Management Efficiency of Dairy Entrepreneurs

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ABSRACT

The present study was conducted in urban, peri-urban and rural localities of Thanjavur district in Tamil Nadu. Data were collected personally from 150 dairy owning households hailing equally from urban, peri urban and rural areas. Family education status, herd size, input availability, market facilities, level of knowledge about improved dairy husbandry practices, economic motivation, scientific orientation, achievement motivation, self confidence and innovation proneness were found to have positive and significant relationship with management efficiency of overall sample of respondents, irrespective of the localities. Amongst situational and personal characteristics, family education status had positive and significant relationship with management efficiency among peri-urban respondents, whereas herd size and input availability were found to have positive and significant relationship with management efficiency of urban dairy farmers. The regression model showed 81.70 per cent variability in management efficiency among rural respondents followed by peri-urban (76.20%) and urban (70.80%) areas. The regression model fitted using ten independent variables had accounted for 74.60 per cent of variation in management efficiency among overall sample of respondents, irrespective of the localities. Locale wise, economic motivation was the most important variable that affected management efficiency of urban dairy farmers both directly and indirectly. Knowledge level about improved dairy husbandry practices had the maximum direct effect and scientific orientation showed maximum indirect effect on management efficiency of peri-urban respondents. In rural area, scientific orientation and achievement motivation exhibited maximum direct and indirect effects, respectively.

Key Words : *Management efficiency; Dairy entrepreneurs; Urban; Peri-urban; Rural localities*

Dairying in India plays a crucial role in the rural economy that has the highest potential of generating income and employment through augmenting productivity of milch animals. Planners and policy makers have viewed it as an effective instrument of social and economic change. The implementation of various dairy development programmers/schemes by Government of India has changed dairy farming scenario tremendously and helped the dairy entrepreneurs to obtain higher profits.

Sustainability of dairy enterprise however largely depends on the efficient management of the resources by the entrepreneurs running the dairy units. A study encompassing various components underlying the concept is essential as many of the earlier studies on management of dairy enterprise have been fragmentary and covered only few aspects of this multi-faceted concept. The location of dairy farm in an urban, peri-urban and rural area also have a definite influence on the efficiency of dairy farmers in the management of their dairy enterprise as a whole besides the effect of situational, personal and psychological factors. A clear understanding of all those factors influencing management efficiency of the dairy farmers is therefore, paramount importance in augmenting productivity of milch animals and generating family employment and income. The study based on these perspectives is framed with the following specific objectives:

1. To measure the management efficiency of dairy farmers in urban, peri-urban and rural areas.
2. To study the relationship of selected situational and personal factors with management efficiency of dairy farmers and productivity of milch animals.
3. To study the direct and indirect effect of selected situational and personal factors on the management efficiency of dairy farmers and productivity of milch animals.

METHODOLOGY

The present study was conducted in urban, peri-urban and rural localities of Thanjavur district in Tamil Nadu. Thanjavur town, which is largest in terms of geographical area (36sq. km) and head quarter of the district, was selected as urban area for the study. For convenience Thanjavur town was divided into three regions to get representative sample of respondents.

A cluster of three villages viz. Thirukkanoorpatti, Arputhapuram and Minnathur located within 10 km distance from boundary of the urban area were selected as peri-urban area and an another cluster of three villages namely; Panayakkottai, Moorthiammalpuram and Neyvasal located 10 km away from the boundary of the urban area, were selected as rural area for the study. From each of the selected urban, peri-urban and rural areas, 50 dairy owing households classified into small (1-4 milch animals) and large (more than 4 milch animals) herd owning categories were selected through proportionate random sampling method. One adult member (above 20 years of age) who was actively involved in the dairy farming activities from each selected family was considered as respondent for the study. The respondent were interviewed on 12 identified independent variables viz., family education status, herd size, experience in dairy farming, input availability, market facilities, proximity to veterinary support systems, level of knowledge about improved dairy husbandry practices, economic motivation, scientific orientation, achievement motivation, self confidence and innovation proneness and a dependent variables namely; management efficiency of dairy farmers. Management efficiency of dairy farmers was measured through management efficiency index specifically developed for the study on the basis of normalized rank approach method recommended by Guilford (1954 consisting of eight components namely; ability in planning, rationality in decision making, risk orientation, ability in seeking information, extent of adoption of improved dairy husbandry practices, efficiency in mobilization and use of resources, ability in coordinating activities and ability in rational marketing.

