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## A Comprehensive study on the prevailing automation and infrastructure in urban dairy sector

**Bhavya Y, Suresh Rathod, Sarjan Rao K and Nalini Kumari**

### 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. Application of automatic technologies is a growing trend in the livestock industry and plays an important role in the future prospects. In milking automation majority were using bucket milking machines (40%) followed by rotary parlor(30%), herring-bone parlor (20%) and a combination of bucket milking machines and parlor(10%). Infrastructure and automation in storage and processing study has revealed that BMC's (80%) are popular at the farms and others are having combination of BMC's, pasteurization, Clean in place, quality control, packaging and value addition. In feeding automation, TMR, silo, wagons were used. For harvesting and chopping of fodder all the dairy units are using relevant equipment's of which fixed chaff-cutters are majority (60%) in use. Automatic identification by RFID collars and ear tags were only found. Automatic estrous detectors such as activity meters on collars or pedometers on legs are in use. For waste handling and disposal mechanical scrapers, biogas plant (80%) are used more prominently in the studied dairy units. In summer management majority were using a combination of sprinklers and fans and a combination of foggers and fans.

**Keywords:** Automation, milking parlor

### 1. Introduction

Automation is the use of mechanical and electronic equipment to reduce the need for human labor (Evodarek, 2012) [6]. Application of automatic technologies is a growing trend in the livestock industry and plays an important role in the future prospects. The automatic systems most commonly used in animal production concern the various objectives (Cattaneo, 2009) [4] which include automatic identification, drafting, feeding, milking, detection of estrus, detection of births and many other farm operations.

Reduced labor demand and better social circumstances for the dairy farmers are the attractive benefits and other potential benefits are improved animal health and well-being and increased milk yields. 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. Until now, information on such aspects is scant and scattered. Considering the importance of study in this arena it is proposed to carry out research work.

### 2. Materials and Methods

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. A structured interview schedule was prepared for the purpose of data collection, that included questions regarding automation areas such as milking, processing, feeding and watering, dairy herd management which includes identification, reproductive management, feed/manure management, summer management, labor management in the farm.

### 3. Results and Discussion

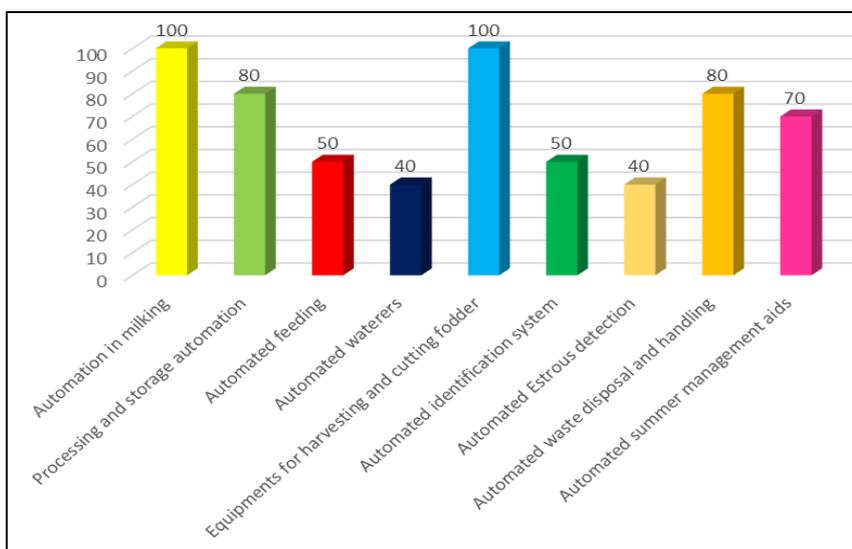
#### 1. Characterization of dairy units based on their prevailing automation and infrastructure

Characterization of the dairy units was done based on their level of automation and infrastructure used at farm. The dairy

units were characterized based on their herd size into fully and semi-automated units i.e 60 and 40 percent respectively. Results of the characterization of dairy units revealed that farms having herd size above 700 are using automation in all the areas of the farm.

