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A study on the socio-economic status of the automated dairy unit owners

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Abstract

The present study was conducted in the ten commercial dairy farms maintaining minimum of 100 animals as a herd and adopted the automatization in and around Hyderabad city of Telangana State. Socio-economic status of the dairy unit owners revealed that in majority (70%) are middle age group (35-55 years) and of graduate (80%) education. Most of the dairy units have herd size between 100-300 (50%), followed by 900-1100 (30%) and least had above 1100 (10%). Chi-square tests for education and age with milking automation was found significant ($p < 0.01$) with values 27.47* and 47.55* respectively.

Keywords: Automation, socio-economic status

Introduction

Application of automatic technologies is a growing trend in the livestock industry and plays an important role in the future prospects. The main reason to start the development of automatic milking in the eighties of the last century, was the need for improved labor efficacy due to the growing costs of labor in many dairy countries (Rossing *et al.* 1985; Lind *et al.* 2000). Milking is on many dairy-farms remains a time consuming activity, which takes about 25 to 35% of the annual labor demand. In the last few decades, technological advances have moved the dairy industry from the small sized, intensively labor based farms to much larger autonomous and industrialized farms. In the long term, productivity and especially productivity growth are necessary conditions for the survival of a farm. To improve productivity at the farm level, investments in new technology are needed and across the globe, the trend towards fewer, larger dairy operations continues.

Materials and Methods

Selection of dairy units

As per the objectives laid down in this study, the proposed research will be undertaken at ten commercial dairy units with a minimum number of hundred dairy animals each located in and around Hyderabad city of Telangana state. The dairy units for study are selected based on the herd size, intensity of automation and nearness to the urban area of Hyderabad by simple random sampling.

Preparation of interview schedule

A structured interview schedule was prepared for the purpose of data collection.

Collection of Data

The collection of data from the respondents was undertaken personally by face to face interview technique. The questions were carefully analysed and explained to the respondents. The answers were recorded in an unbiased way. The following techniques were used in data collection.

- Direct questionnaire and personal contact
- Observation
- Data from farm records

Variables and their techniques of measurement

Keeping in view of the objectives of the study, past literature and the discussion with the scientists, certain important variables were selected for the study and presented as below:

S. No	Variables	Measurements
1.	Age	Schedule developed on the basis of score for the purpose
2.	Education	Schedule developed on the basis of score for the purpose
3.	Herd size	Schedule developed on the basis of score for the purpose
4.	Milking automation	Schedule developed on the basis of score for the purpose
5.	Infrastructure and automation in storage and processing of milk	Schedule developed on the basis of score for the purpose
6.	Automation in feeding	Schedule developed on the basis of score for the purpose
7.	Automation in watering	Schedule developed on the basis of score for the purpose
8.	Mechanical equipment for harvesting and cutting of fodder	Schedule developed on the basis of score for the purpose
9.	Automatic identification	Schedule developed on the basis of score for the purpose
10.	Automatic estrous detection	Schedule developed on the basis of score for the purpose
11.	Waste handling and disposal automation	Schedule developed on the basis of score for the purpose
12.	Infrastructure in summer management	Schedule developed on the basis of score for the purpose

1. Age

Age is operationally defined as the chronological years completed at the time of the interview of the respondents. Score one was assigned to each year of age for analysis and on the basis of age, respondents were grouped under the following categories.

S. No.	Category	Years	Score
1	Young	Up to 35	1
2	Middle	35 to 55	2
3	Old	55 and above	3

2. Education

Education refers to the number of years of formal education attended by the respondent, the score for which is given below.

S. No.	Category	Score
1.	Illiterate	1
2.	Primary school	2
3.	High secondary	3
4.	Graduate and above	4

3. Herd size

This refers to the number of dairy animals maintained by the respondent. One score was assigned for each animal possessed by the dairy owner and this has been categorized as follows.

S. No	Category	Score	Designation
1.	Absent	1	P1
2.	Bulk milk coolers	2	P2
3.	Pasteurization plant in addition to BMC	3	P3
4.	Value added products along with BMC and pasteurization plant in-addition to the above category	4	P4
5.	Quality control laboratory in addition to BMC, pasteurization and value added products	5	P5
6.	Packaging section in addition to BMC and pasteurization plant	6	P6
7.	Packaging section in addition to BMC and pasteurization plant and value added products	7	P7
8.	Clean in place system along with BMC, pasteurization plant and packaging	8	P8
9.	Packaging, bulk milk cooler and value addition	9	P9
10.	Clean in place, pasteurization, packing, BMC, value addition, quality control	10	P10

6. Automation in feeding

It refers to automated equipment's that are in use in the selected dairy farms and score was given to each category as follows.

S. No	Category	Score
1.	Absent	1
2.	Total mixed ration(TMR)	2
3.	Self-propelled feeders	3
4.	Others	4

follows.