RESULTS AND DISCUSSION

Correlation analysis between situational, personal and psychological factors with management efficiency of dairy farmers : Table 1 reveals that out of 12 independent variables; 10 variables viz. herd size, input availability, level of knowledge about improved dairy husbandry practices, economic motivation, scientific orientation, achievement motivation, self confidence, innovation proneness ($P<0.01$), family education status and market facilities ($P<0.05$) were found to be positively and significantly correlated with management efficiency of dairy farmers, irrespective of three locales of the study. It implies that higher the educational status of the family members, better was their comprehension and understanding of the intricacies of scientific dairy farm management and higher was their management efficiency. Reddy (1983) also reported significant association of education with management orientation among groundnut growers in Kolar district of Karnataka state. Higher educational status possessed by the sericulture farmers of Karnataka state helped them in the effective management of their sericulture enterprise (Nagaraja, 1989). Educated farm housewives of West Bengal were found to be efficient in the management of financial affairs of their livestock enterprises (Sarkar et al., 2001). The result however was found different with respect to the respondents of urban and rural areas, where non-significant relationship between family education status and management efficiency was observed. The urban respondents might have developed better understanding and comprehending abilities through better and wider social contacts and high orientation in commercialization of their dairy enterprise, hence were found efficient in the management of the dairy units regardless of their family education status. On the other hand, low commercial orientation, traditionalism and resource poorness among the rural respondents might have affected the efficiency in management of their dairy units, irrespective of the family education status. . The variables viz., experience in dairy farming and proximity to veterinary support systems did not show significant relationship with the management efficiency of dairy farmers.

The variable herd size was found to have positive and highly significant ($P<0.01$) relationship with management efficiency among overall sample of respondents, irrespective of the locality. It indicates that as the number of milch animals per family increases, the managerial efficiency of the dairy farmers also increases in order to obtain maximum returns. Localewise, the study revealed positive and highly significant ($P<0.01$) relationship between herd size and management efficiency only among the urban respondents and was found non-significant among peri-urban and rural respondents. Input availability showed positive and highly significant ($P<0.01$) relationship with management efficiency of overall sample of respondents as well as among those belonged to urban area. The better availability of inputs facilitated efficient planning, easy mobilization of resources, timely adoption and better management of the dairy enterprise by the respondents. Table 1 further indicates non-significant relationship between input availability and management efficiency among peri-urban and rural respondents. Geographically, less variation were found among peri-urban as well as rural respondents in terms of distance and regularity of availability of inputs for running the dairy enterprise.

Table 1 further shows that the existence of market facilities had a positive and significant ($P<0.05$) relationship with the management efficiency of overall respondents, irrespective of the locality. Better the market facilities for

milk/ milk products, easier will be their disposal and regular will be the flow of income from the dairy enterprise. This inclines an individual to manage his dairy unit in an efficient way to obtain higher income on sustained basis. Non-significant relationship however was revealed between market facilities and management efficiency among peri-urban respondents and no correlation with urban and rural respondents. Existence of marketing facilities among all the respondents in the urban area did not show any variation, thus no correlation was observed. Similar situation was also observed in the rural area.

