NEW OPPORTUNITIES AVAILABLE WITH RURAL DAIRY FARMERS OF SHIRUR TAHSIL OF PUNE DISTRICT IN MILK PROCESSING AND MILK PRODUCTS MANUFACTURING

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ABSTRACT

The study entitled "Challenges faced by rural dairy farmers in milk processing and milk products manufacturing" was conducted in Shirur tahsil of Pune district of Maharashtra state. 200 dairy farmers were selected from 25 villages by using random sampling method. Data were collected by personally interviewing the dairy farmers with the help of well-structured interview schedule, primary data collected by questionnaire and interview of rural dairy farmers, similarly secondary data from books, internet, research paper etc. and data were subjected to appropriate statistical analysis.The results of the study revealed that majority of the dairy farmers (42%) belonged to middle age group,49% of the dairy farmers had dairy + agriculture as their main occupation and 61.50% of dairy farmers residing with medium size of family with 63% of dairy farmers had nuclear type of family while, 53.50% dairy farmers had annual income between Rs. 2,00,000 to 3,00,000. Nearby half i.e. 46% of dairy farmers had medium size of herd, 49% of dairy farmers had collected milk from other dairy farmers and 40% of dairy farmers had high level of daily milk production. Nearly half i.e. 48% of dairy farmers had sold low level of milk, 26.53% dairy farmers were sold high level of dahi product. In new opportunities 81% of dairy farmers had used cone shaped milk can and 05% dairy farmers used paneer press machine while, only 04% dairy farmers had used ghee making machine and 06% dairy farmers used khoa making machines. In new techniques 49% of dairy farmers used packaging technique, 48% of dairy of farmers used chilling technique with 45% dairy farmers used cream separation by traditional method while, of 07% of dairy farmers had used cream separation by improved method and only 02% of dairy farmers used homogenization technique.Hence, it is inferred that there is need to provide training, guidance, knowledge and credit to rural dairy farmers, so as to increase milk processing ultimately to enhance socio-economic status of rural dairy farmers in study area.

(Keywords: Socio-economics status,milk processing, modern machineries)

INTRODUCTION

The dairy and animal husbandry sector contributes around 4.2% of India's GDP farmers. It is a primary source of income for about 7 crore rural families. Most of the milk producers are landless or small and marginal farmers (Kapgate *et al.*, 2021). India is ranked 1st in milk production contributing 23 per cent of global milk production. Dairy farming is one of the important activities of the rural population of our country. The importance of the dairy, as a subsidiary industry to agriculture, has stressed by the National Commission on Agriculture. Dairy enterprise, next to agriculture, not only provides continuous income and improves dietary standards of family, but also supplement the income and reduces unemployment to a large number of the rural poor. There is a good market opportunity for different milk products. Milk production must be accompanied by processing to produce variety of products to meets market opportunities. Further milk is highly perishable thus there is need to processes the milk into products that have a longer shelf-life, easier to handle and transport to long distance market outlets (Njarui *et al.*, 2010). Milk for man is important constituent of human diet, so the importance of milk in human diet cannot be emphasized in India. Milk is only source of animal protein, calcium and riboflavin, as getting an adequate quantity of animal protein and calcium (Priyanka *et al.*, 2022). Rural dairy farmers maintained dairy farmer on commercial basis or as a subsidiary business to the agriculture. In India most of the rural dairy farmers live in villages as farmers which have main occupation farming and side business milch animal

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rearing, most of rural dairy farmers carrying out traditional practices for milk processing and milk products manufacturing at village level. Milk processing and marketing is very less at village level in rural area. Inadequate knowledge, lack of modern machinery, lack of market knowledge are the reasons for poor economic condition of rural dairy farmers.

Therefore, present study focused on studies on new opportunities available with rural dairy farmers of Shirur Tahsil of Pune district in milk processing and milk products manufacturing.