S. No	Number of animals	Score
1.	Between 100 to 300	1
2.	Between 300 to 500	2
3.	Between 500 to 700	3
4.	Between 700 to 900	4
5.	Between 900 to 1100	5
6.	Above 1100	6

4. Milking automation

It refers to various automatic machines that are used in the area of milking in the dairy farm and score is given to each category as follows.

S. No	Category	Score
1.	Absent	1
2.	Bucket milking machine	2
3.	Milking pipeline	3
4.	Herring bone parlor	4
5.	Rotary parlor	5
6.	Robotic milking system	6
7.	Buckets and parlor	7
8.	Others	8

5. Infrastructure and automation in storage and processing of milk

Score to each category is given as below.

7. Automated watering

Score is given to each category as follows.

S. No	Category	Score
1.	Absent	1
2.	Automated waterer	2

8. Mechanical equipment for harvesting and cutting of fodder

Score is given to each category as follows.

S. No	Category	Score
1.	Absent	1
2.	Harvester	2
3.	Fixed Chaff cutter	3
4.	Tractor mounted chaff cutter	4
5.	Both harvester and fixed chaff cutter	5
6.	Harvester and tractor mounted chaff cutter	6

S. No	Category	Score
1.	Absent	1
2.	Activity meters	2

9. Automatic identification in herd

It refers to different identification systems that can be used and score is given to each category as follows.

S. No	Category	Score
1.	Absent	1
2.	RFID	2
3.	GPS	3
4.	Retinal-imaging/Muzzle Printometry	4
5.	Others	5

10. Automatic estrous detectors

Score to each category is given as below.

S. No	Category	Score
1.	Absent	0
2.	Sprinkler	1
3.	Foggers	2
4.	Fans	3
5.	foggers and fans	4
6.	Sprinklers and fans	5
7.	Others	6

11. Equipment and automation used in waste disposal and handling

Score is given to each category as follows

S. No	Category	Score
1.	Absent	0
2.	Mechanical scrapers	1
3.	Hydraulic flushing systems	2
4.	Biogas plant	3
5.	Mechanical scraper and biogas plant	4
6.	Hydraulic flushing and biogas plant	5
7.	Others	6

12. Equipment or infrastructure used during summer management

Score is given to each category as follows.

Results

1. Socio-economic variables of respondents in the study area

70 percentage respondents were of middle age group (35-55 years) and 30 percent respondents were of old age group (55 and above years). As per the educational status 80 percent of the respondents were graduates and 20 percent are of higher secondary education. The study also revealed that 50 percent respondents are having herd size in between 100-300, 10 percent of respondents are having herd size in between 700-900 & above 1100 and 30 percent respondents were having herd size in between 900-1100.

2. Relation between socio-economic factors and automation and dairy income in the dairy units

The results of the study showed that the education level (27.47) and age (47.55) of the dairy owners had significant relation ($p < 0.05$) with milking automation and the remaining variables not showed any significant associations with milking automation.

Socio-economic variables of respondents

Variables	n=10	Percentage
Age		
Young	0	0
Middle	7	70
Old	3	30
Education		
Illiterate	0	0
Primary	0	0
Higher secondary	2	20
Graduate and above	8	80
Herd size		
Between 100 to 300	5	50
Between 300 to 500	0	0
Between 500 to 700	0	0
Between 700 to 900	1	10
Between 900 to 1100	3	30
Above 1100	1	10

Chi-square test for socio-economic factors and automation and dairy income in the dairy units

S. No	Variable 1	Variable 2	DF	X ² results	Critical x ² (5percent)
1.	Milking automation	Education	8	21.94	27.47*
2.	Milking automation	Age	32	66.75	47.55*
3.	Milking automation	Herd size	27	30.00	25.59
4.	Milking automation	Milk yield per animal per day	18	16.67	17.28
8.	Herd size	Automated estrous detectors	9	10	13.46
9.	Herd size	Identification	9	10	13.86
10.	Income per animal	Cost of feeding	81	90	46.05
11.	Value of output from per animal per day	Fixed costs	81	90	46

Significant at 0.05 percent level

Discussion

These results are in comparison to Orhan *et al.* (2010) [6]. They identified that age, education and also herd size

significantly influenced adopting technology at farm level. Education and size of operation positively impacted the decision to adopt a management-intense technology. It was

concluded that most of the dairy farmers who are at middle age with graduation are looking for new technology and are opting the automation for augmentation of milk and milk products quality.

Summary

Socio-economic status of the dairy unit owners revealed that in majority (70%) are middle age group (35-55 years) and of graduate (80%) education. Most of the dairy units have herd size between 100-300 (50%), followed by 900-1100 (30%) and least had above 1100 (10%). Chi-square tests for education and age with milking automation was found significant ($p < 0.01$) with values 27.47* and 47.55* respectively.

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