Table 1. Zero order correlation analysis between situational, personal and psychological variables and management efficiency of dairy entrepreneurs

S. No.	Variables	Correlation co-efficient (r)			
		Urban (n=50)	Peri-urban (n=50)	Rural (n=50)	Overall (N=150)
X_1	Family education status	-0.086 NS	0.308**	0.191 NS	0.180*
X_2	Herd size	0.392**	0.190 NS	0.230 NS	0.305**
X_3	Experience in dairy farming	0.146 NS	0.155 NS	-0.102 NS	-0.126 NS
X_4	Input availability	0.310*	0.193 NS	-0.022 NS	0.222**
X_5	Market facilities	0.000	0.182 NS	0.000	0.184*
X_6	Proximity to veterinary support systems	0.262 NS	-0.064 NS	0.033 NS	-0.023 NS
X_7	Level of knowledge about improved dairy husbandry practices	0.673**	0.767**	0.746**	0.725**
X_8	Economic motivation	0.780**	0.717**	0.798**	0.797**
X_9	Scientific orientation	0.625**	0.735**	0.830**	0.675**
X_{10}	Achievement motivation	0.494**	0.734**	0.846**	0.719**
X_{11}	Self confidence	0.552**	0.703**	0.702**	0.675**
X_{12}	Innovation proneness	0.655**	0.684**	0.747**	0.715**

**- Significant at 0.01 level of probability, * Significant at 0.05 level of probability, NS-Non-significant

The psychological characteristics of the respondents viz. level of knowledge about improved dairy husbandry practices, economic motivation, scientific orientation, achievement motivation, self confidence and innovation proneness had positive and highly significant ($P<0.01$) relationships among overall sample of respondents as well as among respondents in each of urban, peri-urban and rural areas, separately. It indicates that respondents with high level of knowledge were efficient managers and vice-versa. Nandapurkar (1982) and Mahipal (1983) observed that knowledge of dairy enterprise affected the entrepreneurial performance of the farmers. Anantharaman (1991) also found that the farmers with high level of knowledge about scientific cassava cultivation practices in Kerala and Tamilnadu states were more efficient in managing the cassava cultivation operations as compared to those with low level of knowledge. The lack of knowledge about mango production technology was the reason for poor management orientation among mango growers of Andhra Pradesh as reported by Reddy and Ratnagar (1994). The positive and highly significant relationship between economic motivation with management efficiency might be attributed to the fact that respondents who were highly economically motivated, managed their dairy enterprise in an efficient manner in order to get higher returns than those who were less economically motivated. Badachikar (1985) also observed significant and positive correlation between economic motivation and management orientation of farmers in Bijapur district of Karnataka. Bora and Ray (1986) also found that commercial vegetable growers of West Bengal having higher level of economic motivation achieved higher returns through efficient farm management. Similarly, Nagaraja (1989) found that the sericulturists, who were highly economically motivated were efficient managers. Anantharaman (1991) also reported significant relationship between economic motivation and management efficiency among cassava farmers of Kerala and Tamilnadu states.Table 1 further pointed out that the variables; scientific orientation and innovation proneness exhibited positive and significant correlation with management efficiency which implies that the respondents having high orientation towards scientific practices and more proneness to adopt dairy innovations had readily accepted and followed scientific dairy management practices. Localewise also, the study revealed significant relationship of these psychological factors with management efficiency. The farmers of Karnataka state, who were efficient in managing sericulture enterprise, were also found with high level of scientific orientation and more proneness to adopt sericulture innovations (Nagaraja, 1989).The study further highlighted significant and positive correlation of achievement motivation with management efficiency indicating that the respondents with high level of achievement motivation strived harder in the best possible way to attain their desired goal of

higher income and better standard of living. Bora and Ray (1986) reported that the returns to farm management were better among highly achievement motivated commercial vegetable farmers of West Bengal as compared to those having low achievement motivation. Similar association between achievement motivation and management efficiency was reported among sericulture farmers and among cassava farmers (Nagaraja, 1989 and Anantharaman, 1991). It suggests that the management efficiency of a dairy farmer was influenced by the level of intrinsic motivation possessed by them in the attainment of the ultimate goal through their enterprise.

