KNOWLEDGE GAINED BY DAIRY FARMERS THROUGH MICRO TRAINING CENTRES (MTCs): A SUMMATIVE EVALUATION

T H E S I S

Submitted

In partial fulfilment of the requirements for the Degree of

M A S T E R O F V E T E R I N A R Y S C I E N C E

IN

VETERINARY AND ANIMAL HUSBANDRY EXTENSION

BY

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Enrollment Number: V/15/108

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(INDIA)

2023

DECLARATION OF STUDENT

I hereby declare that the experimental research work and Interpretation of the thesis entitled "**KNOWLEDGE GAINED BY DAIRY FARMERS THROUGH MICRO TRAINING CENTRES (MTCs): A SUMMATIVE EVALUATION"** or part thereof has not been submitted for any other degree or diploma of any University, nor the data have been derived from any thesis/publication of any University or scientific organization. The sources of materials used and all assistance received during the course of the investigation have been duly acknowledged.

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We also certify that the thesis or part thereof has not been previously submitted by him for a degree of any other university.

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This is to certify that the thesis entitled, **"KNOWLEDGE GAINED BY DAIRY FARMERS THROUGH MICRO TRAINING CENTRES (MTCs): A SUMMATIVE EVALUATION"** submitted by **Shri. KAMBLE AVINASH CHANDRAKANT** to the Maharashtra Animal and Fishery Sciences University in partial fulfillment of the requirement for the degree of **Master of Veterinary Science** has been approved by the Student's Advisory Committee after examination in collaboration with the External Examiner.

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The future belongs to those who believe in the beauty of their dreams."

-Eleanor Roosevelt

Whenever a journey reaches its climax, it is always a pleasure to look back at all the noble characters that had come in the way and made the expeditions a fabulous one.

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I AM DEDICATING THIS THESIS TO MY DEAREST AAI, BHAU AND BABA.

The author begs extreme pardon and render apologies to all those who helped me directly or indirectly but their names have not been induced through an oversight in the acknowledgment; they would kindly excuse me for the same.

Place: Nagpur ***(Kamble Avinash Chandrakant)***

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%	:	Per cent
≤	:	Less than
>	:	Greater than
viz.	:	Namely
f	:	Frequency
etc.	:	And elsewhere
et al.	:	And the others
@	:	At the rate
i.e.	:	That is
Rs.	:	Rupees
GDP	:	Gross Domestic Product
AHD	:	Animal husbandry department
SC	:	Scheduled Caste
OBC	:	Other Backward Classes
ST	:	Scheduled Tribes
VJ	:	Vimukta Jati
NT	:	Nomadic Tribes
SBC	:	Special Backward Castes
NDDB	:	National Dairy Development Board's
MTCs	:	Micro Training Centres
MAFSU	:	Maharashtra Animal and Fishery Sciences University
SMS	:	Subject Matter Specialist
SHGs	:	Self Help Groups
A. I.	:	Artificial Insemination
TMR	:	Total Mixed Ration

INTRODUCTION

One of the fastest-growing parts of India's agricultural economy is the dairy sector. It accounts for almost 4.2 per cent of the entire GDP and provides nearly 28.63 per cent of the total value of agriculture GDP. The overall growth of the dairy sector is expanding and is currently approximately 8.24 per cent, despite the fact that investment in this area has been low. The livestock sector in 2019-20 has a production of 198.4 million tonnes of milk, 63.02 billion eggs, 42.99 million kg of wool and 4.83 million tonnes of meat. India is the world's leading producer of milk, with production increasing from 17 million tonnes in 1950-51 to 198.4 million tonnes in 2019-20. Per capita milk availability has also increased from 112 grams per day in 1968-69 to 407 grams in 2019-20. Exotic/crossbred animals produce 7.95 kg of milk per day on average, while indigenous/non-descript animals produce 3.01 kg of milk per day (Garg and Kumar 2021).

Buffalo, cattle and goats are the most common dairy animals in the country. According to provisional figures from the 20th livestock census, the overall cow, buffalo and goat population in the country is 192.4 million, 109.85 million, and 148 million, respectively. Out of 192.4 million cattle, there are 145.11 million female cattle and the milch population is 74.17 million, with only 43.9 million animals in milking stage. In case of buffaloes, the total female population is 100 million, with 51.16 million being milch animals and only 38.16 million are in milking stage (20th Livestock Census, 2019).

In India, dairy development has played a significant role in raising milk output, improving people's nutritional standards, creating jobs and increasing revenue in rural areas. Non-adoption of scientific dairy management practices or lack of information could cause slow dairy development. After the Green Revolution, the National Dairy Development Board's Operation Flood launched in 1970 ushered the White Revolution. It actually had brought the dairy industry back from the brink of extinction.

With a volume of 132.4 million tonnes, India ranks first in the milk production worldwide. More than 65 per cent of Indians live in villages and rely on agriculture, making it as an agrarian country mostly relying on agriculture and related industries for their living. Dairy farming is now a significant secondary source of providing employment and income for millions of rural families. It is now playing the most significant role in creating opportunities for marginal and female farmers to generate income. Majority of the milk in our nation is produced by marginal farmers and laborers who lack access to land for animal husbandry. (Himabindu *et al.* 2014). In rural areas, majority of landless laborers, marginal farmers, and small farmers practice small-scale dairy farming with less than 10 cows, fighting to make ends meet for their families. The main characteristic of the Indian dairy business is that it is still mostly disorganized and only 18–20 per cent of the country's total milk production goes through the organized sector (Anonymous, 2014). Because, landless laborers, marginal farmers, and small farmers participate more frequently in unstructured small-scale dairy farming, it is necessary to determine their socioeconomic profiles so that the best strategy may be developed for their social and economic growth (Ram *et al*. 2018).

Conducting training for dairy farmers on the newest dairy farming procedures will certainly improve their knowledge of scientific dairy practices. Animal productivity will be improved by understanding and adopting scientific procedures. Scientific dairy farming training programs have been reported to have a positive impact on dairy farmers' adoption of technology and knowledge levels (Murai and Singh, 2011, Yadav and Pareek, 2014).

Dairy farming is one of the crucial businesses that help rural households by offering stable work and timely money. It is widely acknowledged that milk and milk products are essential for a person's physical growth and well-being. In India, it has long been customary for women to maintain livestock, and dairy farming has long been a crucial component of the domestic farming system. Even though women perform a large portion of the job associated with livestock husbandry, the areas in which they require the greatest training are not adequately taken into account when designing training programmes. Therefore, research on

the training requirements of farm women engaged in dairy farming is of utmost significance to the extension organizations working on rural development (Singh *et al.*2020).

Dairy farming and animal husbandry are typically done as a side business by farmers to help with household expenses and to complement their income from crop agriculture. But in the modern day, when most rural residents own tiny plots of land, livestock raising is anticipated to be pro-poor and active in eradicating poverty (Birthal and Taneja, 2008). The livestock industry generated 4.35% of the country's GDP in 2021-22. (GOI, 2023). In a state like Punjab, large numbers of farmers and households have found work opportunities in the cattle sector, both full- and part-time. (Singh *et al*.2015)

A number of livestock development programs are in existence across the country to assist dairy producers in adopting dairy management methods. There is still a significant gap between research technology and its application, notably in animal rearing. As a result, dairy owners are slow to adopt dairy management practices.

Farmers who are interested to know about dairy practices can apply and get benefits from the training given by the Veterinary Institutes. Training Centre such as Micro Training Centre (MTC) which is established by the Maharashtra Animal and Fishery Sciences University (MAFSU), Nagpur with the financial assistance of the National Dairy Development Board (NDDB), Anand. The progressive farmer provides training to the beneficiary dairy farmers of Mother Dairy. This training is given at their respective farm site. The rationale for this training is that the one who is trained in MTCs will spread his knowledge to other local dairy farmers.

Through such training, many farmers are benefited and they have started scientific dairy cattle management practices to get maximum returns from their enterprises. If we compare them before and now at present, there is great variation in their farming style which indicates that such training centres are having a good effect on farmers and the overall dairy development.

The main objective of this research is to assess the effect of training on farmers who have undergone such training at MTC and how it has changed their farming practices and whether they got benefited or not. The purpose of this study is to assess the effect of MTC on dairy farmers. Hence the present study on the topic **"Knowledge Gained by Dairy Farmers Through Micro Training Centres (MTCs): A Summative Evaluation"** is planned with the following specific objectives.

Objectives:

1. To study the socio-economic profile of trainees of Micro Training Centres (MTCs).

2. To assess the effectiveness of training given to the dairy farmer in Micro Training Centres (MTCs).

3. To study knowledge gained by trainees of Micro Training Centres (MTCs).

4. To ascertain the constraints perceived by trainees of MTCs in implementing the dairy technologies.

REVIEW OF LITERATURE

1. To study the socio-economic profile of trainees of Micro Training Centre (MTCs)

2.1.1. Age:

Singh *et al.* (2021) study was conducted to investigate the socio-economic and communication profile of the dairy farmers of a central plain zone of Uttar Pradesh and reported that the majority of the respondents (46.97%) were from the age group of 36-50 years followed by the 33.33 per cent of the respondents belong to more than 50 years age group and near about one-fifth of the respondents (19.70%) belong to the age category of up to 35 years.

Anand *et al*. (2019) observed that the majority of the farm trainees (71.66%) who were imparted training on animal husbandry from both the KVKs of Ranchi and Lohardaga belong to the middle age group of 31 to 50 years whereas, the remaining others were found in the young age group of fewer than 30 years of age (16.67%).

Prasad *et al.* (2019) study was conducted in Jhitkari, Chhabariya and Chandana villages of Sardhana block of Meerut district and revealed that most of the dairy farmers (53.33%) belong to middle age group ranging from 36 to 50 years, followed by old (40%) age group ranging above 50 years and only 6.67 per cent had young (up to 35 years) age group.

Atreya *et al.* (2018) revealed that in the case of Member dairy farmers in the district Sultanpur, maximum number of respondents (58%) was observed in the middle-age category, followed by 25 per cent in the young age category and 17 per cent in the old age category.

Prasad *et al.* (2017) investigated the socio-economic profile and constraints faced by dairy farmers of the Wayanad district of Kerala and observed that half of the farmers (50 %) belong to the middle age group (20- 40 years), 22 per cent of the farmers belong to the adult age group (40-60 years), 16 per cent

belong to the senior citizen (above 60 years) and 12 per cent belong to young age group (15-20 years).

Gopi *et al.* (2017) studied that the age of dairy farmers ranged between 20-85 years and the average age was 44 years. About two-fifths of the dairy farmers (41.67 %) belong to the old age group, while 35.00 per cent of them were in the middle age group and only 23.33 per cent were in the young age group.

Bankar *et al.* (2015) observed that most of the trainees in both the KVKs were average age group of dairy farmers varied from 24 to 62 years and 69.49 per cent of dairy farmers were from the middle age group (20-40 years).

Sabapara *et al*. (2014) studied the personal characteristics of dairy animal owners and noticed that majority of the dairy animal keepers (43.67%) belong to the middle-age category, followed by old age category (41.66%) and young age category (14.66%).

2.1.2 Education:

Karthik *et al.* (2021) observed that a significant percentage of respondents (45.91%) possessed high school education, followed by secondary education (16.82%), intermediate/diploma (15.45%), primary education (8.64%), graduation and above (7.73 %) and illiterates (5.45%).

Singh *et al.* (2021) conducted a study to investigate the socio-economic and communication profile of the dairy farmers of a central plain zone of Uttar Pradesh and noticed that the majority of the respondents (25.15%) had a middle-level of schooling, followed by 21.52 per cent of the respondents who had secondary level of schooling. Furthermore, it was found that 16.67 per cent of the respondents had a secondary level of education and 14.24 per cent of the respondents had a primary level of education. More than one-tenth of the respondents (11.21%) had a graduate level and above while 7.88 per cent of the respondents belong to the functionally literate and 3.33 per cent of the respondents belong to the functionally illiterate categories.

Prasad *et al.* (2019) study was conducted in Jhitkari, Chhabariya and Chandana villages of Sardhana block of Meerut district and indicated that majority of dairy farmers (37.50%) had high school level of education, followed by (20.83%) were graduation and above, (20%) were intermediate, (17.50%) were middle school and 4.17 per cent had just primary schooling.

Manjusha *et al.* (2018) identified the role of livestock in the sustainable livelihood of the tribal women of Jharkhand and noticed most of the respondents (30%) who did not have any formal education fell into the "can read and write" category, and the next largest groups (25.00%) were illiterates. About 23 per cent had only completed their elementary education, while 21.7 per cent had completed middle school.

Kalaivani *et al.* (2017) studied the socio-economic and psychological characteristics of dairy contract farmers and found about one-third of the respondents (45.83 %) had middle school education, 21.67 per cent had secondary school education, while 11.67 per cent were illiterates, 10.83 per cent were functionally illiterate and an equal proportion 10.00 per cent had a primary school and collegiate education.

Gour *et al.* (2016) observed that the majority of the tribal livestock owners (35.33%) were illiterate, followed by 30 per cent and 24 per cent were educated in the up to primary and middle school categories, respectively. Only 10.67 per cent of respondents were educated up to high school level and none of the respondents had graduated and above.

Sabapara *et al.* (2014) studied the personal characteristics of dairy animal owners and noticed that the per cent level of illiterate, up to primary, secondary and above secondary, up to college level were 37.00, 29.67, 28.33 and 5.00 respectively.

2.1.3 Marital Status:

Dzarma *et al.* (2020) studied the marital status of the farmers and unveiled that 62.5 per cent were married and remaining 36.25 per cent were not married.

Girei *et al.* (2014) found from his study that 26.7 per cent of the respondents were found to be unmarried while 73.3 per cent of the respondents were married.

Khan *et al.* (2014) conducted work on the comparative impact of dairy farming on the health status of dairy farmers and non-farmers of Lahore and found that the majority of the dairy farmers (77.1%) were married while the remaining 22.9 per cent were unmarried.

Mumba *et al.* (2012) studied the socio-economic characteristics of smallholder dairy farmers and reported that 82.8 per cent were married, 12.1 per cent were widowed and the rest 5.1 per cent were unmarried.

2.1.4 Gender:

Karthik *et al.* (2021) studied the profile characteristics of youth in the dairy industry of Telangana States and found that majority of the respondents (75.45%) were male and 24.55 per cent of respondents were found to be female dairy entrepreneurs.

Maurya *et al.* (2021) revealed the socio-economic status of dairy farmers and found that about 96.25% of the respondents were male and only 3.75% respondents were female.

Rajadurai *et al.* (2018) observed the socio-economic profile of the dairy farmers in Puducherry and found the majority of the dairy farmers (61.8%) were women and 38.2 per cent were men.

Kalaivani *et al.* (2017) studied the socio-economic and psychological characteristics of dairy contract farmers and noticed that three-fourths of the respondents (75.83 %) were male while the rest 24.17 per cent were female.

Rai *et al.* (2017) investigated the socio-economic characteristics of the tribal dairy farmer of Himachal Pradesh and noticed that 85.00 per cent of the tribal farmers were male and 15.00 per cent were female.

Rahman *et al.* (2018) study was conducted to assess the impact of Self-help Group activities on the socio-economic status of dairy farmers in Kamrup district of Assam and found that the majority of members (60.00%) and 77.00 per cent of non-members were male while 40 per cent of member and 23 per cent non-members were female.