**Table 1:** Characterization of dairy units

S. No	Herd size	No. of dairy units (n)	Category
1.	752	4	Fully automated
	928		
	957		
	1640		
2.	133	6	Semi-automated
	172		
	181		
	277		
	285		
	938		

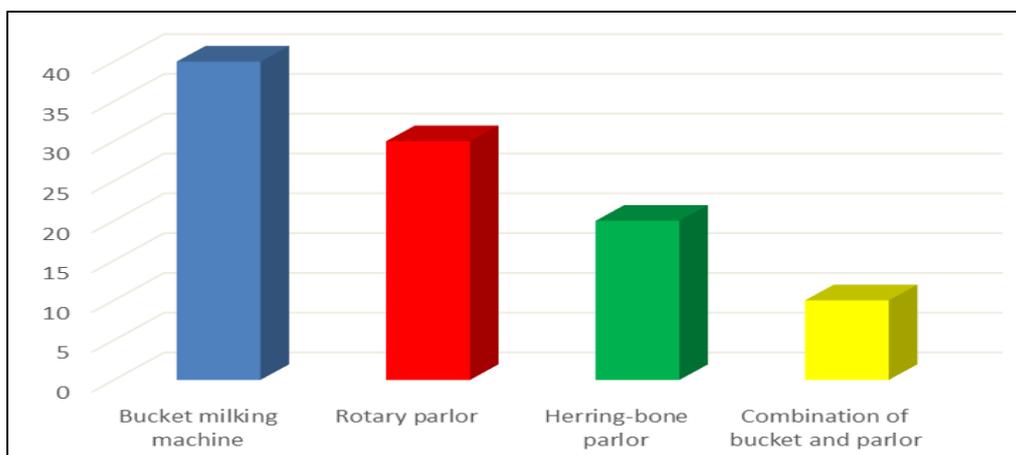


**Fig 1:** Distribution of dairy units based on their level of automation in different areas

#### 2. Milking automation and infrastructure

The results showed that all the dairy units under study (100%) were using milking automation, out of which 40 percent were using bucket milking machines, 30 percent dairy units were using rotary parlor, 20 percent dairy units were using herring bone parlor and 10 percent dairy units were using a combination of bucket milking machines and parlor. The percent of dairy units using bucket machines for milking was

higher and least in case of combination of buckets and parlor milking. It was evident that as the herd size is increasing, respondents were shifting from bucket machines to milking parlor's except in cases where the labor are available. Similarly Khanal *et al.* (2010), also reported in their studies that the milking parlors use was high as the average dairy farm size grew by 37.5percentage in cows.