The study further revealed that the respondents with high level of self confidence were more quicker in making and implementing the right decisions at the right time concerning the various management operations of the dairy enterprise than those with low level of self confidence, hence the study showed positive and significant relationship of self confidence with management efficiency of dairy farmers. Similar observations were also made by Nagaraja (1989) who revealed that high level of self-confidence among sericulture farmers increased their efficiency in the management of the sericulture enterprise. The experience of the respondents in dairy farming did not show any significant relationship with their management efficiency in the overall sample as well as among respondents in each of the three localities (Table 1). It may be due to the fact that the feed back received to the kind of management of a dairy enterprise would have been more immediate and thus the respondents might have learned the pros and cons of efficient management in the initial stages of establishment of the dairy enterprise itself. Hence, experience that changed chronologically did not seem to have any significant relationship with management efficiency. However, a positive and significant relationship of experience with management efficiency of farmers engaged in other agricultural enterprises was observed by Bora and Ray (1986), Nagaraja (1989).

Multiple regression analysis for management efficiency of dairy entrepreneurs on selected situational, personal and psychological factors : The contribution of situational and personal factors towards management efficiency among urban, peri-urban and rural respondents and also among overall sample of the three areas was studied by using multiple regression analysis model only of those situational and personal factors that were found significantly correlated with management efficiency. To isolate the independent variables that had significantly contributed towards the variability of the dependent variable, t-test was also employed.

*Urban area :*The prediction equation $Y_1 = 7.49+0.12 X_2+0.07 X_4+1.13* X_7+1.08** X_8+0.31X9-0.12X_{10}+0.49X_{11}+0.79X_{12}$ reveals that a unit increase in level of knowledge or economic motivation would cause an increase in management efficiency to 1.13 units or 1.08 units, respectively, while other independent variables were kept constant in either case. Thus, it could be concluded that the increase in the level of knowledge about improved dairy husbandry practices and economic motivation of urban respondents concurrently raised their management efficiency.

The analysis in Table 2 showed that co-efficient of multiple determination R2 (0.708) was found to be highly significant (P<0.01). This indicates that 70.80 per cent of variation in management efficiency of respondents in urban area was due to the combined influence of the eight variables considered in the analysis. The regression model further shows that the variables; economic motivation and level of knowledge had positively and highly significantly (p<0.01) contributed towards the variability in management efficiency while other studied variables did not contribute significantly.

Table 2. Multiple regression analysis for management efficiency of respondents in urban area on selected independent variables (N=50]

S. No.	Independent variables	'b'	S.E.(b)	't' value
X_2	Herd size	0.12	0.291	0.42**NS**
X_4	Input availability	0.07	0.413	0.16**NS**
X_7	Level of knowledge about improved dairy husbandry practices	1.13	0.499	2.26*
X_8	Economic motivation	1.08	0.348	3.10**
X_9	Scientific orientation	0.31	0.323	0.95**NS**
X_{10}	Achievement motivation	-0.12	0.393	-0.30**NS**
X_{11}	Self confidence	0.49	0.984	0.50**NS**
X_{12}	Innovation proneness	0.79	0.712	1.11**NS**

Tabulated value of 't' = 2.021 at 0.05 level and 2.695 at 0.01 level of probability, R^2= 0.708 NS- Non-significant
**- Significant at 0.01 level of probability
F = 12.43** *- Significant at 0.05 level of probability;

Table 3 indicates that about 76.00 per cent of variation in the management efficiency of respondents was due to the combined influence of the seven independent variables included in the analysis. Out of these, level of knowledge about improved dairy husbandry practices (P<0.01) and self confidence (P<0.05) showed positive and significant contribution towards management efficiency. Rest of the independent variables showed non-significant contribution towards the dependent variable.Table further indicates that the ranks of the variables with respect to direct effects and total indirect effects were not the same. The highest total indirect effect on management efficiency of overall

respondents (Y_1) was found to be exercised by achievement motivation (X_{10}) like in urban area followed by scientific orientation (X_9) self confidence (X_{11}) and innovation proneness (X_{12}).It was further observed that nine out of ten independent variables had their largest indirect effect through economic motivation (X_8) whereas economic motivation (X_8) had its largest indirect effect through level of knowledge about improved dairy husbandry practices (X_7) on management efficiency of overall respondents (Y_1). Similar findings were observed among the respondents came from urban area with respect to largest indirect effects.