Mumba *et al.* (2012) observed the socio-economic characteristics of the smallholder dairy farmers and found the majority of the respondents (63.1%) were male and 36.9 per cent were female.

2.1.5 Category:

Maurya *et al.* (2021) revealed the socio-economic status of dairy farmers and found that majority of the respondents (74.4%) belong to OBC category, followed by 19.4 per cent belong to UNRESERVED category and Only 6.3 per cent of the respondents belong to SC categories.

Kumar *et al.* (2020) studied during their study the socio-economic profile of dairy farmers and revealed that 61.00 per cent of the dairy farmers were from the OBC category, followed by 24.00 per cent from SC/ST and 15.00 per cent from the General categories.

Atreya *et al.* (2018) indicated that the maximum number of members of dairy farmers (73%) belonged to the other backward class categories, followed by 21 per cent belongs to the scheduled caste and 6 per cent belongs to the general category.

Vekariya *et al.* (2016) studied and noticed 78.33 per cent of the Maldhari dairy farmers were from the OBC category, followed by 21.67 per cent found to be from the ST category.

Khan *et al.* (2014) revealed that the role of dairy co-operative societies in the socio-economic development of dairy farmers has the largest share of Brahmans (36.30%), followed by Muslims (17.04%) and Thakurs (14.07%).

Sabapara *et al.* (2014) revealed the personal characteristics of dairy animal owners and noticed that the majority of the respondents (40%) belong to Other Backward Categories, followed by Scheduled Tribe (39.33%), General Category (13.67%) and Scheduled Caste (7%).

2.1.6 Family Type:

Karthik *et al.* (2021) while working on profile characteristics of youth in the dairy industry of Telangana State and found that the majority of respondents (62.73%) belong to the nuclear family while the rest 37.27 per cent of respondents had joint families.

Kumar *et al.* (2020) reported that the majority of farmers (66.00%) belong to nuclear-type families and 34.00 per cent belong to joint-type families.

Anand *et al*. (2019) revealed that the majority of the respondents (57.78%) of Ranchi KVKs belong to the nuclear type of family and 42.22 per cent of the respondents were from a joint type of family. Whereas the majority of the respondents (54.44%) of Lohardaga KVKs belong to the nuclear type of family and 45.56 per cent of the respondents were from the joint type of family.

Kalaivani *et al.* (2017) studied the socio-economic and psychological characteristics of dairy contract farmers and found that three-fourths of the respondents (74.17 %) belong to the nuclear family, while the rest 25.83 per cent belong to the joint family.

Prasad *et al.* (2017) study was conducted to explore the socio-economic profile and constraints faced by dairy farmers of the Wayanad district of Kerala and noticed that the majority of the respondents (84%) belonged to nuclear families and 16 per cent are joint families.

Dwivedi *et al.* (2014) revealed that the majority of the peri-urban dairy farmers (68.33%) belonged to a joint family, followed by 31.66 per cent were the nuclear family type.

Sabapara *et al.* (2014) indicated that in the personal characteristics of dairy animal owners and found that the majority of the respondents (58.33%) belonged to the nuclear-type family and 41.67 per cent belonged to joint-type families.

Rathod *et al.* (2011) found that the majority of farm women lived in a joint family (65%) while 35 per cent lived in a nuclear family.

2.1.7 Family Size:

Karthik *et al.* (2021) studied about profile characteristics of youth in dairying in Telangana State and revealed that the majority of respondents (62.73%) fall within the family size range of 1-5 people, while 24.55 per cent of medium families (with 6-7 people) and 12.73 per cent of high families (with 7 or more).

Singh *et al.* (2021) investigated the socio-economic and communication profile of the dairy farmers of a central plain zone of Uttar Pradesh and found that more than half of the respondents (57.27%) had medium-sized families comprising 5 to 7 members, followed by 23.03 per cent of the respondents had high family size with more than 7 members and 19.70 per cent of the respondents had low family size with less than 5 members.

Anand *et al.* (2019) observed that 40 per cent respondents had a small size of family and 17.78 per cent of respondents had a large sized family in Ranchi KVK. Whereas in Lohardaga KVKs, the majority of the respondents (45.56%) belong to a medium size of family, 35.56 per cent of respondents had a small size of family and 18.88 per cent of respondents had a large size of family.

Prasad *et al.* (2019) conducted their study in Jhitkari, Chhabariya and Chandana villages of the Sardhana block of Meerut district and depicted that the

majority of dairy farmers (53.33%) had medium size families (5-10 members) followed by 45 per cent had small size family (up to 5 members) and 1.67 per cent had large size family (above 10 members).

Atreya *et al.* (2018) revealed that majority of the members of dairy farmer (62%) had a medium family size (5 to 11 members), followed by 22 per cent had a small family size (Up to 4 members) and 16 per cent had large family size (11 and above).

Kalaivani *et al.* (2017) investigated the socio-economic and psychological characteristics of dairy contract farmers and noticed that the majority of the respondents (86.67 %) had up to five members in their family whereas the remaining (13.33%) had more than five members in their family.

Gour *et al.* (2016) conducted a study in the Mandla and Seoni district of Madhya Pradesh as these two districts had good proportion of the tribal population and they revealed that the majority of the respondents (69.33%) belonged to the medium family-size category followed by 24 per cent tribal livestock owners had small family size and only 6.67 per cent fall in the category of large family size.

2.1.8 Occupation:

Singh *et al.* (2021) study was conducted to investigate the socio-economic and communication profile of the dairy farmers of a central plain zone of Uttar Pradesh and reported that the majority of the respondents (70.00%) had Agriculture as their primary occupation while 10.30 per cent of the respondents practiced dairying as their major occupation, followed by 7.58 per cent of the respondents who choose labor work, 6.36 per cent of the respondents were choose business and 5.76 per cent of the respondents were choose service sector.

Prasad *et al.* (2019) study was conducted in Jhitkari, Chhabariya and Chandana villages of Sardhana block of Meerut district and found that the majority of respondents (80%) had agriculture as their main occupation followed

by dairying (9.17%), service (5.83%) and only 5 per cent had business as the main occupation.

Shahjar *et al.* (2018) investigated that majority of the respondents (90%) undertook animal husbandry and agricultural occupations, 5 per cent had animal husbandry, agriculture and business whereas, rest 5 per cent had animal husbandry, agriculture and service.

Kalaivani *et al.* (2017) investigated that more than half of the respondents (55.84 %) had crop farming plus dairy farming as their occupation, followed by 43.33 per cent had crop farming plus dairy farming and others as their occupation and a negligible 0.83 per cent had dairy farming alone as their occupation.

Prasad *et al.* (2017) investigated the socio-economic profile and constraints faced by dairy farmers of the Wayanad district of Kerala and observed that the main source of income of the farmers (80%) was agriculture which included livestock farming, 14 per cent earned their income from livestock business, 4 per cent were government employees and 2 per cent were engaged in private practices.

2.1.9 Land Holding:

Karthik *et al.* (2021) studied profile characteristics of youth in dairying in Telangana State and found that small farmers made up a sizeable percentage of the respondents (46.82%), followed by marginal farmers (33.64%), medium farmers (11.82%) and large farmers (7.72%).

Singh *et al.* (2021) investigate the socio-economic and communication profile of the dairy farmers of a central plain zone of Uttar Pradesh and found that the majority of the respondents (46.36%) were marginal landholders, followed by 24.24 per cent of the respondents who were small landholders and 20.00 per cent of the respondents who were high landholders. A very less proportion of the respondents (5.45%) had medium land holding, followed by 3.94 per cent of the respondents who were landless.

Anand *et al.* (2019) revealed that majority of the respondents (45.55%) of Ranchi KVKs were marginal farmers, 27.78 per cent respondents were small farmers, 11.11 per cent respondents were medium farmers, 9.99 per cent respondents were landless farmers and 5.55 per cent respondents were large farmers. Whereas the majority of the respondents (37.77%) of Lohardaga KVKs were small farmers, 22.22 per cent respondents were marginal farmers, 20 per cent respondents were landless farmers, 11.11 per cent respondents were large farmers and 8.88 per cent respondents were medium farmers.

Prasad *et al.* (2019) conducted their study in Jhitkari, Chhabariya and Chandana villages of the Sardhana block of Meerut district and noticed that about half of the dairy farmers (49.16%) had large (above 6 acres) farm sizes, followed by small (17.50%) farm size (2.1 to 4 acres),16.67 per cent had marginal (up to 2 acres) and 16.67 per cent had medium (4.1 to 6 acres) each as their land holding.

Atreya *et al.* (2018) revealed that majority of the dairy farmer (93.00%) were found in the marginal land holding category (below 1ha), followed by 5 per cent dairy farmers had small land holding categories (1-2 ha) and 2 per cent dairy farmers were medium land holding category (2-4 ha).

Rajadurai *et al.* (2018) studied the socio-economic profile of the dairy farmers in Puducherry and found the majority of the dairy farmers (71.4%) were landless, followed by 17.7 per cent were small categories of dairy farmers, 5.9 per cent were medium categories of dairy farmers and 5.0 per cent were large categories of dairy farmers.

Gour *et al.* (2016) observed that 22 per cent of the tribal livestock owners were landless. The majority of the respondents (64.67%) possessed 1-2 hectares of land and belong to the small farmers' category, while, 13.33 per cent of the respondents had less than 1 hectare of land and fell in the marginal farmers' category. The average land holding of tribal livestock owners was found to be less than 2 hectares due to fragmentation of land and population explosion.

Sabapara *et al.* (2014) revealed the personal characteristics of dairy animal owners and found that 36.00, 20.67, 10.33 and 33.00 per cent of the respondents were falling under marginal, small, large farmer and landless, respectively.

2.1.10 Herd Size:

Anand *et al.* (2019) revealed that the majority of the farm trainees who were imparted training on animal husbandry (57.22%) had small herd sizes followed by 36.67 per cent with medium herd size and 6.11 per cent respondents were having large herd sizes.

Prasad *et al.* (2019) revealed that the majority of dairy farmers (53.33%) had small (up to 3 milch animals) herd size, followed by medium 39.17 per cent herd size (4-6 milch animals) and only 7.5 per cent had large (above 6 milch animals) herd size.

Shahjar *et al.* (2018) observed that the majority of the respondents (68.33%) had a medium herd size (3-5 animals), 20 per cent had a small herd size (up to 2 animals) and rest 11.66 per cent had a large herd size (>5 animals).

Rajadurai *et al.* (2018) studied socio-economic profile of the dairy farmers in Puducherry and notice that the majority of the respondents (55%) had small herd size, followed by medium herd size (34.5%) and large herd size (10.5%).

Kalaivani *et al.* (2017) studied the socio-economic and psychological characteristics of dairy contract farmers and observed that the majority of the respondents (86.67 %) had small herd sizes, followed by medium herd sizes (10.83 %) and large herd sizes (2.50 %).

Gour *et al.* (2016) observed that most of the respondents (65.89%) had a herd of 1-3 cattle, followed by 14.67 per cent had a herd size of 4–7 cattle and 10 per cent had herds of more than 7 cattle. Only 14.67 per cent of respondents said that they had 1-3 buffaloes. According to the survey, tribal livestock owners owned 1-3 goats (51.33%), 1-3 pigs (9.33%) and 1-3 poultry (38%).

Lohakare *et al.* (2015) studied that most of the respondents (70.00%) had medium herd sizes of 3 to 9 animals, followed by high herd sizes (16.20%) and low herd sizes (13.80%).

2.1.11 Experience in Dairy Farming:

Karthik *et al.* (2021) studied the profile characteristics of youth in dairying in Telangana State and noticed respondents (58.64%) had high dairy farming experience followed by medium dairy farming experience (30.91%) and low dairy farming experience (10.45%).

Singh *et al.* (2021) found that majority of the respondents (47.27%) had more than 25 years of experience in dairy farming, followed by 28.79 per cent of the respondents had 17 to 25 years and 23.94 per cent of the respondents had less than 17 years of experience in dairy farming.

Rajadurai *et al.* (2018) studied the socio-economic profile of the dairy farmers in Puducherry and found that many respondents have good experience in dairy farming (40.0%) were 20-30 years, while 20.9 per cent had 10-20 years of experience and 35.0 per cent were in 30 years and above experience category.

Ram *et al.* (2018) studied the socio-economic status of unorganized dairy farmers and the study was carried out in the Junagadh district of Gujarat state and found that many respondents have good experience in dairy farming, (63.50%) had medium experience, followed by 19.50 per cent with low experience and 17.00 per cent with high experience (Bashir *et al.*, 2011).

Kalaivani *et al.* (2017) found that majority of the respondents (55.00%) had a medium level of experience (11- 20 years), whereas 37.50 per cent had high levels of experience (more than 20 years) and 7.50 % had low levels of experience (up to 10 years).

Vekariya *et al.* (2016) stated that more than half of the respondents (54.17%) were from medium level of experience followed by 27.50 per cent

with a high level of experience and 18.33 per cent with a low level of experience in dairy farming.

2.1.12 Daily Milk Production:

Kumar *et al.* (2020) studied the socio-economic profile of dairy farmers regarding milk production per day and most of the farmers (44.00 %) belonged to the low category of milk production (less than 5 litres), 39.00 per cent of them belong to medium milk production (5-10 litres) and only 17.00 per cent were from the high category of milk production (more than 10 litres per day).

Prasad *et al.* (2019) revealed that majority of the respondents (75%) had high milk production (above 10 litre/day), followed by (20.83%) medium milk production (5-10 litre/day) and only 4.17 per cent had low milk production (up to 5 litre/day).

Kalaivani *et al.* (2017) found that more than two-thirds of the respondents (69.17 %) produced (up to 20 litres/day) of milk, followed by 20.00 per cent of farmers produced (20.1-40 litres/day), 7.50 per cent of farmers produced (40.1-60 litres/day) and 3.33 per cent of farmers produced above 60 litres/day of milk.

Rai *et al.* (2017) studied the socio-economic characteristics of the tribal dairy farmers of Himachal Pradesh and revealed that most of the respondents (41.88%) belong to medium level of milk production (12.52 to 21.67 lit/day) whereas, 38.70 per cent of them fall into the low category (<12.52) and 19.38 per cent into the high category (>21.67).

Lohakare *et al.* (2015) revealed that majority of respondents (75%) were found in the medium category of milk production i.e. 2 to 13 litres. Most of the cattle owners kept non-descript and desi cattle for manure purposes and bullocks for draught purposes without giving emphasis to milk production. However, 14.29 per cent of the farmers were high milk producers from the study area.

2.1.13 Milk Sale:

Koli *et al.* (2019) revealed that the majority of the dairy farmers (92.50 %) had medium level of sale of milk (12 to 34 litres/day), followed by 04.50 per cent had high level of sale of milk (above 34 litres/day) and 3 per cent had low level of milk sale (up to 11 litres/day).

Kalaivani *et al.* (2017) reported that more than two-thirds of the respondents (69.17 %) sold milk up to 20 litres/day, followed by 21.67 per cent of farmers sold 20.1-40 litres/day, 5.83 per cent of the farmer sold 40.1 -60 litres/day and 3.33 per cent of the farmer sold above 60 litres/day.

2.1.14 Annual Income:

Karthik *et al.* (2021) revealed that almost half of the respondents (48.64%) fall into the medium-income category (between Rs. 70,000 and Rs. 1,90,000), followed by the low income (30.91%) and high income (20.45%) groups. The respondents' average yearly income was found to be Rs. 1,30,750.