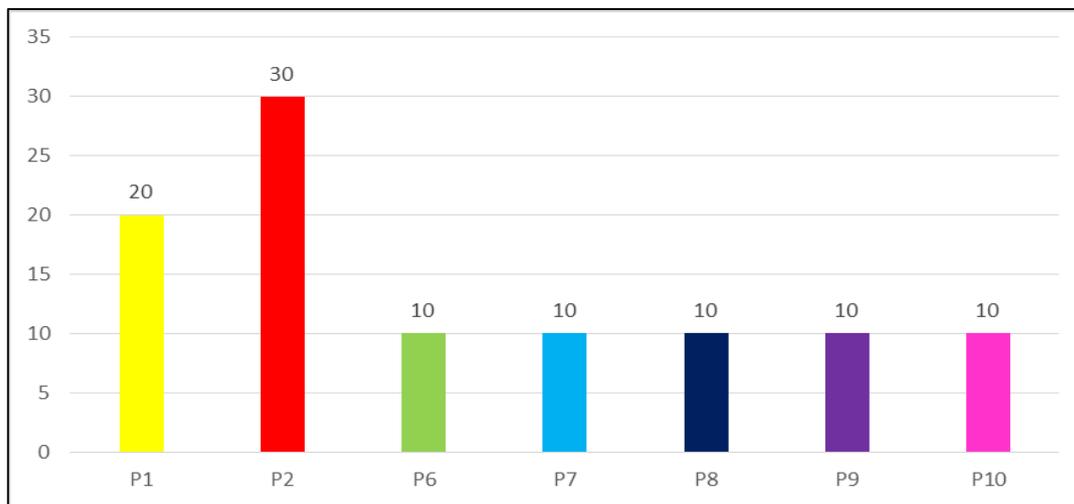


**Fig 2:** Various types of milking automation used in dairy units

### 3. Infrastructure and automation in storage and processing of milk

The results showed that 20 percent of dairy units do not have any storage and processing section, 30 percent dairy units were using BMC alone and 10 percent of dairies are using combination of BMC, pasteurization unit and packaging section, packaging section and value added products, Clean in

place system in different dairy units. Bulk milk coolers were mostly used by all the dairy farms in alone or in combination with other processing units. It was observed that as there is increase in the herd size and production, dairy farmers are entering into automization and procurement of infrastructure and storage and processing of milk which can improve the quality and profits from the value added products.



P1 = Absent; P2 = BMC; P6 = Combination of BMC, Pasteurization unit and Packaging section; P7 = Combination of BMC, Pasteurization unit, Packaging section and Value added products; P8 = Combination of BMC, Pasteurization unit, Packaging machine and Clean in place system; P9 = BMC, Packaging and Value addition; P10 = BMC, Pasteurization, Packaging, Clean in place, Value addition and Quality control.

**Fig 3:** Various types of infrastructure and automation in storage and processing of milk

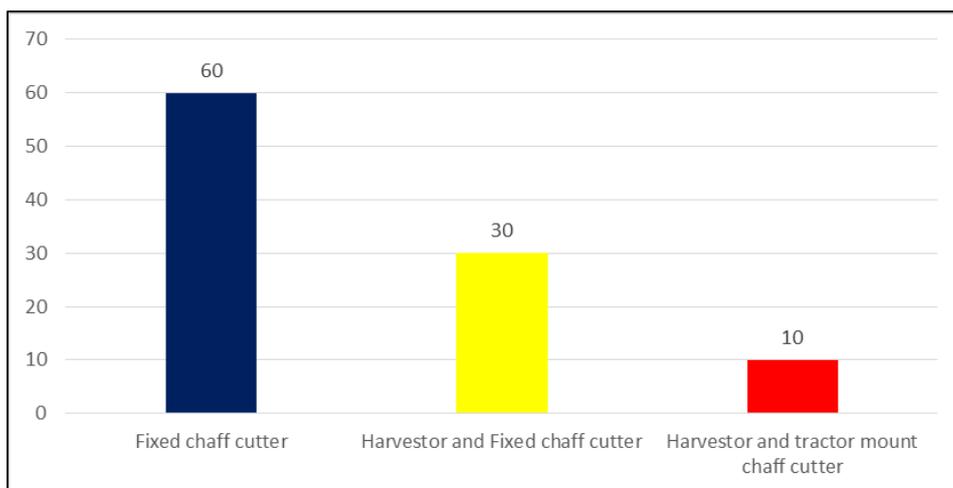
### 4. Automation in feeding and watering

50 percent of the dairy units are using total mixed ration to feed their animals through wagons along the feed bunks and remaining 50 percentage of dairy units are using labor as a manual feeding. 40 percent dairy units were using automated waters and remaining are using common water troughs for watering the animals.

These findings were in accordance to Grothmann *et al.* (2008), Samer. M (2009) who observed that feeding equipments are common in the automated and semi-automated dairy units in the case of sizeable herds.

### 5. Mechanical equipment for harvesting and chaffing of fodder

60 percent dairy units are using fixed chaff cutter for chaffing the fodder, 30 percentage dairy units were using both harvester and fixed type of chaff cutter and 10 percent dairy units were using harvester cum tractor mounted chaff cutter., these findings are in accordance to Pathak and Gowripathi Rao (2015) <sup>[12]</sup>, the agricultural mechanization has been considerably progressed over the last few years and the tractor mounted implements have become popular and being commercialized.