Table 3. Multiple regression analysis for management efficiency of respondents in peri-urban area on selected independent variables (N= 50)

S. No	Independent variables	'b'	S.E.(b)	't' value
X_1	Family education status	-0.34	0.683	-0.50NS
X_7	Level of knowledge about improved dairy husbandry practices	1.90	0.491	3.88**
X_8	Economic motivation	0.24	0.300	0.78NS
X_9	Scientific orientation	0.08	0.359	0.21NS
X_{10}	Achievement motivation	0.10	0.353	0.29NS
X_{11}	Self confidence	1.83	0.880	2.08*
X_{12}	Innovation proneness	0.87	0.660	1.31NS

Tabulated value of 't' = 2.021 at 0.05 level and 2.695 at 0.01 level of probability R^2= 0.762 F = 19.19**
**- Significant at 0.01 level of probability
*- Significant at 0.05 level of probability;
NS- Non-significant B Peri urban area

Based on the prediction equation Y_1 = 29.97-0.34 X_1+1.90** X_7+0.24 X_8+0.08 X_9+0.10 X_{10}+1.83* X_{11}+0.87 X_{12}, it could be stated that an unit increase in level of knowledge would cause an increase in management efficiency to 1.90 units and an unit increase in self confidence to 1.83 units, while other independent variables were kept constant in either case. This indicates that when the level of knowledge and self-confidence increased, management efficiency also increased among peri-urban respondents.

Rural area : In order to predict the management efficiency of the rural respondents, six independent variables i.e. level of knowledge about improved dairy husbandry practices, economic motivation, scientific orientation, achievement motivation, self confidence and innovation proneness were fitted in the regression model.

Table 4 reveals that the co-efficient of multiple determination was found to highly significant (R^2 = 0.817) indicating 81.70 per cent of variation in management efficiency of rural respondents was due to the combined influence of the six independent variables. The regression model also explained maximum variability on account of level of knowledge about improved dairy husbandry practices (P<0.01) followed by scientific orientation (P<0.05). All the other four variables fitted in the model did not contribute at statistically significant level in influencing the management efficiency of rural dairy farmers. The prediction equation Y_1 = 12.48+1.31**X_7 + 0.50X_8 + 0.66* X_9 + 0.36 X_{10} + 0.21 X_{11} + 0.62 X_{12} reveals that an unit increase in level of knowledge about improved dairy husbandry practices had raised the level of management efficiency to 1.31 units and scientific orientation to 0.66 units, while other independent variables were kept constant in either case. Thus, it could be stated that an increase in the level of knowledge and scientific orientation resulted in an increase in the level of management efficiency of respondents in the rural area.

Table 4: Multiple regression analysis for management efficiency of respondents in rural area on selected independent variables (N=50)

S.No.	Independent variables	'b'	S.E.(b)	't' value
X_7	Level of knowledge about improved dairy husbandry practices	1.31	0.483	2.71**
X_8	Economic motivation	0.50	0.357	1.41NS
X_9	Scientific orientation	0.66	0.279	2.39*
X_{10}	Achievement motivation	0.36	0.477	0.76NS
X_{11}	Self confidence	0.21	0.909	0.23NS
X_{12}	Innovation proneness	0.62	0.799	0.78NS

Tabulated value of 't' = 2.021 at 0.05 level and 2.695 at 0.01 level of probability R^2= 0.817
- Significant at 0.01 level of probability F = 32.05
*- Significant at 0.05 level of probability; NS- Non-significant