Kumar *et al.* (2020) reported that majority of dairy farmers (53.00%) had low annual income (less than Rs. 24842), 26 per cent of them had high annual income (more than Rs. 60575) while, 21 per cent of them had medium annual income (Rs. 24842 to 60575).

Atreya *et al.* (2018) reported that majority of the members of dairy farmers (63.00%) were in the low annual income group (Up to Rs. 87165), followed by 24 per cent of member dairy farmers were in the medium annual income group (Rs. 87166 to 228155) and 13 per cent of member dairy farmers were in high annual income group (Rs. 228156 and above).

Shahjar *et al.* (2018) studied that the majority of the respondents (68.33%) had medium annual income (Rs.16336-52564), 16.67 per cent had low annual income (Rs.11000-16335) and rest 15 per cent had a high annual income (Rs.52565-80000).

Kalaivani *et al.* (2017) observed that more than three-fourths of the respondents (76.67 %) belong to the low-income category (Rs.1-2.6 lakhs), followed by 20.00 per cent belong to the medium income category (Rs.2.7–4.3 Lakh) and 3.33 per cent belong to the high-income categories (Rs.4.4–6 Lakh).

Gour *et al.* (2016) found that majority of the respondents (75.33%) were between Rs. 8,600-23,373 followed by 14 per cent had an income of less than Rs. 8,600 while a mere 10.67 per cent had an income of more than Rs. 23,373.

2.1.15 Training Attended by the Farmers:

Karthik *et al.* (2021) revealed that majority of respondents (51.36%) possessed a low level of training exposure, followed by medium level of training exposure (37.73%) and high level of training exposure (10.91%).

Maurya *et al.* (2021) found that majority of the respondents (61.3%) had never undergone any training while only 38.8 per cent respondents had undergone through training session.

Kumar *et al.* (2020) opined that the majority of participants (56.4%) joined the training programs for the medium duration (5-7 days; 56.4 %) followed by short duration (2-4 days; 23%) and long duration (> 7 days; 20.6%).

Shahjar *et al.* (2018) observed that majority of the respondents (55%) had not participated in any training event, whereas, 45 per cent of the respondents had undertaken training programmes regarding animal husbandry.

2.1.16 Extension Contact:

Kumar *et al.* (2020) revealed that more than half the respondents (54.00%) belonged to medium extension contact. Whereas, 34.00 per cent of them belonged to low extension contact and only 11.00 per cent had high extension contact.

Ram *et al.* (2018) studied the socio-economic status of unorganized dairy farmers at Junagadh district of Gujarat State and found that 86 per cent of farmers

had a medium level of extension participation followed by 11.00 per cent had high level and 3.00 per cent had low level of extension participation.

Shahjar *et al.* (2018) revealed that most of the respondents (73.33%) had a medium extension contact, 15.00 per cent had a low extension contact and 11.66 per cent had a high extension contact.

Kalaivani *et al.* (2017) revealed that most of the respondents (53.34%) belonged to low level of extension agency contact, followed by respondents of (40.83%) belonged to medium level of extension agency contact and rest of the respondents (5.83%) belonged to high levels of extension agency contact.

Rai *et al.* (2017) noticed that 42.50 per cent of dairy farmers had a medium level of extension contact followed by 22.50 per cent high level of extension contact and the rest 35.00 per cent with a low level of extension contact.

Sabapara *et al.* (2014) reported that majority of the respondents (70.67%) belong to medium-level of extension contacts, followed by 17.67per cent were high-level extension contacts and 11.67 per cent were low-level extension contacts.

2.1.17 Social Participation:

Karthik *et al.* (2021) observed that majority of respondents (66.82%) had medium levels of social activity, followed by low levels of social activity (20.91%) and high levels of social activity (12.27%).

Maurya *et al.* (2021) studied that majority of the respondents (54.4%) were not associated with any organisation, followed by 33.8 per cent respondents having associated with one organisation. 6.3 per cent of the respondents had membership of two organization and only 5.6 per cent of the respondent membership of more than two organization.

Atreya *et al.* (2018) indicated that the majority of members of dairy farmers (50.00%) had membership in two organizations, followed by 39 per cent

of members having membership in one organization and 11 per cent of participation in more than two organizations/office bearers.

Kalaivani *et al.* (2017) noticed in study that more than half of the respondents (55.84 %) were members of one organization, one-third of respondents (33.33 %) were not a member of any organization and 10.83 per cent of the respondents were members in more than one organization.

Vekariya *et al.* (2016) observed that more than half of the Maldhari dairy farmers (54.17%) had no membership in any organization, 38.33 per cent had membership in one organization and 07.50 per cent of Maldhari dairy farmers had membership in more than one organization. None of the Maldhari dairy farmers were holding positions in any of the organizations.

Lohakare *et al.* (2015) revealed from study that majority of the respondents (80%) were found in the medium category of social participation and it indicated that most the cattle owners might have participated in more than one rural social organization like SHGs, village co-operative society and gram panchayats, etc.

Sabapara *et al.* (2014) reported that majority of the respondents (92.34%) had membership in one organization while, 2 per cent respondents had membership in more than one organization, 1.33 per cent respondent had membership with holding position in organization and 4.33 per cent respondents had no participation in any organization.

2. To assess the effectiveness of training given to the dairy farmers in Micro Training Centre (MTCs)

Kobba *et al.* (2020) revealed that 75 per cent of the trainees rated the training above 81 per cent, 17 per cent of them rated the training between 61-80 per cent and only 2 per cent rated the training between 41-60 per cent and also it was observed that highest mean score was obtained on relevance of training and clarity of explanation (4.5), followed by training environment and presenting at the level of trainees was (4.3), coverage of training objectives (4.2), handling of

sessions (4.1), practical exposure (4.0), boarding facilities (4.0), and facilities for training (3.9) each out of 5. Overall effective index was 84.00 per cent.

Kumar *et al.* (2016) revealed the mean feedback rating on the overall components of the training programs was 3.42 out of the maximum possible score of 5, which indicates scope for further improvement. The greatest feedback was in the areas of the usefulness of the course (3.75), the relevance of the course contents (3.69) and handling of the session (3.63).

Singh and Rampal (2016) studied a sample comprising 60 trained dairy farmers who received training from Krishi Vigyan Kendras (KVKs) and the study area was selected to study the effect of training. For control 60 dairy farmers not trained under these KVKs were selected. Ex post facto research design was employed to determine the effect. The entrepreneurial index was calculated to see the extent of the entrepreneurial level of the trained and control group dairy farmers. The analysis revealed that the Entrepreneurial Behavior Index (EBI) was the maximum achievement motivation in the farmers of both categories. The overall EBI of the trained and control dairy farmers was found to be 73.35 and 54.67, respectively.

Gour *et al.* (2016) revealed that majority of the respondents (64.37%) had a low level of knowledge followed by a medium level of knowledge (35.63%). None of the respondents had a high level of knowledge regarding management, breeding, feeding and health care practices of animal husbandry.

Singh *et al.* (2015) revealed that most of the dairy farmers (55.84%) had a medium level of overall knowledge regarding CMP practices, followed by those 27.50 per cent having a low level of overall knowledge. On the other hand, 16.66 per cent of the respondents had a high level of overall knowledge.

Singh *et al.* (2015) indicated that a majority of beneficiary farmers (55.0%) reported a ‘medium level’ of effectiveness for training programs while 21.7 per cent of respondents reported a ‘low level’ of training effectiveness and only 18 per cent of farmers found these trainings as highly effective.

Reddy *et al.* (2012) indicated a high relevance of most of the contents, substantial knowledge gain and low skill improvement by the participants with an overall effectiveness index of 69.38 per cent of the training program.

3. To study knowledge gained by trainees of Micro Training Centres (MTCs)

Kobba *et al.* (2020) studied the knowledge test administered before and after the training to know the knowledge gained as a result of the training. The mean test score was 30 per cent before the training and the whereas after training it was 75 per cent. This shows that there was 45 per cent increase in knowledge of the trainees as a result of the training.

Koli *et al.* (2019) revealed that majority of dairy farmers (93.50%) had a high level of knowledge and the remaining 06.50 per cent dairy farmers had a medium level of knowledge about modern dairying of animal husbandry and dairy management practices.

Marriammal *et al.* (2018) revealed that the overall knowledge level of women dairy farmers was moderate (48.33%), followed by good (27.34%) and poor (24.33%).

Kumar *et al.* (2016) observed the knowledge score obtained by participants during pre and post-training tests. It is evident from the data as a result of the training, the mean knowledge score of the participants rose to 77.43 from 48.39 registering an average increase of 29.03 per cent.

Gour *et al.* (2016) revealed that majority of the respondents (64.37%) had a low level of knowledge followed by a medium level of knowledge (35.63%). None of the respondents had high level of knowledge regarding management, breeding, feeding and health care practices of animal husbandry.

Lohakare *et al.* (2015) revealed that majority of the respondents (44.14%) had complete knowledge regarding healthcare practices, followed by clean milk production (40.00%), calf rearing (33.73%), management (28.66%), breeds and

breeding (25.47%), feeding (22.85%), housing (15.91%) and marketing (12.85%), while the least knowledge was reported for insurance practices (4.66%).

Venkatesan *et al.* (2015) studied training needs in livestock and poultry rearing and observed that the majority of the farm women (49.17%) had high training needs compared to 35.00 per cent of them had medium training needs. A big share of the farm women had high training needs in food processing, while 33.33 per cent of them had medium training needs in food processing.

Bankar *et al.* (2015) revealed that respondents i.e. dairy farmers had optimum knowledge about the preparation of various household milk products (79.66%), proper milking method (71.19%), the importance of quality feed and balanced ration for higher milk production (74.58%), however, the respondents had poor knowledge about good hygienic practices (18.64%), milk-borne diseases (38.98%) and methods of detection for adulteration in milk and its side effects (35.59%).

Reddy et al. (2012) studied that majority of the respondents (47.30%) were under the medium knowledge gain category, followed by 29.62 per cent in were high knowledge gain category and 23.08 per cent in were low knowledge gain category.

4. To ascertain the constraints encountered by dairy farmers

2.4.1 Breeding:

Rajadurai *et al.* (2018) studied the constraints faced by the dairy farmers in Puducherry and noticed that the dairy farmers faced repeat breeding problems followed by a low conception rate through artificial insemination of 65.0 per cent as constraints while 46.30 per cent of the dairy farmers faced non-availability of A.I. facility and 25.90 per cent of the dairy farmers faced the non-availability breeding bull.

Sharma *et al*. (2018) studied the constraints faced by dairy farm women of the Nainital districts of Uttarakhand and noticed that the dairy farm women were

asked if they were facing the problems of (1) Low productivity of animals, (2) Poor Knowledge of low conception of Artificial Insemination and (3) Incidence of reproduction disorders in the milch animals, while the majority of respondents (98%) were facing the problems of poor knowledge of low conception of Artificial Insemination (1st Rank), followed by Low productivity of animal (78%), was ranked 2nd and incidence of reproduction disorders in the milch animals (42%) was ranked 3rd.

Meena *et al.* (2017) studied the constraints faced by livestock's farmer in adoption of scientific technology and noticed that the majority of respondents experienced the constraints such as preference of natural service (91%) was 1st rank, lack of good bredable bulls (88%) were 2nd rank and lack of A.I. centre, ill equipped A.I. centre, lack of service at A.I. centre, distant location of veterinary hospital (86%) were 3rd rank, followed by high cost involved in calling veterinary staff for treatment of breeding related problem (83%) was 4th rank, anestrus and repeat breeding (68%) was ranked 5th, lack of knowledge about right time of servicing the animals after calving (64%) was ranked 6th, poor conception rate in animals (61%) was ranked 7th, scarcity of resources to maintain crossbred/ superior breed of milk animals (59%) was ranked 8th, large number of villages under one livestock extension officers (55%) was ranked 9th and lack of knowledge about pregnancy diagnosis, false belief that animals which are covered through natural services are invariably pregnant (53%) was ranked 10th.

Singh *et al.* (2015) observed that inadequate facilities of artificial insemination (AI) centers were the first-ranked constraint for dairy farmers (71.1%). The second rank was accorded to the high prices of imported semen straw (62.2 %) followed by unsatisfactory results of AI (48.8%), lack of staff at government hospitals (44.4 %), and inexperienced staff at AI centers (33.3%) which were ranked III, IV and V, respectively.

Patel *et al*. (2013) reported that the major constraints were repeat breeding (70.00%), low conception rate through artificial insemination (67.50%), followed by the belief that rectal palpation of animals for pregnancy confirmation would harm the animal and the foetus (40.00%), lack of availability of insemination

service in time (26.25%), lack of improved bulls for breeding in villages (10.00%) and lack of knowledge of signs of heat (3.75%).

Tailor *et al.* (2012) conducted study in the Udaipur district of Rajasthan to identify the constraints faced by the tribal dairy farmer and found that the first and major constraint in animal breeding was the repeated breeding of milch animals and this might be due to the lack of balanced feeding of the milch animals while lack of pedigree bulls for natural services was found to be 2nd rank and inadequate knowledge about artificial insemination were found to be the 3rd rank, whereas, poor services available at artificial insemination centers was ranked 4th.

Shisode *et al.* (2009) revealed that 72.50, 39.00 and 9.50 per cent of dairy farmers reported a lack of breeding bull and AI facilities at a local level, long calving intervals and poor conception rate of AI, respectively.

2.4.2 Feeding:

Gupta *et al*. (2019) studied feeding constraints and observed that the lack of availability of green fodder throughout the year (81.66%), high cost of concentrates (79.16%), low availability of mineral mixtures (75.83%) and inadequate knowledge about scientific feeding of dairy animals (75%) constraints ranked first, second, third and fourth, respectively by dairy farmers.

Rajadurai *et al.* (2018) studied the constraints faced by the dairy farmers in Puducherry and noticed that dairy farmers were facing constraints of the high cost of concentrates and shortage in green fodder, followed by non-availability of grazing land 77.70 per cent and 46.30 per cent of the dairy farmers reporting fluctuation in concentrate feed cost.

Sharma *et al.* (2018) studied the constraints faced by dairy farm women of the Nainital districts of Uttarakhand and noticed that the dairy farm women were asked if they were facing the problems of (1) Low availability and high cost of concentration (2) Low availability of dry fodder (3) Use and role of the mineral mixture and the majority of respondents (90%) reported that they were unaware use and role of the mineral mixture (1st rank), while more than fifty per cent of the

respondents (64%) were facing the problem of low availability (2nd rank) and high cost of concentration followed by low availability of dry fodder (10%) was 3rd rank.

Meena *et al.* (2017) indicated the constraints faced by livestock's farmer in adoption of scientific technology and noticed that majority of the respondents constraints experienced as belief that colostrum feeding is unhygienic and it may be harmful to the health calves (90%) were 1st rank, high cost involved in purchase of ingredients concentrate mixture (86%) were 2nd rank and lack of knowledge about proper amount of concentrate feeding (80%) were 3rd rank, whereas belief that feeding of available grasses, weeds and leaves from fodder trees collected from nearby forest are sufficient for animals feeding (79%) was ranked 4th, belief that advance pregnant animals need to be feed low quantity of concentrate, as these are hot for the animals (75%) was ranked 5th, non-availability of information about balance feeding (67%) was ranked 6th, lack of awareness about treatment of poor quality straw to improve its nutritive value (61%) was ranked 7th, scarcity of green fodder round the year (59%) was ranked 8th, distant location of market for purchase of concentrate and mineral mixture (57%) was ranked 9th, and belief that feeding should be given on the basis of production (i.e. concentration only milch animals (51%) was ranked 10th.