MATERIALS AND METHODS

The present study was carried out during the year 2021-22 in Shirur tehsil of Pune district in western region of Maharashtra State. Twenty-five villages were selected for the study purpose. From each village 8 dairy farmers follows milk products manufacturing were selected. Total 200 dairy farmers were personally interviewed with help of well-designed questionnaire. Data were collected by personal interview with the help of structured schedule especially designed for the purpose of present study. Tabulation was done after completion of the interview work with the dairy farmers and editing the schedule. The raw data from edited schedule were first recorded in suitable primary table serially and incorporated in secondary table according to the classification. The entire schedule was numbered serially to facilitate the work of tabulation and analysis. All schedules were tabulated in different tables and the categorized and tabulated. The frequencies were converted into percentage for giving better and clear expression to the data. The analysis was done, keeping in view the objectives of the study. The statistical methods used in this study were mean and standard deviation for the purpose of categorization. The data collected in respect of above study were tabulated and subjected to statistical evaluation by adopting the standard technique prescribed by Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

A) Socio-economic status of rural dairy farmers of study area

The data on distribution of rural dairy farmers according to socio-economic status are presented in Table 1.

Data regarding age category of rural dairy farmers revealed that 38% of the rural dairy farmers belonged to young age category up to 35 years followed by 42% of dairy farmers belonged to middle age category i.e., between 36 to 50 years and only 20% of dairy farmers belonged to old age category i.e., above 50 years. Present findings are in line with Gopi et al. (2017).They noticed that 41.67% of dairy farmers belonged to old age group, 35% belonged to middle age group and 23.33% to young age group.Data

regarding educational status revealed that, 48 % of the dairy farmers were educated up to college (above 12th std.) level, followed by 29.50% of the dairy farmers were educated up to higher secondary school (11th to 12th std.) level; whereas 10.50% of dairy farmers were having education up to high school (8th to 10th std.) and 07% of dairy farmers as well as 03% of dairy farmers were having education up to middle school (5th to 7th std.) and primary school (1st to 4th std.) respectively.It was also observed that 02% of the dairy farmers were found to be illiterate. Present findings are inconformity with Sahu et al. (2017). They observed that 38.57% of dairy farmers educated up to high school, 23.58% up to higher secondary level, 12.14% educated up to middle school level, 10.71% educated up to primary school, 09.29% educated up to graduation and 05.71% of dairy farmers were illiterate.

Data regarding occupation majority (49%) of the dairy farmers were engaged in dairy and agriculture occupation. Relatively fewer dairy farmers were engaged in dairy along with agricultural labour and dairy as well as service 20.50% and 14.50% respectively. It was observed that 11 % of the dairy farmers were engaged in dairy occupation and only 05% of the dairy farmers were engaged in dairy and other occupation. Present findings are in line with Chaudhari (2006). They observed that 83% of dairy farmers engaged in agriculture and dairy occupation, 11% dairy and services occupation and 06% engaged in agriculture with dairy and other occupation.Data regarding family size maximum number i.e. 61.50% of the dairy farmers had medium family size (5 to 8 members) whereas, 14% of dairy farmers belonged to small family size (Up to 4 members) and 24.50% of dairy farmers belonged to large family size (Above 8 members). Lohakare et al.(2015) noticed that 81.43% dairy farmers were having medium family size i.e. 4 to 9 members, 11.42% were having big family size and 07.15% were having small size family.In family type 63% of dairy farmers belongs to nuclear type while 37% belongs to joint type. Gopi et al. (2017) observed that 70.83% of dairy farmers were having nuclear type of family, while 29.17% were having joint type of family. Data regarding annual income maximum (53.50%) dairy farmers had medium level of annual income (Rs.2,00,000 to 3,00,000) followed by 29% of dairy farmers who had low level of annual income (Rs. Up to 2,00,000), while only 17.50% of the dairy farmers had high level of annual income (Rs. above 3,00,000). Deepa et al.(2015) reported that 75% dairy farmers belonged to medium level of annual income, 15% belonged to low level of income and 10% belonged to high level of income. Data regarding herd size 46% of dairy farmers were possessed medium (07 to 14 animals) herd size. Whereas, 34% of dairy farmers had small herd size (Up to 06) and 20% of dairy farmers were having large herd size above 14 animals so, they are categorized under large herd size category. Nishi et al.(2011) noticed that 72.50% dairy farmers had medium herd size (6-9 animals), 16.25% were having large herd size (Above 9 animals) and 11.25% were having small herd size (up to 5 animals). In sources of milk 51% of dairy farmers used owned dairy milk