**Fig 4:** Various types of equipment's used in the dairy units for harvesting and cutting fodder

### 6. Automatic identification in herd

Only 50 percent of the dairy units were using automation in identification of herd especially RFID system (majority using

collar type). Similarly Stankovski *et al.* (2011) reported in his studies that automatic identification with RFID system helps to analyze larger amount of valuable information for dairy

cows which is beneficial with its characteristics such as simple installation, replacement of the handwritten records with electronic ones and also easily integrated into the new or existing complex farm management system.

**7. Automatic estrous detectors**

The study revealed that only 40 percent dairy units were using activity meters in detection of heat in animals automatically. Similarly Jeffrey Bewley (2010) studies revealed that automatic estrus detection monitors are already being utilized by dairy producers and are perceiving the benefits, that include increased efficiency, reduced cost, improved product quality,

minimized adverse environmental impacts, and improved animal health and well-being

**8. Equipment and automation used in waste handling and disposal**

30 percent of dairy units were using biogas plant alone, 20 percent of dairy units were using mechanical scrapers in combination with biogas plant and 10 percent of dairies were using mechanical scrapers, hydraulic flushing system and other type of handling and waste disposal method respectively.

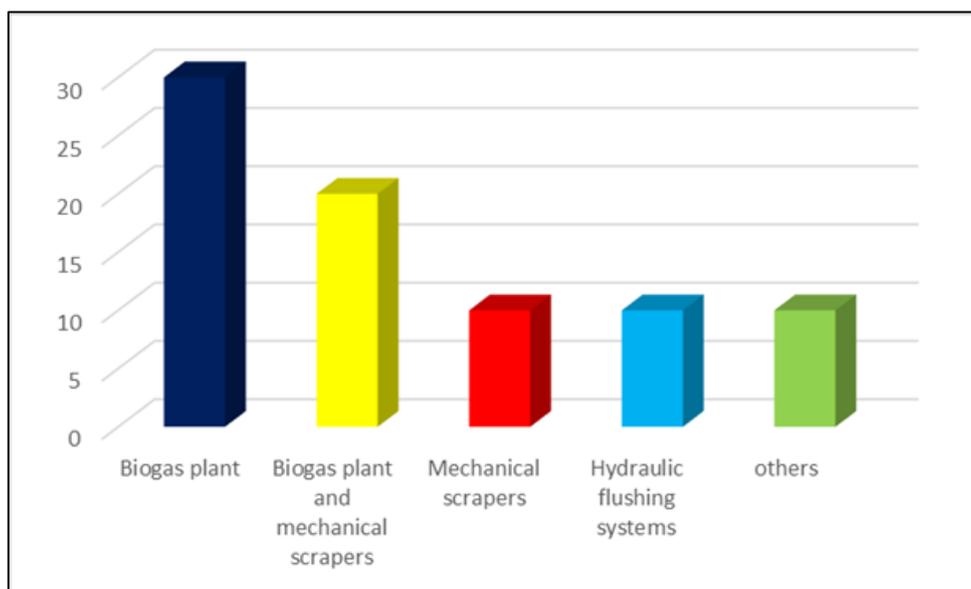


Fig 5

**9. Equipment and automation used during summer management**

10 percent of dairy units were using fans, foggers and

combination of sprinklers and fans whereas 20 percent were using a combination of foggers and fans and sprinklers alone respectively in their dairy farms.