Panchbhai *et al.* (2017) observed that the majority of the respondents (89 %) faced constraint of more amount of feed required to feed dairy animals followed by 87 per cent of the respondents who reported higher prices of concentrates, whereas 31 per cent respondents reported non-availability of the green fodder around the year and 21 per cent of the respondent reported unavailability of land for fodder crops.

Kumar *et al*. (2012) indicated that feeding is the major constraint and farmers' preferences to grow cash crops instead of fodder crops, poor knowledge about scientific feeding of dairy animals (81.66%), high cost of ingredients of concentrates mixture (79.16%), poor availability of high yielding variety seeds of fodder (63.33%).

Tailor *et al.* (2012) reported the first and foremost constraint in dairy farming was the non-availability of green fodder throughout the year, inadequate knowledge about proper or scientific feeding of dairy animals was ranked 2nd, non-availability of cattle feed ware rank 3rd, high cost of concentrates was ranked 4th, high cost of green fodder was ranked 5th, high cost of dry fodder was ranked 6th and lack of knowledge about mineral mixture were found to be 9th rank, whereas inadequate knowledge about the cultivation of hay preparation was ranked 8th and lack of sufficient pasture lands for animal grazing was ranked 9th.

2.4.3 Health Care:

Rajadurai *et al.* (2018) revealed the constraints faced by the dairy farmers in Puducherry and found that dairy farmers faced high cost of veterinary services followed by reproductive disorders 93.60 per cent while 52.70 per cent of the dairy farmers faced reduced accessibility of veterinary hospitals and 44.50 per cent of the dairy farmers faced reduced accessibility of timely veterinary service.

Sharma *et al.* (2018) revealed the constraints faced by dairy farm women of the Nainital districts of Uttarakhand and observed that (94%) majority of respondents faced the problems of worm infestation (1st rank), followed by inadequate knowledge about balanced feeding (78%) was ranked 2nd and unawareness of improved dairy farming practices (76%) were ranked 3rd while maximum respondents (72%) faced the problems of insufficient Veterinary Doctors or attendants (4th rank) followed by lack of awareness on animal health care (62%) were ranked 5th.

Meena *et al.* (2017) indicated the constraints faced by livestock farmers in the adoption of scientific technology and found the non-availability of livestock extension officers and veterinary doctors in time (93%) were 1st rank, distant location of the veterinary dispensary (87%) were 2nd rank and belief that anger of god(s)/ goddess(s) cause diseases in animals (80%) were 3rd ranks, whereas the high cost of veterinary medicine and vaccines (78%) were 4th rank, lack of awareness about the importance of vaccination (73%) were 5th rank, the belief that vaccination reduced milk yield in animals (69%) were 6th rank, and more faith in

jadu / tona for treatment of animals rather than modern veterinary treatment (67%) were 7th rank, lack of knowledge/disposing of the carcass of diseased animals (65%) were 8th rank, lack of knowledge about symptoms of common contagious diseases and their prevention measures (61%) were 9th rank and lack of knowledge about the importance of isolating the diseased animals (55%) were 10th ranks.

Singh *et al.* (2015) reported that majority of farmers admitted that the non-availability of adequate veterinary services was the major problem. It was followed by non-availability and high cost of medicines, less economic returns and no facilities for testing of animals.

Patel *et al*. (2013) reported that the most important health constraints were inadequate knowledge of diseases and their control (57.00%), the problem of mastitis in crossbred cows (53.33%), and the high cost of veterinary treatment (52.50 %).

Tailor *et al.* (2012) study was conducted in the Udaipur district of Rajasthan to identify the constraints faced by the tribal dairy farmer and found that the Lack of scientific housing was ranked the 1st major constraint. The tribal farmer could not afford to invested huge amount which is needed in preparing the scientific housing for dairy animals while lacking knowledge about vaccination against contagious diseases was found to be the 2nd major constraint, lack of knowledge of isolation of sick animals was found to be the 3rd constraint and inadequate knowledge about deworming & dehorning of animals was found to be 4th major constraints, followed by inadequate knowledge about cleaning of cattle shed were observed to be a 5th constraint and inadequate knowledge about cleaning/grooming of animals was observed to be 6th constraints.

Shisode *et al*. (2009) opined that the health constraints faced by dairy cattle farmers revealed that 72.00, 59.50 and 49.50 per cent of the crossbred animals were more prone to diseases, ticks and other ectoparasites and lack of knowledge about animal diseases and vaccination respectively. While only 16 per

cent of dairy cattle farmers reported the unavailability of prompt and timely veterinary services, costly veterinary aids and medicines in the near area.

2.4.4 Management:

Gupta *et al.* (2019) observed that the respondents also reported the problem of animal sheds or housing facilities (57.50%) because of their poor economic status and their inability to maintain farms. Non-remunerative price of milk (68.83%) followed by lack of knowledge in making value-added dairy products (60.83%) and lack of transport facilities and all-weather roads (51.66%) were the major constraints.

Rajadurai *et al.* (2018) found that majority of the dairy farmers faced high cost of construction and lack of availability of land, followed by 74.10 per cent of the dairy farmers facing inadequate knowledge of scientific housing and poor housing facilities because of their poor economic status.

Meena *et al.* (2017) revealed the constraints faced by livestock farmers in adoption of scientific technology were limited space and other resources available for providing scientific housing to dairy animals (96%) was 1^{st} rank, inadequate credit facilities for purchasing necessary inputs (90%) was 2^{nd} rank, lack of knowledge about clean milk production practices (84%) was 3^{rd} rank followed by, lack of knowledge about the right time of drying off pregnant animals (81%) was 4^{th} rank, high investment in scientific management of animals (77%) was 5^{th} rank, lack of awareness about cleaning and sanitation of animals and cattle shed (71%) was 6^{th} rank, easy availability of local substitutes (67%) was 7^{th} rank, scarcity of clean drinking water facilities for animals (63%) was 8^{th} rank, reliance on the indigenous methods of deworming and castration as they are considered to be more convenient effective and cheap (55%) was 9^{th} rank and lack of knowledge about the importance of deworming and dehorning (51%) was 10^{th} rank.

Panchbhai *et al.* (2017) observed that the majority of the respondents (78.00%) reported lack of knowledge about the scientific method of milking as a major constraint followed by 17.50 per cent of the respondents had the constraint

of calf mortality, whereas 12.50 per cent of the respondents reported lack of time to adopt managemental practices of the pregnant newborn calf and 6.00 per cent of the respondents reported non-availability of clean drinking water.

Patel *et al*. (2013) observed that lack of own capital (77.50%) to construct a byre due to low-level income, and high cost of construction (72.50%) for bids the tribal to construct a proper shelter for the dairy animal.

Tailor *et al.* (2012) revealed that low milk productivity of dairy animals was the 1st and major constraint in milk production faced by the tribal dairy farmer in Udaipur district of Rajasthan. This is might be due to local breeds and unproductive animals maintained by tribal farmers lack of awareness about clean milk production was observed to be the 2nd constraint and lack of knowledge about preparing value-added dairy products was observed to be the 3rd constraint. This might be due to a lack of knowledge about the importance of clean milk production and the utility of value-added dairy products.

MATERIAL AND METHODOLOGY

The material and methods used for the present study are discussed in the ensuing section with a heading and subheading for the objective-wise selected variables for the study. The major research procedures used in this study are presented under the following headings and are represented with the use of the observed data from the study.

3.1 Sampling design

3.2 Locale of the study

3.3 Sample and sampling procedure

3.4 Steps in research

3.5 Tools and ways used for data collection

3.6 Tabulation of data

3.7 Measurement of variables

3.8 Statistical analysis of data

3.1 Sampling design

The study was conducted in three districts of Vidarbha region of Maharashtra namely Nagpur, Wardha and Amravati and data was collected from these MTC's centres. These districts were purposively selected because three Micro Training Centres were located in these three districts, and also the livestock population was high as per livestock census of year 2019. Thus, it was assumed that the number of dairy farmers involved in dairy farming will also be sufficiently available from these districts.

From each Micro Training Centre (MTC) 80 dairy farmers were randomly selected (3 X 80 = 240). Thus, a total of 240 farmers were randomly selected for

the final study with the help of a structured interview schedule with personal dialogue methods and observations.

Table 3.1 List of Selected MTCs Places

Sr. No.	Districts	MTCs Place	Sample Size
1	Nagpur	Bina	80
2	Wardha	Jogaheti	80
3	Amravati	Kamnapur Ghusli	80

3.2 Locale of the study

The present study was carried out in three purposively selected districts viz. Nagpur, Wardha, and Amravati of Eastern Vidarbha region keeping in mind the problems of farmers in these areas.

Nagpur is the third largest city of Maharashtra after Mumbai and Pune as well as the biggest in central India. It consists of 14 Talukas of which the author tried to cover the majority in his research. It is also called the Tiger Capital of India because it is surrounded by many tiger reserves and around it.

The second district Wardha is located near the geographic center of India, in the state of Maharashtra; Wardha is famous for the many social reformers like Mahatma Gandhi, Vinoba Bhave, Baba Amte, and Jamnalal Bajaj.

Amravati district is located in North East of Maharashtra state having 760 37, 27” E latitude and 200 32, to 210 46, N longitude. In North and West, Madhya Pradesh state borders are present, due to South Akola and Yavatmal district, while towards East Nagpur and Wardha district is present. Amravati is the second-largest city in the Vidarbha region and ninth largest city in Maharashtra, India. It is the administrative headquarters of the Amravati district Amravati division which includes the Akola, Buldhana, Washim, and Yavatmal districts. It is one of Maharashtra's nominated cities under Smart Cities Mission.

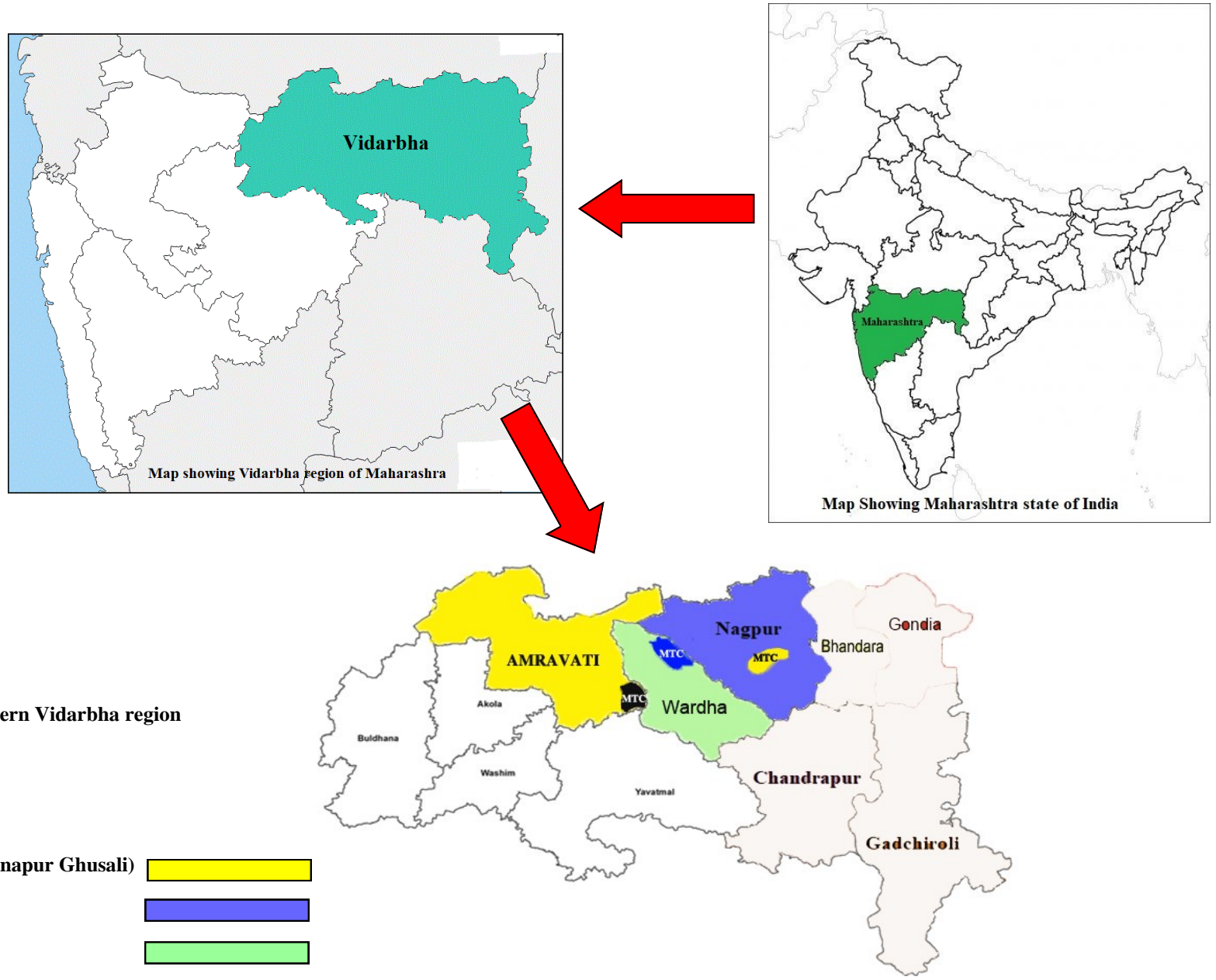

Fig. 3.1 Locale of the study

3.3 Sample and Sampling Procedure

3.3.1 Selection of district

This district were purposively selected as MTC were setup in these districts by the Maharashtra Animal and Fishery Sciences University (MAFSU), Nagpur under a special project of establishment of Micro Training Centres (MTCs) with the financial support of National Dairy Development Board (NDDB), Anand, Gujrat. The findings of the livestock census 2019 revealed a considerably higher livestock population in Nagpur, Wardha and Amravati districts of the Eastern Vidarbha region of Maharashtra, thus they are purposively selected for the present study. The livestock population in selected districts is as follows.

Table 3.2 Classification of districts according to livestock animal population for the study

Sr. No.	Districts	Total bovine	Sheep	Goat	Pig
1	Amravati	661142	70212	292007	5681
2	Nagpur	552914	7713	265340	6893
3	Wardha	353152	1685	130342	2810
	Total	**1,567,208**	**79,610**	**6,87,689**	**15,384**

Source: 20th Livestock Census 2019

3.3.2 Selection of farmer

For the present study, a dairy farmer who has more milk production and sells the milk in large amounts to the mother dairy was considered as a respondent. A list of such dairy farmers was prepared by the Mother Dairy with the help a of supervisor. From each selected Micro Training Centre place, a sample of 80 dairy farmers who were engaged in dairy farming was selected. Thus, a total sample of 240 dairy farmers was selected randomly from different villages of the three districts (Nagpur, Wardha and Amravati) where the Micro Training Centres were functional.

3.4. Steps in research

1. Selection of state, district, tehsils, and training centre.
2. Contact farmers from the selected training centre of these districts.
3. Preparation and Pre-testing of the interview schedule for finalization of the interview schedule.
4. Personal interview with farmers, from the selected training centre of these districts.
5. Rating scale was used to measure various aspects of the training. Data were analyzed using descriptive statistics. The method used by Reddy *et al.* (2012) was used to calculate the overall effectiveness index.
6. Composition and tabulation of data
7. Analysis of data**:** By application of suitable and authentic statistical tools and methods the data was scrutinized, tabulated and analyzed to draw meaningful conclusions and presentation of data.