and 49% of dairy farmers had used milk collected from other for processing of milk and milk products manufacturing. In daily milk production 26% of the dairy farmers had low level of daily milk production (Up to 15 litre) followed by 34% of dairy farmers who had medium level of daily milk production (15-25 liter), while 40% of the dairy farmers had high level of daily milk production (Above 25 liter).Jaisridhar *et al.* (2013) reported that 69.33% of dairy farmers had milk production of 10.19-27.20 litres day^{-1}, 20% of dairy farmers had 27.20 liters day^{-1} and 10.67 % of dairy farmers had low milk production.Data regarding sale of milk 48% farmers had low level of daily sale of milk (Up to 5 liter) followed by 31% of dairy farmers had medium level of daily milk sale (5-10 liter), while 21% of dairy farmers had high level of daily sale of milk (Above 10 liter). These results corroborate with the findings of Lohakare *et al.* (2015). They noticed that 74.76% of dairy farmers sold medium level of milk, 14.29% sold high level of milk and 10.95% sold low level of milk sale. In sale of milk products out of 200 dairy farmers 49% of dairy farmers i.e. (98 farmers) sale different milk products in study area among them 12.24% of the dairy farmers had sold the milk product paneer, 26.53% of dairy farmers had sold dahi and 14.29% dairy farmers had sold pedha. However, 16.33% of dairy farmers had sold khoa followed by 14.29% of dairy farmers sold ghee while, 06.12 % of dairy farmers had sold other milk products and about 10.20% of dairy farmers had sold shrikhand.

B) Opportunities available with rural dairy farmers for milk processing

Equipment's available with rural dairy farmers for milk processing

The data on distribution of rural dairy farmers according to equipment available with rural dairy farmers for milk processing are presented in Table 2.

In case of equipment majority of dairy farmers i.e. 49% of dairy farmers used milk boiler followed by of 34% of dairy farmers used lactometer for checking specific gravity of milk and 44% of dairy farmers used electric milk tester for checking fat and SNF of received milk while 81% of dairy farmers used cone shaped milk can for store the milk for some time and 32% of dairy farmers used milk cooler for cooling the milk before use for processing.

Chavhan *et al.*(2017) reported that cooling is the predominant method of maintaining milk quality during collection. The bacterial load is a reflection of the hygienic quality of milk. This aspect has been ignored due to lack of facility for proper on-farm cooling of milk immediately after milking.

Modern dairy products machines available with rural dairy farmers

The data on distribution of rural dairy farmers according to modern dairy products making machines available with dairy farmers are presented in Table 3.

In modern dairy products machines 06% of dairy farmers used khoa making machine followed by 05% dairy farmers used pedha making machine for production of pedha,

while 04% of dairy farmers used ghee making machine for fast ghee production and 14% of dairy farmers utilized Gerber centrifuge machine for milk fat determination. However, 04% of dairy farmers used shrikhand making machine.However, 05% of dairy farmers used paneer pressing machine for pressing of paneer during its production.

Kumar *et al.* (2010) noticed that traditional method of khoa making has a number of drawbacks with non-uniform product quality like burning of the products occurs which lowers its quality. Applications of thin film microscopy and surface heat technology could have great potential for industrial use, likewise. Kumar *et al.* (2018) observed that continuous ghee making offers number of advantages like compactness in designs, hygienic operation, CIP cleaning. Apart from these benefits, continuous ghee making system incorporates an excellent feature of energy used for preheating cream.

New dairy processing techniques available with rural dairy farmers

The data on distribution of rural dairy farmers according new dairy processing techniques available with rural dairy farmers are presented in Table 4.

In new dairy processing techniques 49% of dairy farmers used boiling/heating technique for milk processing and also same per cent i.e. 49% of dairy farmers utilized packaging technique in milk processing and milk products manufacturing. About 02% of dairy farmers used preservation technique and 45% of dairy farmers used cream separation by traditional method technique and cream separation by improved method, 07% farmers used for production of ghee, while 25% of dairy farmers used fermentation techniques for produce shrikhand and other fermented products, 48% of dairy farmers used cooling/chilling technique, while only 04% and 02% of dairy farmers utilized standardization and homogenization technique respectively.

Chandan (2015) found that homogenization process reduces size of fat globules of milk by pumping milk at high pressure through a small orifice, called valve. Homogenized milk does not form a cream layer on storage. It leads better viscosity and stability in cultured products by fully dispersing stabilizers and other ingredients in ice cream, yoghurt and other formulated dairy products.