Table 5. Multiple regression analysis for management efficiency of overall respondents of three localities on selected independent variables (N=150)

Sl. No	Independent variables	'b'	S.E.(b)	't' value
X_1	Family educational status	-0.77	0.359	-2.14*****
X_2	Herd size	0.060	0.199	0.29**NS**
X_4	Input availability	-0.30	0.121	-2.51*****
X_5	Market facilities	0.45	0.259	1.73**NS**
X_7	Level of knowledge about improved dairy husbandry practices	1.28	0.290	4.43******
X_8	Economic motivation	0.81	0.198	4.07******
X_9	Scientific orientation	0.14	0.174	0.79**NS**
X_{10}	Achievement motivation	0.19	0.225	0.86**NS**
X_{11}	Self confidence	0.50	0.548	0.91**NS**
X_{12}	Innovation proneness	0.92	0.433	2.13*****

Tabulated value of 't' = 1.960 at 0.05 level and 2.576 at 0.01 level of probability
R^2= 0.746
**- Significant at 0.01 level of probability
F = 40.89**
*- Significant at 0.05 level of probability;
NS- Non-significant

Table 6. Direct and indirect effects of selected independent variables on management efficiency of dairy entrepreneurs in urban area (N=50)

Variable No.	Independent variables	Direct effect		Total indirect effect		Largest indirect effect through single variable	
		Effect	Rank	Effect	Rank	Effect	Rank
X_2	Herd size	0.0418645	VI	0.3501357	VII	0.1807334	X_8
X_4	Input availability	0.0154319	VIII	0.2945681	VIII	0.1722681	X_8
X_7	Level of knowledge about improved dairy husbandry practices	0.2535419	II	0.4194579	V	0.2556509	X_8
X_8	Economic motivation	0.4232632	I	0.3567367	VI	0.1531393	X_7
X_9	Scientific orientation	0.1204067	IV	0.5045934	III	0.2552277	X_8
X_{10}	Achievement motivation	-0.0375893	VII	0.5315893	I	0.2120548	X_8
X_{11}	Self confidence	0.0641796	V	0.4878203	IV	0.2264458	X_8
X_{12}	Innovation proneness	0.1433775	III	0.5116224	II	0.2696186	X_8

Table 7. Direct and indirect effects of selected independent variables on management efficiency of dairy entrepreneurs in peri-urban area (N=50)

Variable No.	Independent variables	Direct effect		Total indirect effect		Largest indirect effect through single variable	
		Effect	Rank	Effect	Rank	Effect	Rank
X_1	Family education status	-0.0406336	VI	0.3486338	VI	0.1362029	X_7
X_7	Level of knowledge about improved dairy husbandry practices	0.4310218	I	0.3359784	VII	0.1375806	X_{11}
X_8	Economic motivation	0.1124077	IV	0.6045926	III	0.2771470	X_7
X_9	Scientific orientation	0.0371660	VII	0.6978341	I	0.2952499	X_7
X_{10}	Achievement motivation	0.0475603	V	0.6864401	II	0.2560270	X_7
X_{11}	Self confidence	0.2908681	II	0.4121320	V	0.2038733	X_7
X_{12}	Innovation proneness	0.1411430	III	0.5428572	IV	0.2603372	X_7

Table 8. Direct and indirect effects of selected independent variables on management efficiency of dairy entrepreneurs in rural area (N=50)

Variable No.	Independent variables	Direct effect		Total indirect effect		Largest indirect effect through single variable	
		Effect	Rank	Effect	Rank	Effect	Rank
X_7	Level of knowledge about improved dairy husbandry practices	0.2549550	II	0.4910455	VI	0.2002557	X_9
X_8	Economic motivation	0.2003864	III	0.5976141	IV	0.2337913	X_9
X_9	Scientific orientation	0.3193871	I	0.5106134	V	0.1598568	X_7
X_{10}	Achievement motivation	0.1336399	IV	0.7123606	I	0.2733953	X_9
X_{11}	Self confidence	0.0258552	VI	0.6761453	II	0.2152669	X_9
X_{12}	Innovation proneness	0.0948183	V	0.6521821	III	0.2433730	X_9