3.5 Tools and ways used for data collection

3.5.1 Tools for data collection

A basic tool for the present study was structured interview schedule (**Appendix I**). By personally interviewing the respondents, the data was obtained. Assessment of the profile of dairy farmers participating in the training centre, constraints faced by the farmer, before training and after training in the micro training centre were studied.

3.6. Measurement of variables

On the basis of available literature on the micro training centre, and objectives and by taking guidance from the advisory committee, members as well as the experts from the extension discipline, the following variables were selected for the study.

Table 3.3 The following Parameters was used by Dairy Farmers

Sr. No.	Variables	Measurement
A	**Socio-economic Profile of Trainees of Micro Training Centres (MTCs):**	
a	**Socio-personal**	
1	Age (Years)	Structured interview schedule
2	Education	Structured interview schedule
3	Marital Status	Structured interview schedule
4	Gender	Structured interview schedule
5	Caste	Structured interview schedule
6	Family Size	Structured interview schedule
7	Family Type	Structured interview schedule
8	Experience in Dairy	Structured interview schedule
b	**Socio-economic**	
9	Land Holding	Structured interview schedule
10	Herd Size	Structured interview schedule
11	Milk Production (lit/day)	Structured interview schedule
12	Milk Sale (lit/day)	Structured interview schedule
13	Total Annual Income	Structured interview schedule
14	Training Attended	Structured interview schedule
15	Extension Contacts	Structured interview schedule
16	Social Participation	Structured interview schedule
B	**Effectiveness of training given to the dairy farmers in Micro Training Centres (MTCs)**	As per Reddy *et al*. (2012) through structured interview schedule
C	**Knowledge gained by trainees of Micro Training Centres (MTCs)**	As per Ravi Kumar *et al.* (2016) through structured interview schedule
D	**Constraints perceived by trainees of MTCs in implementing the dairy technologies.**	A structured interview schedule and Garrett Ranking method was used to analyse the data

The operational definition, scoring and categorization procedure used for the study is as follows

3.6.1 Socio-economic profile of trainees of MTCs

3.6.1.1 Age

Age refers to the chronological age of the respondents measured in years and responses were recorded on direct questioning and categorized as under:

Table 3.4 Classification of dairy farmers based on age

Sr.no.	Category	Score
1	Young age	Up to 30 yrs.
2	Middle age	31 to 50 yrs.
3	Old age	51 yrs. and above

3.6.1.2 Education Level

Education refers to the level of formal education completed by the respondents in terms of standards. The score of different levels of education was given as follows.

Table 3.5 Classification of dairy farmers based on education

Sr. No.	Category	Score
1	Illiterate (No Education)	1
2	Primary Standard	2
3	Secondary Standard	3
4	Higher Standard	4

3.6.1.3. Marital Status of Dairy Owner

These are the distinct options that describe a person’s relationship with significant other in the family. The dairy owner was categorized on the basis of their marital status and their scoring is given as follows.

Plate: 4.1 Photograph showing MTC Trainer at Bina, Nagpur

Plate: 4.2 Photograph showing MTC Trainer at Jogaheti, Wardha

Plate: 4.3 Photograph showing MTC Trainer at Kamnapur Ghusali, Amravati

Table 3.6 Classification of dairy farmers based on marital status

Sr. No.	Category	Score
1	Married	1
2	Unmarried	2
3	Divorced	3
4	Widow	4

3.6.1.4 Gender

It refers to the range of characters pertaining to and differentiating between feminity and masculinity. Accordingly, the livestock owners are classified into two categories and their scoring is given as follows.

Table 3.7 Classification of dairy farmers based on gender

Sr. No.	Category	Score
1	Male	2
2	Female	1

3.6.1.5 Caste

Caste is a form of social stratification characterized by endogamy, hereditary transmission of a style of life which often includes an occupation, ritual status in hierarchy and customary social interaction and exclusion based on cultural notions of purity and pollution. Accordingly, the respondents are classified into seven categories and their scoring is given as follows.

Table 3.8 Classification of dairy farmers based on caste

Sr. No.	Category	Score
1	Unreserved	1
2	Scheduled Caste (SC)	2
3	Scheduled Tribes (ST)	3
4	Other Backward Classes (OBC)	4
5	Vimukta Jati and Nomadic Tribes (VJ NT)	5
6	Special Backward Classes (SBC)	6
7	Other	7

3.6.1.6 Family Size

Family may be defined as the social unit consisting of one or more adults together with the children or a group of persons that are related closely by means of blood relationships may be as parents, children etc (www.thesaurus.com). The family size was recorded by direct questioning. Each family member was denoted one score. The classification of family size was done by calculating mean and standard deviation and mentioned in the following table.

Table 3.9 Classification of dairy farmers based on family size

Sr. No	Category	Size
1	Small	2-4 Members
2	Medium	5-9 Members
3	Large	10-20 Members

3.6.1.7 Family Type

It refers to a person living alone or with a group of people in one house or property. They don't have to be related – usually share the costs e.g. food, heating it could be a family. Accordingly, the respondents are classified into two categories and their scoring is given as follows.

Table 3.10 Classification of dairy farmers based on family type

Sr. No.	Category	Score
1	Nuclear	1
2	Joint	2

3.6.1.8 Experience in Dairy Farming

It refers to the involvement of the respondent in dairy farming for a specific period or time measured in years. The following categories were made on the basis of mean, frequency and percentage as mentioned in the table as follows.

Table 3.11 Classification of dairy farmers based on experience in dairy farming

Sr. No.	Category	Experience (Years)
1	Low	0-3 years
2	Medium	3.01-6 years
3	High	Above 6.01 years

3.6.1.9 Land Holding

A piece of property or land held/owned or taken on lease by an individual. Accordingly, the respondents were categorized on the basis of equal intervals drawn from the range between the minimum and the maximum score for data by following the minor adjustment in the medial range.

Table 3.12 Classification of dairy farmers based on land holding

Sr. No.	Category	Size of land holding
1	Landless	0
2	Marginal	Up to 1 ha.
3	Small	1.01 to 2 ha.
4	Semi-medium	2.01 to 4 ha.
5	Medium	4.01 to 10 ha.
6	Large	Above 11 ha.

3.6.1.10 Herd Size

Herd size refers to the total number of milking animals i.e. cows or buffaloes possessed by the respondents. The categorization was made as under

Table 3.13 Classification of dairy farmers based on herd size

Sr. No.	Category	Score
1	Low herd size	2
2	Lower medium herd size	3 to 5
3	Upper medium herd size	6 to 10
4	Large	11 and above

3.6.1.11 Daily milk production

Daily milk production refers to the average quantity of milk in liters produced by the farmer in a day. The categorization of daily milk production of the respondents was done as under

Table 3.14 Classification of dairy farmers based on daily milk production

Sr. No.	Category	Daily milk production
1	Low milk production	Up to 20
2	Low medium milk production	21 to 40
3	High medium milk production	41 to 60
4	High milk production	61 and above

3.6.1.12 Daily milk sale

It refers to the quantity of milk sold out of the total milk produced per day by the respondent measured in liters. The daily milk sale of the respondent was recorded by direct questioning and categorized as under

Table 3.15 Classification of dairy farmers based on daily milk sale

Sr. No.	Category	Daily milk sale
1	Low milk sale	Up to 20
2	Low medium milk sale	21 to 40
3	High medium milk sale	41 to 60
4	High milk sale	61 and above

3.6.1.13 Annual Income

Total annual income refers to the total income of the family of the respondent in rupees derived from the main and subsidiary occupations within a year. The total annual income was calculated on the basis of income derived from land, dairy farming and others. The categorization and scoring were done as under

Plate: 4.4 Photograph showing training infrastructure at MTC Bina, Nagpur

Plate: 4.5 Photograph showing training infrastructure at MTC Jogaheti, Wardha

Plate: 4.6 Photograph showing training infrastructure at MTC Kamnapur Ghusali, Amravati

Table 3.16 Classification of dairy farmers based on annual income

Sr. No.	Category	Score
1	Low income (Up to Rs. 1,50,000)	1
2	Medium income (Rs. 1,500,01 to Rs. 3,00,000)	2
3	High income (Above Rs. 3,00,001)	3

3.6.1.14 Social participation of Dairy Farmers

Social participation refers to the individual participation in the activities of a formal or non-formal organization or the degree of involvement of respondents in social organization as members or office bearer

The respondents were classified to their level of social participation on the basis of none and member by assigning the score of 1 and 2. Further, respondents were grouped into low, medium and high categories by using frequency and percentage.

Table 3.17 Classification of dairy farmers based on social participation

Sr. No.	Category	Scoring
1	Low social participation	7
2	Medium social participation	8
3	High social participation	9

3.6.1.15 Extension contacts

It was defined as the degree to which an individual maintained contacts with Livestock Development Officers, Animal Husbandry Department, Subject Matter Specialists, Dairy Experts, Television, Radio, Newspaper, Social-Media, etc. in order to get information and technical assistance regarding strengthening the dairy farming. For this purpose, a schedule was developed with the help of experts. The response was then measured on a three-point continuum scale viz., 'Regular Contact', 'Occasional Contact' and 'No Contact' by assigning the scores of 3, 2 and 1 respectively. Further, respondents were grouped into low, medium and high categories by using frequency and percentage.

Table 3.18 Classification of dairy farmers based on extension contact

Sr. No.	Extension contacts	Score
1	Low	1 – 10
2	Medium	11 – 20
3	High	21 – 30

3.6.1.16 Training attended

Training is a planned communication process for manpower development to bring desired changes in knowledge, skill, practice, attitude, behavior and other things in accordance with job requirements (Misra, 1999). A score of 2 and 1 was given to training attended and not attended respectively.

Table 3.19 Classification of dairy farmers based on training attended

Sr. No.	Training attended	Score
1	Yes	2
2	No	1

3.6.2 Effectiveness of Training

The effectiveness of training involves processes happening prior to, during and following training that contributes to the likelihood of an effect. Training evaluation is the level of the effectiveness of training and researchers and practitioners have assessed training impact based on outcomes (Kirkpatrick, 2005).

The method used by Reddy *et al.* (2012) was used to calculate the Overall Effectiveness Index (OEI). Nine indicators were considered and for each, a score was obtained. overall Effectiveness Index was calculated by using the formula given below:

$$\text{Overall Effectiveness Index (OEI)} = \frac{\text{Obtained scores of all nine indicators}}{\text{Maximum score for all nine indicators}} \times 100$$

Effectiveness was considered on the basis of the 5 continuum scale. The respondents have been categorized on the basis of a 5 continuum scale as follows

Table 3.20 Classification of dairy farmers based on the effectiveness of training

Sr. No.	Category	Score
1	Not Effective	1
2	Least Effective	2
3	Effective	3
4	Moderately Effective	4
5	Most Effective	5

3.6.3 Knowledge gained by trainees of the micro training centre

It refers to the level of knowledge gained by trainees of the micro training centre. The study was done on the basis of pre and post-training knowledge of dairy farmers. The test items consisted of selected objective questions on various aspects of the training curriculum. The scores were converted into percentages and average scores were worked out as per Kumar *et al.* (2016). The knowledge test was administered to the respondents of the present study. Scoring was done according to the correctness of the response of the respondents against each item. Knowledge scores of the individuals in different aspects such as breeding, feeding, healthcare and management were obtained by summing up scores of each item under different aspects to get the score for pre and post knowledge score of each respondent and the difference in knowledge gain was statistically worked out by subtracting the aggregate mean of pre knowledge score by post knowledge score.

3.6.4 Constraints perceived by trainees of MTCs

Constraints are difficulties or problems in the process of doing the work. In the present study, various constraints regarding feeding constraints, health care, breeding management and management constraints were selected by communicating with specialists on the subject. For the present study, the constraints were recorded by the trainees of MTCs in implementing the dairy technologies which was assessed by the 'Garrett Ranking' method by using an interview schedule. The respondents were then asked to rank them in accordance

with their order of preference. The data was tabulated and the score was measured by using the Garrett Ranking method.

Table 3.21 Classification of dairy farmers based on constraints perceived by trainees

Sr. No.	Constraints	Rank
A.	**Feeding Constraints (Rank 1-8)**	
1.	High Price of Concentrate Mixture	
2.	Low Availability of Concentrates & Mineral Mixture in Villages	
3.	High Cost of Fodder	
4.	Inadequate Knowledge About the Scientific Feeding of Dairy Animals	
5.	Lack of Knowledge About Process of Total Mixed Ration	
6.	Low Availability of TMR Ingredients	
7.	Lack of Knowledge About Process of Silage Making	
8.	High Cost of Chaff Cutter	
B.	**Health Care (Rank 1-7)**	
1.	Lack of Awareness About the Importance of Vaccination	
2.	Lack of Awareness About the Importance of Deworming	
3.	High Cost of Vaccine & Medicine	
4.	Lack of Veterinary Aids	
5.	High Cost of Treatment of Sick Animal	
6.	Lack of Knowledge in Identifying Diseases of Animal	
7.	There is a Growing Problem of Mastitis in Lactating Animal	
C.	**Breeding Management (Rank 1-2)**	
1.	Lack of A.I. Facility	
2.	Lack of Good Quality Semen	
D.	**Management (Rank 1-5)**	
1.	Lack of Knowledge About Management of Calf, Pregnant Animal	
2.	High Calf Mortality Rate	
3.	Poor Housing of Dairy Animals	
4.	Lack of Proper Knowledge About Clean Milk Production	
5.	Waste Disposal is a Major Problem	

3.7. Statistical Analysis of Data

After completion of the survey, the data obtained were tabulated and analyzed using appropriate statistical methods. Statistical tools like arithmetic mean, standard deviation, standard error, frequency and percentage were used along with the coefficient of correlation. The statistical analysis was done by using appropriate tools.

3.7.1 Mean

The arithmetic mean is the quotient that sum of all the items in the series is divided by the total number of items

It is a statistic that measures the dispersion of a dataset relative to its mean. The standard deviation is calculated as the square root of variance by determining each data points deviation relative to the mean.

3.7.2 Frequency and Percentage

The frequency of a particular value is the number of times the data value occurs.

The percentage is calculated by taking the frequency in the category divided by the total number of respondents and multiplying it by 100.

3.7.3 Garret Ranking

The respondents are asked to assign ranks for all factors and the outcomes of such ranking have been converted into score values with the help of the following formula

Percent position= 100 (Rij- 0.5)/Nj

Where,

Rij= rank given for the ith variable by jth respondents

Nj= number of variables

The value of Rij is then multiplied by the Garret value to determine the total Garret score. The average Garret score is then calculated by dividing the total garret score by the number of alternatives. The alternative ranking is done based on the highest average value.

Plate: 4.7 Group Photo of trainees at MTC Bina, Nagpur

Plate: 4.8 Group Photo of trainees at MTC Jogaheti, Wardha

Plate: 4.9 Group Photo of trainees at MTC Kamnapur Ghusali, Amravati

RESULTS AND DISCUSSION

The following section presents the data that was gathered for the study "Knowledge Gained by Dairy Farmers Through Micro Training Centres (MTCs)" through the use of surveys, personal observations and pertinent secondary data. The data were tabulated, analyzed and presented in ways that accurately depicted the results. The findings were then discussed in the context of prior research. The following headings and subheadings present these findings.

