hill zone of West Bengal. The findings of the table revealed that majority of selected dairy farmers (64-76%), small animal owners (64-81%) & Poultry owners (65-78%) have medium level of adoption on improved farming practices & only few have low & high level of adoption of improved farming practices about recommended practices.

So, the study concluded that majority of selected Dairy, Small animal & Poultry entrepreneurs have medium knowledge & adoption level about improved Animal Husbandry practices in the Hill zone of West Bengal, which is very much indicative in relation to future animal Husbandry development strategy as well as planning of West Bengal.

Constraints perceived by the various Category of respondents (Dairy, Small animal & Poultry) in Hill zone of West Bengal are expressed in Table-05.

The perusal of the table depicted that lack of transportation facility **(82.74%),** non-availability of feed **(72.02%)** & high cost of feed **(62.5%)** were the three major constraints faced by the rural Dairy farmers of the Hill region for scientific farming practices. So, the tabular facts explored that high cost feed, non- availability of feed, lack of transportation, credit facility, marketing facility, lack of remunerative price, live animal as input along with non-availability of vety. service were the major constraints or drawbacks for promoting dairy farming as entrepreneurial venture in study area of W.B.

The findings of the Table indicated that lack of green folder **(84.52%),** non-availability of feed **(80.36%),** epidemic of animal disease **(72.62%)** and high cost of feed (57.14%) were

the four major constraints perceived by the small animal farmers of Hill Zone in profitable small animal farming practices. The analytical study finally explored that high cost of feed **(93.62%),** epidemic of animal disease **(92.86%),** lack of input **(94.05%),** as live animal & lack of transportation facility **(91.67%)** were the four prime bottlenecks for developing rural entrepreneurship through Poultry farming in selected Hill region of W.B.

Summary of the table represented that lack of credit facility, transportation facility, high cost & non availability of feed, lack of inputs &. Epidemics of animal disease were the major constraints or drawbacks for developing sustainable rural entrepreneurship through improved livestock & Poultry farming in selected Hill area of W.B.

4. CONCLUSION

The adoption study explored that majority of livestock-Poultry owners in Hill area belongs to middle aged, Hindu religion, low education level, SC & OBC category & lower economic status. Cultivation was the main occupation of majority of stakeholders to maintain livelihood security, they resides in Hut & Kutcha house with marginal category land holding pattern. The analysis revealed that various communication sources plays key role in knowledge gain vis-à-vis adoption of improved farming practices and shows significant relationship with several independent variables under study for socioeconomic upliftment of rural stakeholders through better knowledge-adoption level and positive attitude built-up. The study reflects that the majority of selected entrepreneur's possess medium level knowledge & adoption level which is very much indicative. Finally it also depicted various constraints like-lack of credit facility, transportation facility, high cost & non availability of feed, lack of inputs &. Epidemics of disease were the major drawbacks for developing sustainable rural entrepreneurship through improved livestock & Poultry farming in selected Hill area of W.B.

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Knw_Gff	*0.394*	*-0.218*	-0.036
Knw_Cf	0.147	*-0.205*	**-0.377**
Att Productivity	0.089	-0.001	**0.277**
Mass Media	*0.243*	*0.222*	*0.421*
Per Cosmopolite	*0.298*	**0.179**	*0.346*
Per Localite	*0.304*	**0.182**	*0.469*
Communication	*0.371*	*0.253*	*0.44*
Com Skill	**0.189**	0.136	*0.383*
Marketing Orient.	*0.269*	-0.01	0.17
Risk Orientation	0.028	*-0.216*	0.084
Social Participation	0.088	0.051	

N.B. Bold values are significant at 5% level & Bold and italics value are significant at 1% level.

Table 1: Relationship between Selected Independent & Dependent Variable (Adoption Index in IAHP) Of Dairy Farmers in Hill Zones Of W.B.

Variables	Dairy farmers	Small Animal	Poultry farmers
Sex	0.008	0.004	-0.001
Age	0.005	0.151	-0.074
Religion	-0.067	0.099	-0.107
Marital Status	0.021	-0.04	**0.221**
Income	0.074	-0.026	0.02
Oth Income	0.066	0.009	0.041
Tot Income	0.011	-0.008	0.036
Pathology Centre	*0.216*	0.001	**0.249**
Caste	0.079	-0.055	0.206
Milk Productivity	**0.183**	**-0.163**	0.00
Occupation	*-0.213*	0.109	0.00
Education	-0.115	0.109	0.00
Fam. Edu Stat	0.096	-0.057	0.00
Fam_Type	-0.082	-0.128	0.00
Fam_Size	0.026	0.079	0.00
Land	0.137	-0.026	0.00
House	0.064	*-0.202*	0.00
Farm Power	0.031	0.073	0.00
Knw_Col	*0.404*	0.148	0.005
Knw_Goat	-0.046	0.123	**-0.246**
Knw_Pig	0.045	-0.004	**-0.277**
Knw_Duck	-0.142	0.051	-0.056
Knw Poultry	0.107	0.043	0.005
Knw_Milk	*0.331*	-0.126	-0.092
Att. Employment	*0.29*	-0.085	-0.006
Att Income	0.149	0.134	*0.284*
Mat Possession	0.008	0.075	-0.011
Economic Motiv.	0.006	-0.066	**0.239**
Attitude	*0.217*	-0.114	0.014
Knw_Ai	0.127	0.034	0.117
Knw_Vac	*0.234*	0.071	-0.105
Knw_De	*0.296*	0.037	*-0.321*
Knw_Gfc	*0.304*	**0.182**	-0.24

Table- 3: Path analysis showing Direct & Indirect effects of first 05 important factors of selected independent variables & adoption Index of Dairy, S. Animal & Poultry farmers in Hill zone of W.B.