Table 9. Direct and indirect effect of selected independent variables on management efficiency of overall sample of respondents irrespective of their localities (N=150)

Variable No.	Independent variables	Direct effect		Total indirect effect		Largest indirect effect through single variable	
		Effect	Rank	Effect	Rank	Effect	Rank
X_1	Family education status	-0.1218385	V	0.3018386	VIII	0.1320858	X_8
X_2	Herd size	0.0151050	X	0.2898951	IX	0.1368957	X_8
X_4	Input availability	-0.1540363	IV	0.3760364	VII	0.1291259	X_8
X_5	Market facilities	0.0982100	VI	0.0857900	X	0.0469885	X_8
X_7	Level of knowledge about improved dairy husbandry practices	0.2904832	II	0.4345171	V	0.2645416	X_8
X_8	Economic motivation	0.3699883	I	0.4270122	VI	0.2076955	X_7
X_9	Scientific orientation	0.0584085	IX	0.6165917	II	0.2800811	X_8
X_{10}	Achievement motivation	0.0890492	VII	0.6299951	I	0.2919207	X_8
X_{11}	Self confidence	0.0757397	VIII	0.5992606	III	0.2708314	X_8
X_{12}	Innovation proneness	0.1712297	III	0.5437705	IV	0.2778612	X_8

Overall sample : The regression analysis showed that the value of co-efficient of multiple determination was found highly significant (R^2= 0.746). All the ten independent variables considered in the analysis had accounted for 74.60 per cent of variation in management efficiency among overall sample of respondents. The results in Table 5 indicate that level of knowledge about improved dairy husbandry practices and economic motivation showed positive and highly significant (P<0.01) contribution while innovation proneness was contributing significantly at 5 per cent level of significance. Family education status and input availability showed negative and significant (P<0.05) contribution. The other variables like herd size, scientific orientation, achievement motivation and self confidence fitted in the model did not contribute at statistically significant level in influencing management efficiency of the respondents. The prediction equation could be written from the Table as Y_1 = 30.27-0.77* X_1+0.06 X_2-0.30* X_4+0.45X_5 + 1.28** X_7 +0.81** X_8 +0.14 X_9 +0.19 X_{10} +0.91 X_{11} +0.92* X_{12} which reveals that an unit increase in level of knowledge, economic motivation and innovation proneness would cause an increase in the level of management efficiency to 1.28, 0.81 and 0.92 units, respectively, while others were kept constant in each case. Family education status and input availability would cause a decline in the level of management efficiency by 0.77 and 0.30 units, respectively, while other variables were kept constant in either case. Thus, it could be stated that higher the level of knowledge, economic motivation and innovation proneness of respondents, better was their level of management efficiency.

Direct and indirect effect of selected situational, personal and psychological factors on management efficiency of dairy entrepreneurs : The direct and indirect effects of situational and personal factors on management efficiency of respondents in urban, peri-urban and rural areas and of overall sample of respondents, irrespective of their localities were studied, separately. In each case, those factors were included as the independent variables that were found significantly correlated with management efficiency of dairy farmers.

*Urban area :*Table 6 shows that maximum direct and positive effect was exercised by economic motivation (X_8) followed by level of knowledge about improved dairy husbandry practices (X_7) and innovation proneness (X_{12}) in that order on management efficiency of urban respondents. Table further indicates that the ranks of the variables with respect to direct and total indirect effects were not the same. Achievement motivation (X_{10}) followed by innovation proneness (X_{12}) and scientific orientation (X_9) occupied first, second and third ranks, respectively, in terms of total indirect effects.