4.1 To study the socio-economic profile of trainees of Micro Training Centre (MTCs).

4.2 To assess the effectiveness of training given to the dairy farmers in Micro Training Centres (MTCs).

4.3 To study knowledge gained by trainees of Micro Training Centres (MTCs).

4.4 To ascertain the constraints perceived by trainees of MTCs in implementing the dairy technologies.

The results of given objectives are discussed below:

4.1 To study the socio-economic profile of trainees of Micro Training Centre (MTCs).

4.1.1 Age

The dairy farmers are classified into different age group and their frequency are presented in Table No. 4.1 and Figure 4.1.

Table 4.1 Classification of dairy farmers based on age group

N=240

Variable	Category	Frequency	Percentage (%)
Age	Young age (18-30 yrs.)	26	10.83
	Middle age (31-50 yrs.)	153	63.75
	Old age (51 and above)	61	25.42

The age of dairy farmers is a significant component in decision-making since obtaining and applying knowledge in dairy farming has a direct impact on the profitability of their separate enterprises.

It is observed from table 4.1 that the majority (63.75 %) of the dairy farmers were of middle age i.e. between the age group 31 to 50 years, 25.42 % were of old age group i.e. 50 years and above and a few percentages of the respondents belong to the young age group i.e. 18 to 30 years. Here, respondents who fell into the middle age group range (31 to 50 years) made up a bigger portion of the sample. This may suggest that dairy farming is a primary or secondary occupation for the middle-aged population. This finding is in line with Kumar (2020) who reported that majority of dairy farmers (63%) belongs to the middle age group and is close confirmatory with the results of Kalaivani *et al.* (2017).

4.1.2 Education

Education of dairy farmers is categorized into four categories and their frequencies are presented in Table No. 4.2 and Figure 4.2.

Table 4.2 Classification of dairy farmers based on education

N=240

Variable	Category	Frequency	Percentage (%)
Education	Illiterate	13	5.42
	Primary	86	35.83
	Secondary	122	50.83
	Higher	19	7.92

The data in the above table clearly indicated that the majority of the dairy farmers (50.83%) were educated up to secondary school followed by primary education (35.83%), Higher secondary (7.92%) and the remaining 5.42 per cent of the dairy farmers were illiterate.

According to the findings, the majority of dairy farmers completed secondary education. This could be because of the schooling facilities offered in rural areas, as well as the different educational awareness activities conducted to

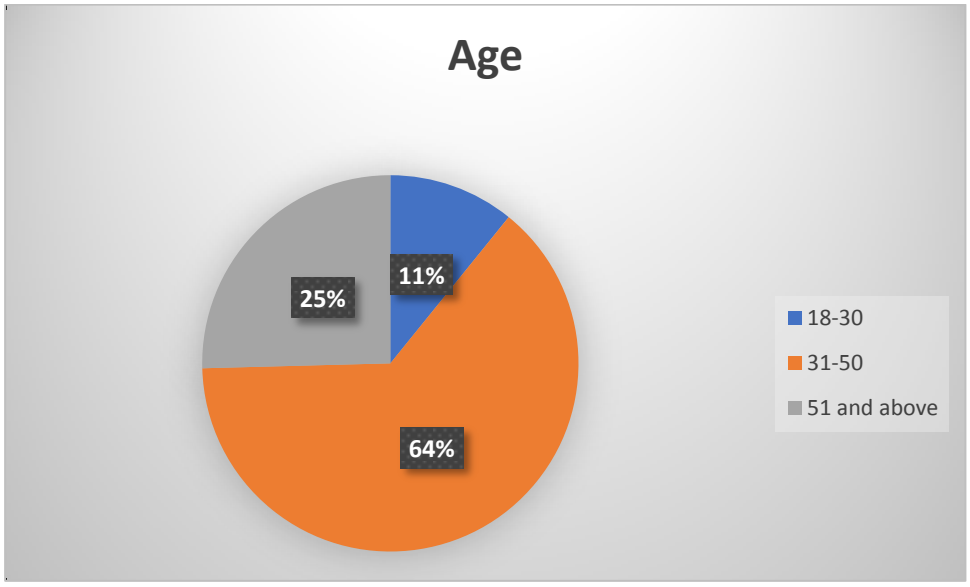

Fig 4.1 Classification of dairy farmers based on age

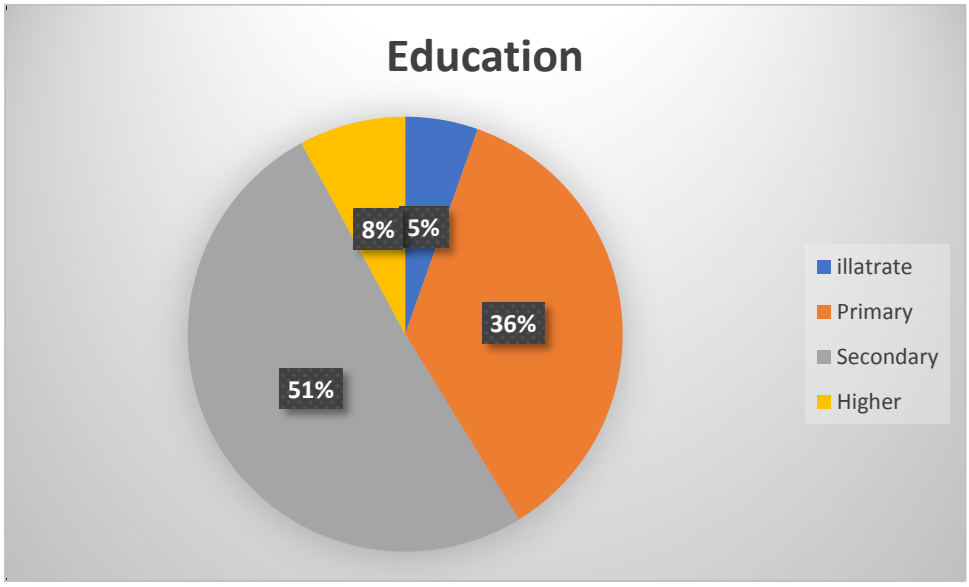

Fig 4.2 Classification of dairy farmers based on education

develop a desire for education and to emphasize the value of education. Only 5.42 per cent of dairy farmers in dairy farming were illiterate. This illustrates that one of the most crucial components of participating in dairy farming is one's working educational level.

In line with current survey, dairy farmers education level was indicated as secondary educated Koli *et al.* (2019) who reported that majority of the dairy farmers (50%) were educated up to secondary school and it is slightly different with the result of rai *et al.* (2017) who reported that 32.50 per cent of the dairy farmer were educated up to primarily schooling.

4.1.3 Marital Status

The marital Status of dairy farmers is categorized and their frequencies are presented in Table No. 4.3 and Figure 4.3.

Table 4.3 Classification of dairy farmers based on marital status

N=240

Variable	Category	Frequency	Percentage (%)
Marital Status	Married	214	89.17
	Unmarried	26	10.83
	Divorced	0	0.00
	Widow	0	0.00

According to Table 4.3, the majority of respondents (89.17%) were married, while the remaining 10.83 per cent were unmarried and none of them were divorced or widow. The male family head responders could explain the current finding, according to a common observation from the study area.

The finding of this study are in conformity with the studies of Girei *et al.* (2014) and Mumba *et al.* (2012), who stated more than half of the respondents were married.

4.1.4 Gender

The gender of the dairy farmers is categorised and their frequencies are presented in Table No. 4.4 and Figure 4.4.

Table 4.4 Classification of dairy farmers based on gender

N=240

Variable	Category	Frequency	Percentage (%)
Gender	Female	10	4.17
	Male	230	95.83

It is clearly indicated in Table 4.4 that majority of the respondents (95.83%) were male, with only 4.17 per cent of respondents were female. It is quite interesting to note that, despite the fact that women do the majority of animal husbandry work, female respondents in dairy farming are only 4.17 per cent.

According to the report, men still make the bulk of decisions in rural regions regarding the sale or acquisition of a new animal in the herd. The dominance of men in business can be linked to tradition, culture, taboos, and beliefs that prevent women from participating in marketing activities held at locations far from their homes.

Maurya *et al.* (2021) and Rai *et al.* (2017) It was also reported that dairy animal marketing is primarily a male-dominated industry.

4.1.5 Category

The category of dairy farmers was classified into their respective categories and their frequencies are presented in Table No. 4.5 and Figure 4.5.

Table 4.5 Classification of dairy farmers based on category

N=240

Variable	Category	Frequency	Percentage (%)
Category	Open	49	20.42
	SC	33	13.75
	ST	9	3.75
	OBC	135	56.25
	VJNT	9	3.75
	SBC	3	1.25
	Other	2	0.83

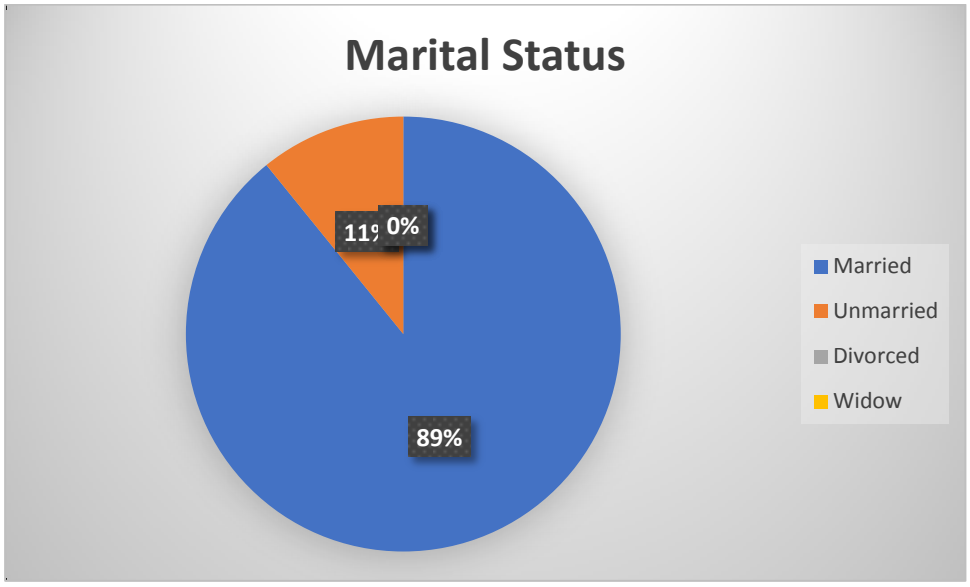

Fig 4.3 Classification of livestock owner based on marital status

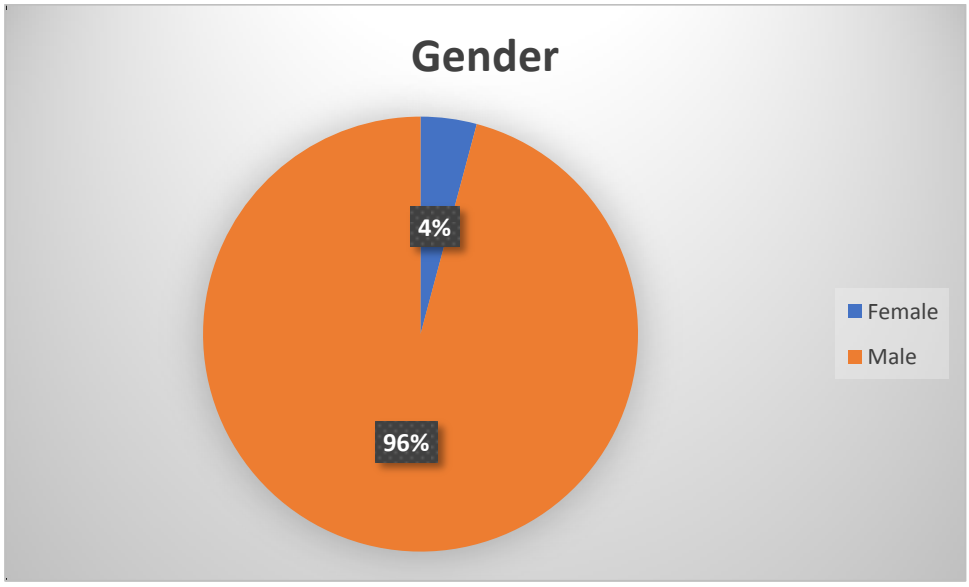

Fig 4.4 Classification of dairy farmers based on gender

According to Table 4.5, the majority of respondents (56.25%) belong to Other Backward Classes (OBC), followed by Open (20.42%), Schedule Caste (13.75%), scheduled tribes (3.75%), VJNT (3.75%), SBC (1.25%) and few in other categories (0.83%).

This observation is in line with the research of Kumar *et al.* (2020) and Atreya *et al.* (2018).

4.1.6 Family Size

The family size of dairy farmers was classified into their respective categorized and their frequencies are presented in Table No. 4.6

Table 4.6 Classification of dairy farmers based on family size

N=240

Variable	Category	Frequency	Percentage (%)
Family Size	Small	79	32.92
	Medium	146	60.83
	Large	15	6.25

Above Table 4.6 and Figure 4.6 reveals that the majority of the respondents (60.83%) had a medium family size, followed by small (32.92%) and large-sized families (6.25%).

The majority of respondents (60.83%) belong to medium families, which could be attributed to growing tendencies to live in nuclear family and also the effect of increased awareness of family planning programs in rural areas.

This observation is in line with Atreya *et al.* (2018), Gour *et al.* (2016) and Singh *et al.* (2021).

4.1.7 Family Type

Family type of dairy farmers was classified is categorized into two categories and their frequencies are presented in Table No. 4.7 and Figure 4.7.

Table 4.7 Classification of dairy farmers based on family type

N=240

Variable	Category	Frequency	Percentage (%)
Family Type	Nuclear	60	25.00
	Joint	180	75.00

Table 4.7 clearly indicated that a three fourth of the respondents were from the joint families and rest one fourth had nuclear families. The findings of this study in line with the report of Dwivedi *et al.* (2014) and Rathod *et al.* (2011).

4.1.8 Experience in dairy farming

Experience in dairy farming was classified is characterized into three categories and their frequencies are presented in Table No. 4.8 and Figure 4.8.

Table 4.8 Classification of dairy farmers based on experience in dairy farming

N=240

Variable	Category	Frequency	Percentage (%)
Experience in dairy farming	Low	89	37.08
	Medium	110	45.83
	High	41	17.08

Information presented in Table 4.8 indicated that the majority of the respondents (45.83%) had medium experience in dairy farming, followed by 37.08 per cent were low experience and the rest 17.08 per cent had high experience in dairy farming.

With reference to the above table, it could be concluded that the farmers in the medium category have basic knowledge about dairy farming but they want to get scientific knowledge about dairy farming to increase their profit. The findings of this study align with the report of Vekariya *et al.* (2016) and Kalaivani *et al.* (2017).