Sl. No.	Independent Variables	Direct Effect	Rank	Independent Factors	Indirect Effect	Rank
Dairy Farmers:						
1.	Personal Cosmo politeness	0.748	i	Communication sources	1.240	i
2.	Personal localiteness	0.626	ii	Total income gen.	0.340	ii
3.	Mass media sources	0.590	iii	Attitude in Dairy farming	0.235	iii
4.	Knowledge in colostrum feeding	0.257	iv	Occupation	0.218	iv
5.	Knowledge in Green fodder feeding	0.192	v	Pathology centre	0.217	v
Small Animal farmers:						
1.	Personal Cosmo politeness	1.455	i	Communication sources	3.039	i
2.	Mass media sources	1.300	ii	Other income sources	0.345	ii
3.	Personal localiteness	1.166	iii	Income generation	0.274	iii
4.	Total Income	0.226	iv	Knowledge in Green fodder cultivation	0.136	iv
5.	Social Participation	0.176	v	Occupation	0.123	v
Poultry Farmers:						
1.	Mass media sources	0.643	i	Communication sources	1.321	i
2.	Personal localiteness	0.549	ii	Pathology centre	0.386	ii
3.	Personal Cosmo politeness	0.436	iii	Knowledge in Poultry farming	0.281	iii

| 4. | Knowledge in Green Fodder cultivation | 0.260 | iv | Social Participation | 0.242 | iv |
| 5. | Education of the respondents | 0.170 | v | Knowledge in colostrums feeding | 0.206 | v |

Table 4: Utilization of different information sources in adoption of IAHP by selected Livestock Owners (Dairy, Small Animal & Poultry) in Northern Hill Zone of W.B.

SL. No.	Sources of Information			
	Category of Farmers	Mass Media	Personal Cosmopoliteness	Personal localiteness
1.	**Dairy Farmers:(168)**			
(a)	No	64	86	93
(b)	%	38.09	51.19	55.36
(c)	Rank	II	I	I
2	**Small Animal Farmers: (168)**			
(a)	No	72	58	87
(b)	%	42.85	34.52	51.79
(c)	Rank	I	II	II
3	**Poultry Farmers: (84)**			
(a)	No	37	44	55
(b)	%	44.05	52.38	65.48
(c)	Rank	III	III	III

Table- 05: Knowledge & Adoption level of different categories Livestock owners (Dairy, Small Animal & Poultry) about improved farming practices in Hill Agro-climatic zones of WB

KNOWLEDGE LEVEL	STATISTICAL PARAMETER	DAIRY FARMERS	POULTRY FARMERS	SMALL ANIMAL FARMERS
Low	< (Mean-SD)	10.60	13.60	8.70
Medium	(Mean - SD) to (Mean + SD)	78.80	59.90	68.50
High	< (Mean-SD)	10.60	26.50	22.80
ADOPTION LEVEL				
Low	< (Mean-SD)	15.50	14.40	14.00
Medium	(Mean - SD) to (Mean + SD)	70.40	68.10	76.30
High	< (Mean-SD)	14.10	17.50	9.70

Table 6: Rank wise constraints Perceived by various Category of Respondents (Dairy, Small Animal & Poultry) in Hill Zone of West Bengal

CATEGORY	Dairy farmers(168)			Small animal(168)			Poultry Farmers(84)		
	Freq	(%)	Rank	Freq	(%)	Rank	Freq.	(%)	Rank
1. High cost of feed	**105**	**62.5**	III	**96**	**57.14**	IV	82	**97.62**	I
2. Non-availability of feed	**121**	**72.02**	II	**135**	**80.36**	**II**	72	85.71	V
3. Lack of transportation facility	**139**	**82.74**	I	39	23.21	XIII	77	91.67	IV
4. Lack of marketing facility	82	48.81	V	27	16.07	XIV	21	25.00	XIV
5. Lack of credit facility	89	52.98	IV	94	55.95	V	69	82.14	VI
6. High cost of vety medicines	32	19.05	XIII	87	51.78	VI	65	77.38	VII
7. Non-availablity of vety. Service	72	42.86	VII	85	50.60	VII	52	61.90	IX
8. Lack of training facilities	54	32.14	X	72	42.86	X	43	51.19	XII
9. Lack of green fodder	65	38.69	VIII	**142**	**84.52**	I	00	00	XV
10. Lack of remunerative price	16	9.52	XV	23	13.69	XV	35	41.67	XIII
11. Lack of input(live animal)	75	44.64	VI	76	45.24	IX	**79**	**94.05**	**II**
12. Lack of electricity	37	22.02	XII	62	36.90	XI	62	73.81	VIII
13. Lack of Panchayet assistance	42	25.00	XI	82	48.81	VIII	51	60.71	X
14. Epidemic of Animal disease.	23	13.69	XIV	**122**	**72.62**	**III**	78	92.86	**III**
15. Lack of proper information	57	33.93	IX	46	27.38	XII	47	55.95	XI