Seven out of eight independent variables had largest indirect effect through economic motivation on management efficiency of urban respondents. Economic motivation, however, had shown its largest indirect effect through level of knowledge about improved dairy husbandry practices. The path analysis indicated that economic motivation was the most important variable that influenced management efficiency of urban dairy farmers both directly and indirectly.

Peri- urban area : Multivariate path analysis of management efficiency of peri- urban dairy farmers with seven independent variables was carried out and results obtained are presented in Table 7. Ranking of direct effect of independent variables on management efficiency of peri- urban respondents indicated that the highest direct effect was exercised by level of knowledge about improved dairy husbandry practices (X_7) followed by self confidence (X_{11}) and innovation proneness (X_{12}). Table 7 shows that the rank of the variables with respect to direct and total indirect effects was also not the same. The maximum total indirect effect on management efficiency of peri-urban respondents was found to be exercised by scientific orientation (X_9) followed by achievement motivation (X_{10}) and economic motivation (X_8). Table further reveals that six out of seven independent variables had their largest indirect effect on management efficiency (Y_1) through level of knowledge about improved dairy husbandry practices (X_7), which in turn had its largest indirect effect through self confidence (X_{11}).

Rural area : Table 8 indicates that the highest positive direct effect was exercised on management efficiency of rural respondent by scientific orientation (X_9) followed by level of knowledge about improved dairy husbandry practices (X_7) and economic motivation (X_8). Table further reveals that the total indirect effects of all the variables were higher than their direct effects. Achievement motivation (X_{10}) followed by self confidence (X_{11}) and innovation proneness (X_{12}) occupied first second and third ranks, respectively in terms of total indirect effects. It was also observed that scientific orientation (X_9) had exercised the largest indirect effect through level of knowledge about improved dairy husbandry practices (X_7) whereas rest of the variables had their largest indirect effect through scientific orientation (X_9).

overall sample : Table 9 shows that all the selected independent variables exercised positive direct effect on management efficiency of all the respondents, irrespective

of their localities except family education status (X_1) and input availability (X_4) which were found to have negative direct effect on it. Economic motivation (X_8) level of knowledge about improved dairy husbandry practices (X_7) and innovation proneness (X_{12}) in that order had exercised highest positive direct effect on management efficiency of overall respondents .Table further indicates that the ranks of the variables with respect to direct effects and total indirect effects were not the same. The highest total indirect effect on management efficiency of overall respondents was found to be exercised by achievement motivation (X_{10}) like in urban area followed by scientific orientation (X_9) self confidence (X_{11}) and innovation proneness (X12).It was further observed that nine out of ten independent variables had their largest indirect effect through economic motivation (X_8) whereas economic motivation (X_8) had its largest indirect effect through level of knowledge about improved dairy husbandry practices (X_7) on management efficiency of overall respondents. Similar findings were observed among the respondents came from urban area with respect to largest indirect effects.

CONCLUSION

The study revealed that urban respondents were the better planners, decision markers, risk takers, coordinators besides skilled in rational marketing and adopted more number of dairy farming practices as compared to those came from rural and peri-urban areas. Economic motivation was the important variable that exercised highest direct effect on management efficiency of dairy farmers regardless of the localities followed by knowledge level about improved dairy husbandry practices and innovation proneness. Achievement motivation followed by scientific orientation and self-confidence exercised largest indirect effect on management efficiency of overall sample of respondents. Since dairy farmers in rural and peri-urban areas were found to possess lower level of management efficiency than those in urban area. It necessitates formulation and implementation of suitable education strategies specifically for rural and peri-urban areas to increase the level of management efficiency among the dairy farmers that in turn influences on productivity of milch animals.Similarly situational, personal and psychological factors viz., family education status, herd size, input availability, market facilities, knowledge level, economic motivation, scientific orientation, achievement motivation, self-confidence and innovation proneness should be given due consideration while formulating and implementing suitable extension and training strategies for improving the management efficiency of the dairy entrepreneurs as well as productivity of milch animals.

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