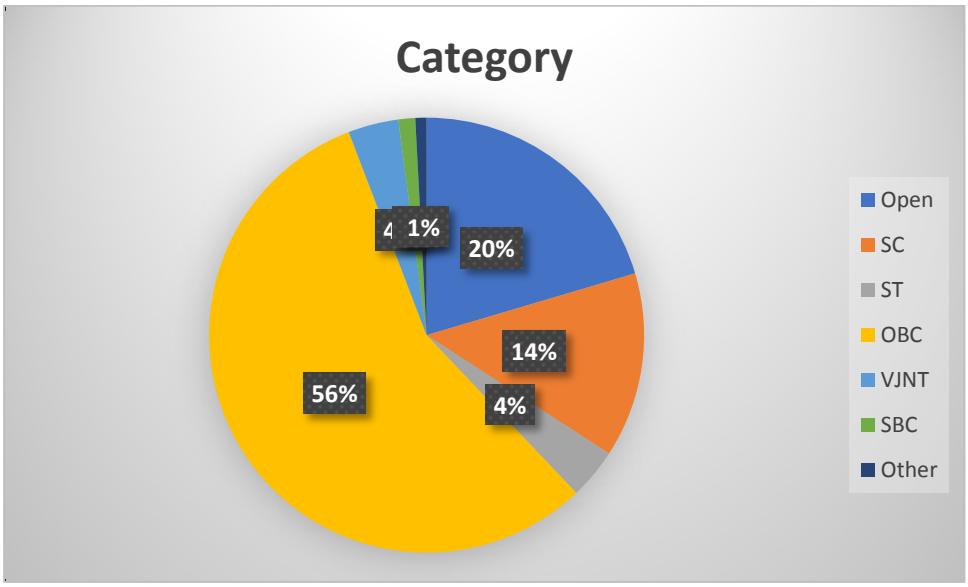

Fig 4.5 Classification of dairy farmers based on their category

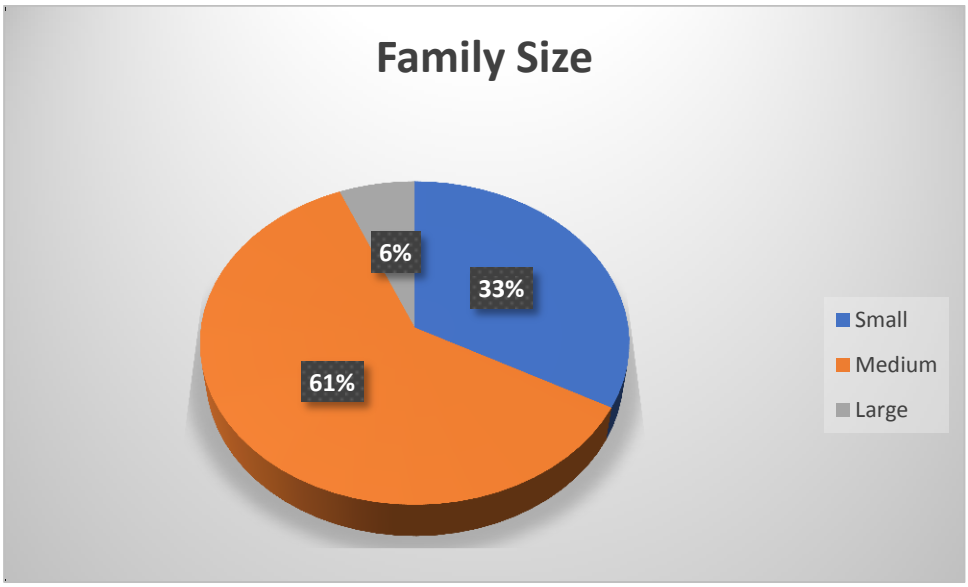

Fig 4.6 Classification of dairy farmers based on their family size

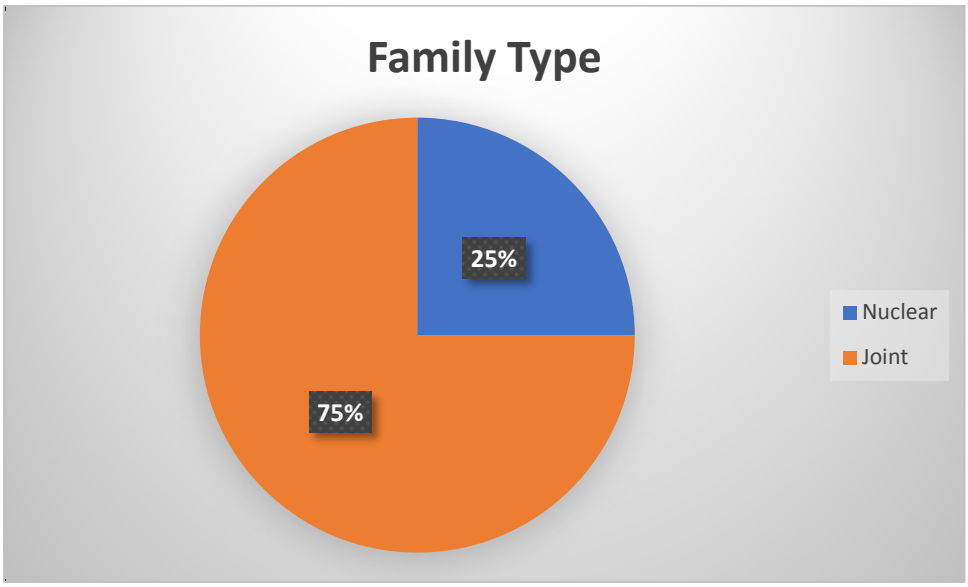

Fig 4.7 Classification of dairy farmers based on their family type

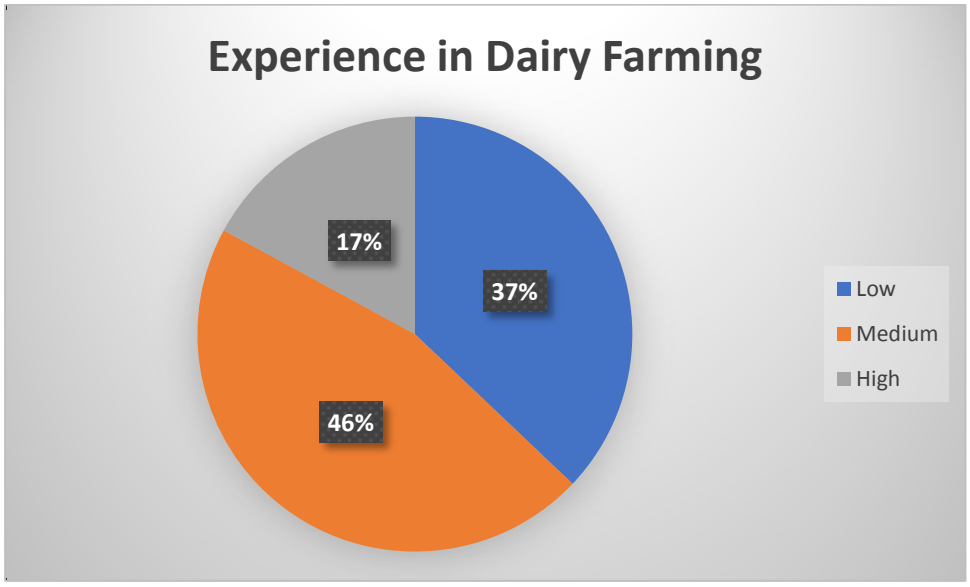

Fig 4.8 Classification of dairy farmers based on their experience in farming

4.1.9 Land Holding

Land holding of dairy farmers is categorized into six categories and their frequencies are presented in Table No. 4.9 and Figure 4.9.

Table 4.9 Classification of dairy farmers based on land holding

N=240

Variable	Category	Frequency	Percentage (%)
Land Holding	Landless	20	8.33
	Marginal	0	0.00
	Small	7	2.92
	Semi-medium	75	31.25
	Medium	135	56.25
	Large	3	1.25

From Table 4.9 it is evident that the majority of respondents possess medium land holding (56.25%), followed by semi-medium (31.25%), landless (8.33%), small land holding (2.92%) and very few are large land holding (1.25%). Land is regarded as a key socio-economic indicator in the agriculture sector and rural development. The farm's production procedures and livestock enterprise volume are mostly determined by farm size.

The findings of this study are in line with the reports of Roy *et al.* (2013) who found that 66.66 per cent of respondents had medium land holding.

4.1.10 Herd Size

Herd size of dairy farmers was classified into their respective categories and their frequencies are presented in Table No. 4.10

Table 4.10 Classification of dairy farmers based on herd size

N=240

Variable	Category	Frequency	Percentage (%)
Herd size	Low herd size	0	0.00
	Lower medium herd size	2	0.83
	Upper medium herd size	28	11.67
	Large	210	87.50

Table 4.10 and figure 4.10 clearly indicates that the majority of the respondents had a large herd size (87.50%), followed by an upper medium herd size (11.67%) and a few dairy farmers had lower herd sizes (0.83%). Above findings are in contrast to results reported by Kalaivani *et al.* (2017) and Lohakare *et al.* (2015) who found the majority of farmers with low and medium herd sizes. The possible reason for the great variation is the due increasing number of livestock day by day and use of scientific managemental practices followed by farmers to get maximum economic profit by rearing large numbers of cows and buffalo.

4.1.11 Daily Milk Production

Daily milk production refers to the average quantity of milk in litres produced by the farmer in a day. The categorization of daily milk production of the respondents was done and is presented in Table No. 4.11 and Figure 4.11 as under

Table 4.11 Classification of dairy farmers based on daily milk production

N=240

Variable	Category	Frequency	Percentage (%)
Milk Production	Low milk production	8	3.33
	Low medium milk production	52	21.67
	High medium milk production	104	43.33
	High milk production	76	31.67

As observed from Table 4.11, the majority of the dairy farmers had high-medium milk production (43.33%), followed by high milk production (31.67%), low medium milk production (21.67%) and the rest 3.33 per cent dairy farmers reported low milk production. More milk production reported by these dairy farmers could be linked to more milking animals and good remunerative price to the milk and proper payment given by the Mother Dairy collection units where these farmers are pourers. This observation is in line with Kalaivani *et al.* (2017) and Rai *et al.* (2017).

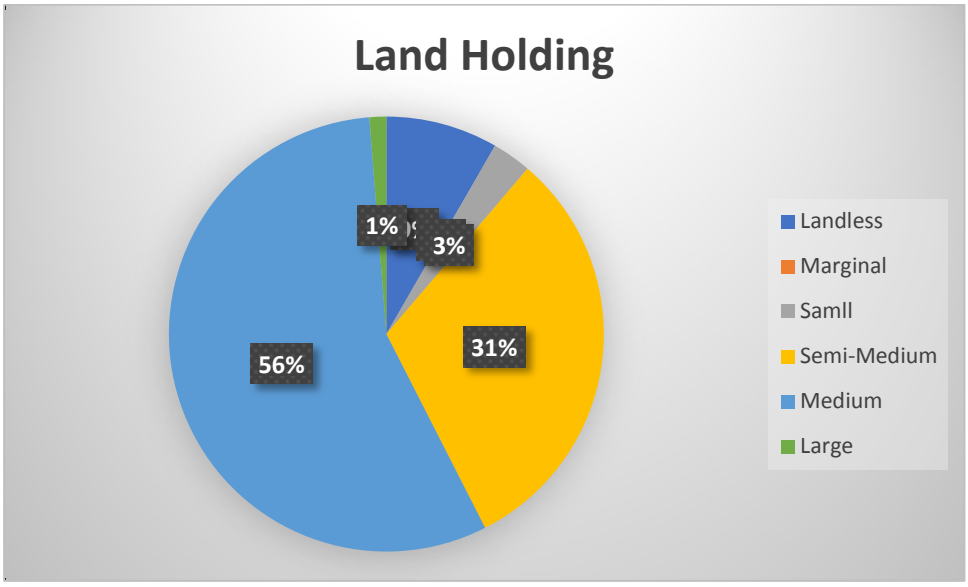

Fig 4.9 Classification of dairy farmers based on their land holding

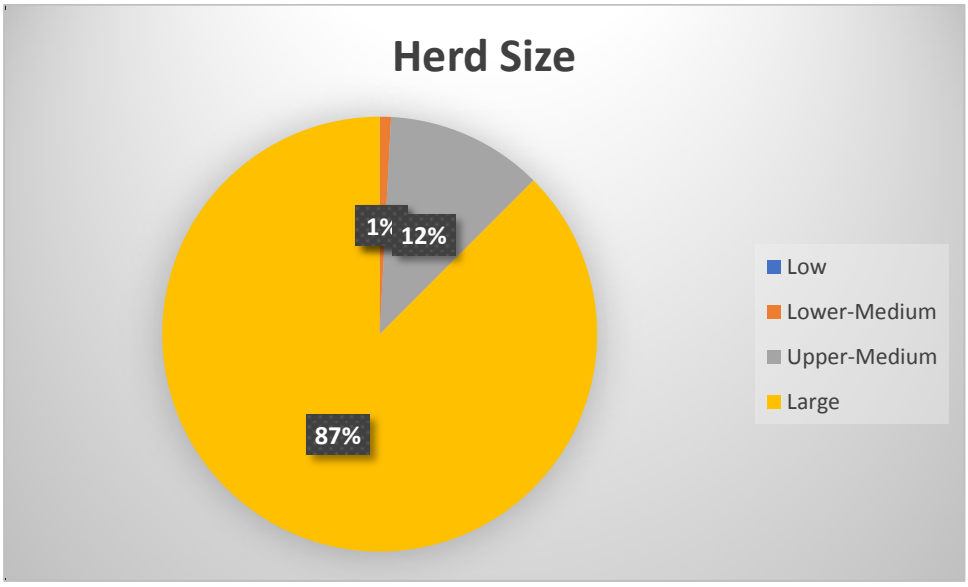

Fig 4.10 Classification of dairy farmers based on their livestock herd size

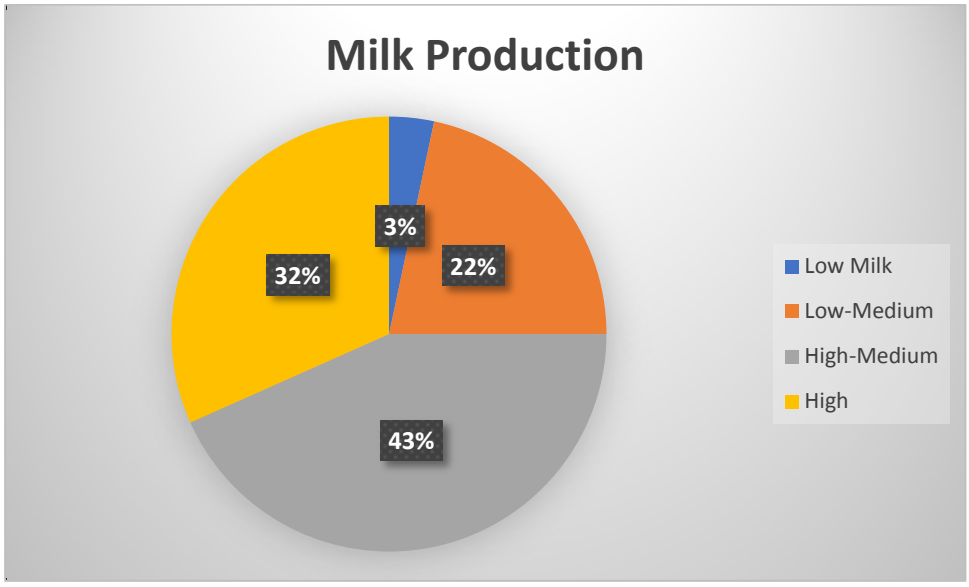

Fig 4.11 Classification of dairy farmers based on their animal milk production

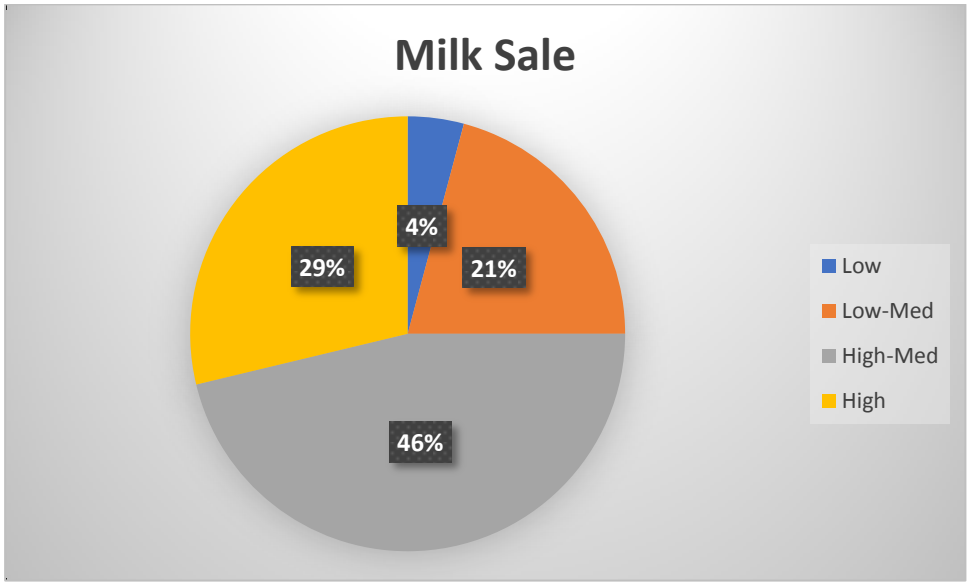

Fig 4.12 Classification of dairy farmers based on their animal milk sale.