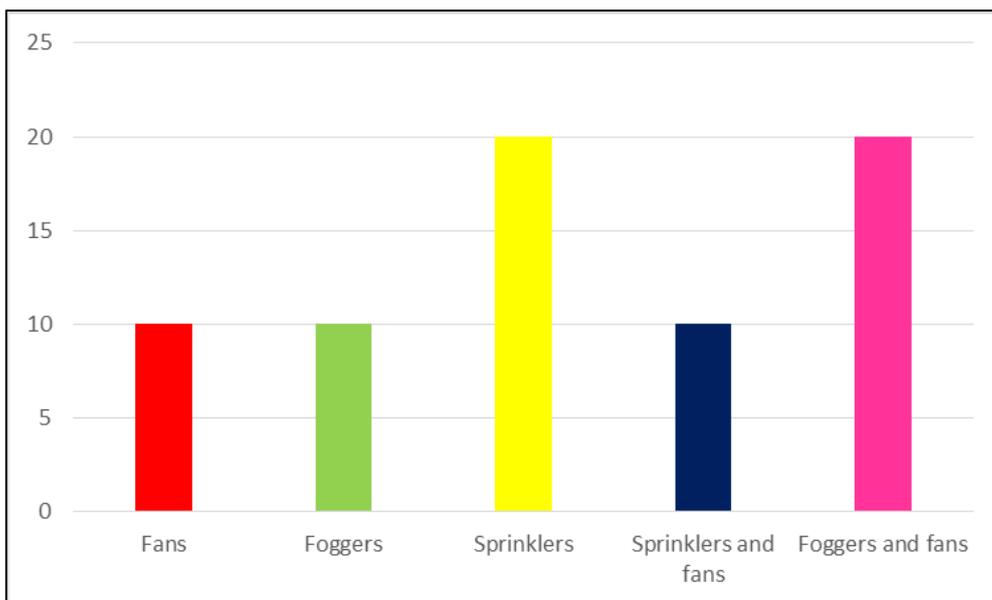


Fig 6: Various types of automation and equipments used in summer management in the dairy units

**Summary**

Use of automation in dairy units in operations like milking and harvesting and chopping of fodder was found to be 100%, in the processing and storage 80%, in feeding and

identification 50%, in watering and estrous detection 40%, in waste handling and disposal and summer management it was found to be 80% and 70% respectively. It can be summarized that automation and infrastructure was more prevalent in

milking and harvesting and chopping of fodder but not so popular in other areas of the dairy units, whereas the trend of increased use of automation in the areas other than milking was found with increasing herd size.

### References

1. Amruta H. Daniel Riordan and Joseph Walsh, Sensor technology for animal health monitoring. Proceedings of the 8th International Conference on Sensing Technology, Liverpool, UK, 2014.
2. Anna M Hekkila, Sami, Pietola K. Effects of economic factors on adoption of robotics and consequences of automation for productivity growth of dairy farms. Factor markets, working paper, No.32, CEPS, Brussels. <http://www.factormarkets.eu/publications>, 2012.
3. Bickert WG, Speicher JA, Armstrong DV. Milking systems for large herds. *Journal of dairy science*. 1973; 57(3).
4. Cattaneo M. Automation and electronic equipment in: agricultural mechanization and automatic – EOLSS Publishers Co Ltd. France. (Eds. P. McNulty and P. M. Grace), 2009, 2.
5. DhruvSood. Food Processing Ingredients. Global agriculture information network, GAIN Report number: IN4119, 2014.
6. Evodarek. The pros and cons of automation in: designing efficient systems, 2012, 72-74. [http://guthriegrade8.wikispaces.com/file/view/on8sb\\_072.pdf/292352791/on8sb\\_072.pdf](http://guthriegrade8.wikispaces.com/file/view/on8sb_072.pdf/292352791/on8sb_072.pdf)
7. Henna P, Azmat AK. Automation in livestock farming – A technological revolution. *International Journal of Advanced Research*. 2015; 3(5):1335-1344.
8. Hiedi S, Pilvi R, Antti H. Introduction of automatic milking system in Finland and its effect on milk quality. *Agriculture and food science*. 2005; 14:346-353.
9. Jago JG, Woolford MW. Automatic Milking Systems: an option to address the labour shortage on New Zealand dairy farms. *Proceedings of the New Zealand Grassland Association*. 2002; 64:39-43.
10. Lind O, Ipema AH, De Konning CJAM, Mottram TT, Herrmann HJ. Automatic milking, *Bulletin of the IDF* 2000; 348:3-14.
11. McNulty PB, Grace PM. Agricultural mechanization and automation report from agricultural and food engineering department, national university of Dublin, Ireland, 2009, 13-17
12. Pathak V, Sachin, Gowripathi Rao NRV. State of farm mechanization in Indian agriculture. *Journal of Scientific and Engineering Research*. 2015; 2(1):36-46.