Patange and Kamble (2018) reported that cow milk, buffalo milk, sheep and goat milk always show variation in composition. Standardization of whole milk may be necessary for production of standardized, toned and double toned milk of standard composition or for manufacture of various milk products to meet the legal standard. He further reported that packaging is an integral part of processing in dairy industry and it is media for safe delivery of the product from the centre of production to the point of consumption. He further noticed that preservation techniques used in milk and milk products during storage and distribution as they exposed to a wide range of environmental conditions.

From the above results it is inferred that most of the dairy farmers involved in dairying with agriculture

Table 1. Distribution of rural dairy farmers according to socio-economic status of rural dairy farmers of study area

Sr. No.	Characteristics	Category	Frequency	Percentage (%)
1.	Age	Young (Up to 35 years)	76	38.00
		Middle (36 to 50 years)	84	42.00
		Old (Above 50 years)	40	20.00
2.	Education	Illiterate (No schooling)	04	2.00
		Primary school (1st to 4th)	06	3.00
		Middle school (5th to 7th)	14	7.00
		High school (8th to 10th)	21	10.50
		HSC (11th to 12th)	59	29.50
		Graduation (Above 12th)	96	48.00
3.	Occupation	Dairy	22	11.00
		Dairy + Agriculture	98	49.00
		Dairy + Agricultural labour	41	20.50
		Dairy + service	29	14.50
		Dairy + Other occupation	10	05.00
4.	Family size	Small (Up to 4 members)	28	14.00
		Medium (5 to 8 members)	123	61.50
		Large (Above 8 members)	49	24.50
5.	Family type	Nuclear	126	63.00
		Joint	74	37.00
6.	Annual income	Low (Up to 2,00,000)	58	29.00
		Medium (2,00,000 to 3,00,0000)	107	53.50
		High (Above 3,00,000)	35	17.50
7.	Size of herd	Small (Up to 06)	68	34.00
		Medium (07 to 14)	92	46.00
		Large (Above 14)	40	20.00
8.	Sources of milk	Owned dairy milk	102	51.00
		Owned + collection from other	98	49.00
9.	Daily milk production	Up to 15 litres (Low)	52	26.00
		15 – 25 litres (Medium)	68	34.00
		Above 25 litres (High)	80	40.00
10.	Daily milk sale	Up to 5 liters (Low)	96	48.00
		5-10 liters (Medium)	62	31.00
		Above 10 liters (High)	42	21.00
11.	Milk product sale	Paneer	12	12.24
		Dahi	26	26.53
		Pedha	14	14.29
		Khoa	16	16.33
		Ghee	14	14.29
		Shrikhand	10	10.20
		Other	06	06.12

Table 2. Distribution of rural dairy farmers according to equipment available with rural dairy farmers for milk processing

Sr. No.	New Equipment	Frequency	Percentage
1.	Milk cooler	64	32.00
2.	Cone shaped milk can	162	81.00
3.	Electric milk tester	88	44.00
4.	Lactometer	68	34.00
5.	Milk boiler	98	49.00

Table 3. Distribution of rural dairy farmers according to modern dairy products making machines available with rural dairy farmers

Sr.No.	New modern machines	Frequency	Percentage
1.	Khoa making machine	12	06.00
2.	Pedha making machine	10	05.00
3.	Ghee making machine	08	04.00
4.	Gerber centrifuge machine	28	14.00
5.	Shrikhand making machine	08	04.00
6.	Paneer pressing machine	10	05.00

Table 4. Distribution of rural dairy farmers according to new dairy processing techniques available with rural dairy farmers for milk processing

Sr. No.	New techniques	Frequency	Percentage
1.	Homogenization	04	02.00
2.	Standardization	08	04.00
3.	Cooling/chilling	96	48.00
4.	Fermentation	50	25.00
5.	Cream separation by traditional method	90	45.00
6.	Cream separation by improved method	14	07.00
7.	Preservation	04	02.00
8.	Packaging	98	49.00
9.	Boiling/heating	98	49.00

occupationwas from middle age group with medium herd size and with high level of daily milk production.Milk processing and dairying was doing as the collateral business with agriculture by most of the rural dairy farmers in the study area. As regards to new modern dairy equipment and modern dairy products making machineries very low level of dairy farmers were followed such new modern dairy equipment and machineries and only few numbers of dairy farmers were used new dairy processing techniques for milk processing and milk products manufacturing. So, there is need to provide training, guidance, scientific knowledge, credit and loan facility for purchasing of different machinery and equipment for processing and manufacturing milk products to rural dairy farmers, so as to increase the milk processing and milk products manufacturing in study area.

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