4.1.12 Daily Milk Sale

It refers to the quantity of milk sold out of the total milk produced per day by the respondent measured in liters. The daily milk sale of the respondent was recorded by direct questioning and was categorized as under

Table 4.12 Classification of dairy farmers based on daily milk sale

N=240

Variable	Category	Frequency	Percentage (%)
Daily Milk Sale	Low milk sale	10	4.17
	Low medium milk sale	50	20.83
	High medium milk sale	111	46.25
	High milk sale	69	28.75

As observed from Table No. 4.12 and Figure 4.12 majority of the dairy farmers had high medium milk sales (46.25%), followed by high milk sales (28.75%), low medium milk sales (20.83%) and few respondents had low milk sales (4.17%). Thus, high-medium milk sold by dairy farmers comprised a majority (46.22%) of the population. High milk sales could be attributed to availability high milk production breed like crossbred of HF and Jersey dairy animals, a good remunerative price for milk, and timely payment by Mother Dairy. This study is reported in line with Kalaivani *et al.* (2017).

4.1.13 Annual Income

Annual income of dairy farmers was classified into three categories and their frequencies are presented in Table No. 4.13 and Figure 4.13

Table 4.13 Classification of dairy farmers based on annual income

N=240

Category	Frequency	Percentage (%)
Low income (Up to Rs. 1,50,000)	81	33.75
Medium income (Rs. 1,500,01 to Rs. 3,00,000)	150	62.5
High income (Above Rs. 3,00,001)	9	3.75

It is evident from Table No. 4.13 that majority of dairy farmers (62.5%) were in the medium-income group, followed by the low-income group (33.75%) and the remaining had the high-income group (3.75%). Most of the farmers had medium landholding because of that their income could be in the medium range. To increase their revenue they are taking an interest to grow in dairy farming.

This report is in line with the report of Shahjar *et al.* (2018) and Kalaivani *et al.* (2017) who had concluded that income levels were up to Rs. 1-2.5 lakh. The present finding is contradictory to Atreya *et al.* (2018) and Kumar *et al.* (2020) who reported that majority of farmers had low annual income.

4.1.14 Training Attended

Training attended by dairy farmers were classified into two categories and their frequencies are presented in Table No. 4.14 and Figure 4.14.

Table 4.14 Classification of dairy farmers based on training attended

N=240

Variable	Category	Frequency	Percentage (%)
Training Attended	Yes	240	100
	No	0	0

The result in the above table indicated that cent per cent dairy farmers had attended at least one training on animal husbandry related subjects either from the field workers of Mother Dairy or from other organization. The findings of this study are in conformity with the report of Kumar *et al.* (2020) and Karthik *et al.* (2021).

4.1.15 Extension Contact

Extension contact of dairy farmers was classified into their respective categories and their frequencies are presented in Table No.4.15 and Figure 4.15.

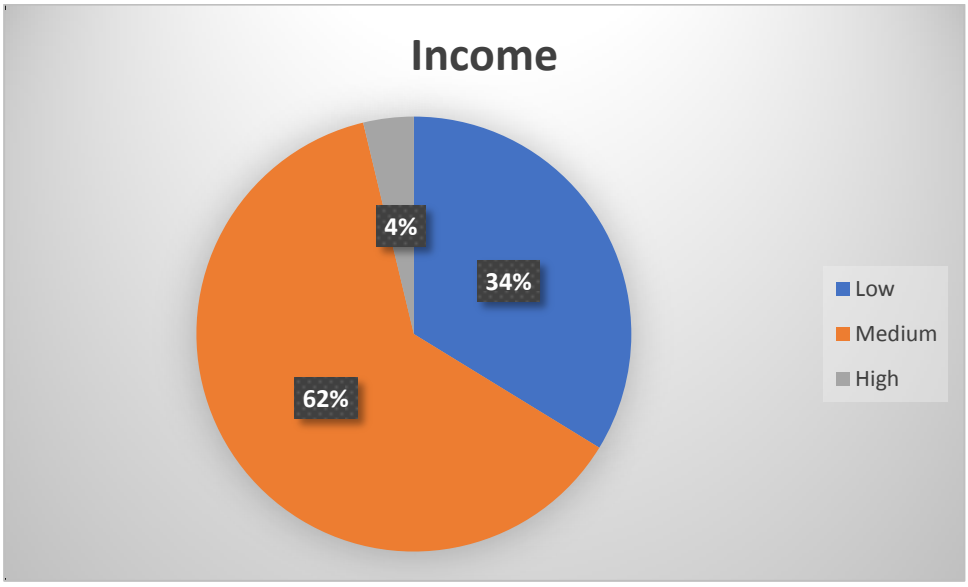

Fig 4.13 Classification of dairy farmers based on their annual income

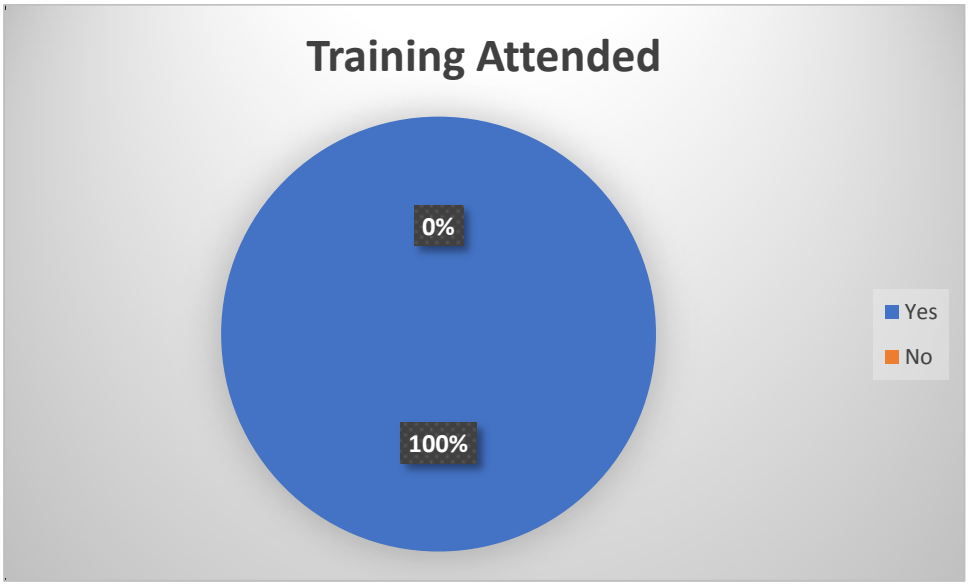

Fig 4.14 Classification of dairy farmers based on their training attended

Table 4.15 Classification of dairy farmers based on extension contact

N=240

Category	No contact		Occasional		Regular	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
LDO	12	5	161	67.08	67	27.92
Animal Husbandry	224	93.33	16	6.67	0	0.00
Subject Matter Specialist	0	0.00	240	100	0	0.00
Dairy Expert	190	79.17	50	20.83	0	0.00
Television	8	3.33	67	27.92	165	68.75
Radio	94	39.17	65	27.08	81	33.75
Newspaper	81	33.75	126	52.50	33	13.75
Social Media	44	18.33	41	17.08	155	64.58

To analyse the information source use of dairy farming techniques, they were given a list of parameters in the form of a structured interview schedule was used to rate each parameter on a three-point scale ranging from no contact to occasional contact to regular contact.

After observation of Table 4.15, it is confirmed that among all the mentioned categories, majority of the dairy farmers (68.75%) have used television regularly for information seeking followed by social media (64.58%) whereas the least contact was noticed in case of the subject matter specialist category. Within the given range of occasional contact, it was observed that the maximum number of people were in contact with Livestock Development Officers (67.08%).

4.1.16 Social Participation

Social participation of dairy farmers was classified into their respective categories and their frequencies are presented in Table No.4.16 and Figure 4.16.

Table 4.16 Classification of dairy farmers based on the social participation

N= 240

Variable	Category	Frequency	Percentage (%)
Social Participation	Low social participation	114	47.50
	Medium social participation	40	16.67
	High social participation	86	35.83

The data in the Table No. 4.16, indicates that majority of the dairy farmers had low social participation (47.50%), followed by 35.83 per cent having high social participation while rest 16.67 per cent of the dairy farmers had medium social participation. The majority of respondents had poor social participation, which might be attributed to a lack of awareness and limited time available for active social participation due to the workload on the dairy farmers. These findings correlate with the findings of Vekariya *et al.* (2016) and Maurya *et al.* (2021).

4.2 To assess the effectiveness of training given to dairy farmers in Micro Training Centre (MTCs)

Effectiveness was considered on the basis of the 5continuum scale viz., 'Not Effective', 'Least Effective', 'Effective', 'Moderately Effective' and 'Most Effective' by assigning the scores of 1, 2, 3, 4 and 5 respectively.

Table 4.17 Classification of dairy farmers based on the effectiveness on different aspects of training

N= 240

Variable	Content / Particulars	Mean Score
Effectiveness Feedback of Training	Coverage of Training Objectives	4.23
	Relevance of the Course	4.90
	Practical Exposure	3.69
	Presentation at the Level of Trainees	4.97
	Clarity of Explanation	4.37
	Handling of Sessions	4.00
	Facilities for Training	4.80
	Boarding Facilities	4.20
	Training Environment	4.25

It is observed from Table 4.17 that the highest mean score of the feedback given by dairy farmers based on Presentation at the Level of Trainees (4.97) followed by Relevance of the Course (4.90), Facilities for Training (4.80), Clarity of Explanation (4.37), Training Environment (4.25), Coverage of Training Objectives (4.23), Boarding Facilities (4.20), Handling of Sessions (4.00) and the lowest mean score was for Practical Exposure (3.69) each. The Overall Effective Index Mean Score was 87.58 for the effectiveness on different aspects of training components.

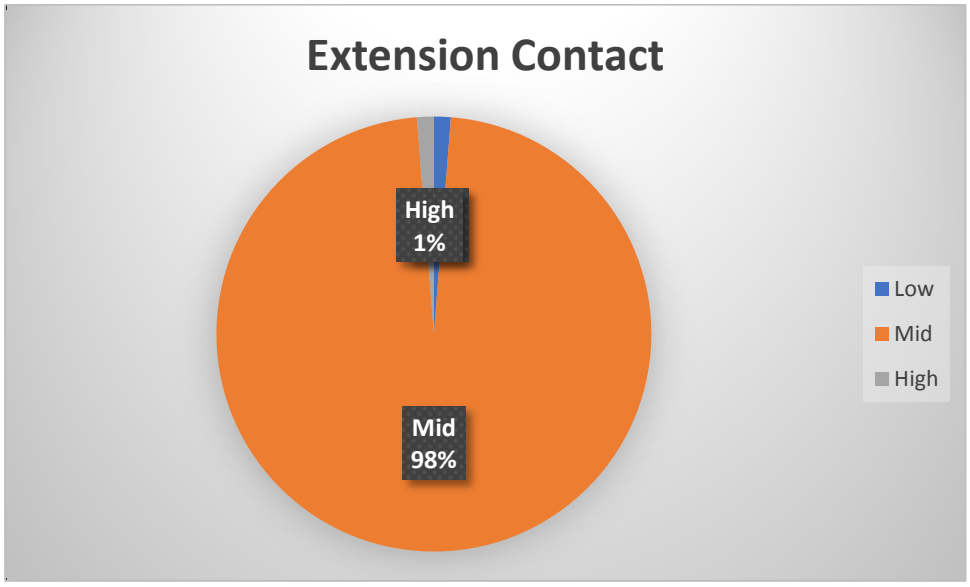

Fig 4.15 Classification of dairy farmers based on their extension contact

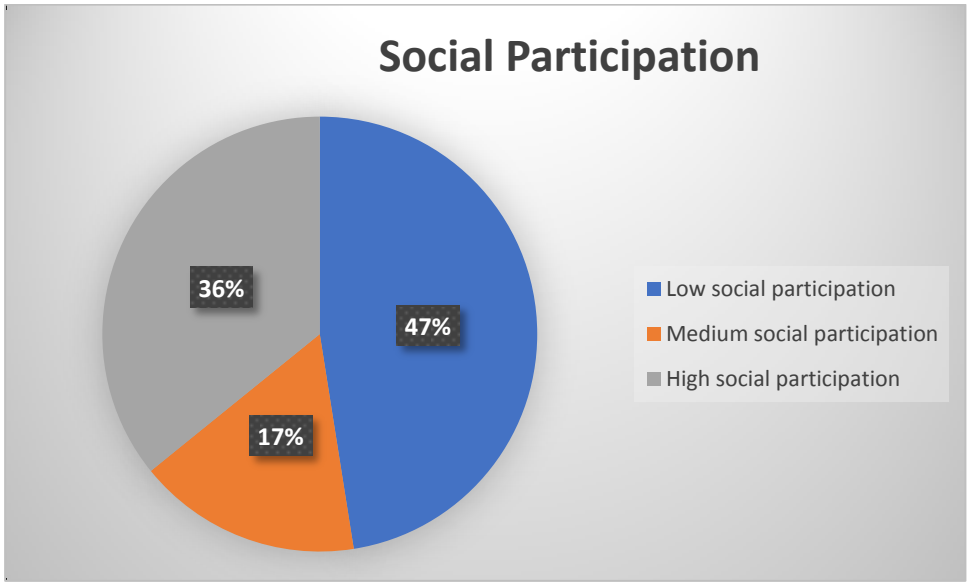

Fig 4.16 Classification of dairy farmers based on social participation

Plate: 4.10 Photograph showing use of chaff cutter at MTC Bina, Nagpur

Plate: 4.11 Demonstration of silage making at MTC Jogaheti, Wardha

Plate: 4.12 Fodder demonstration unit at MTC Bina, Nagpur

Trainers provided concise explanations throughout the training, which was conducted in the local language (Marathi) to ensure participants understood the concepts. They also gave a good explanation about relevant topics which are really hard to understand for farmers and useful for overcoming losses during effective dairy farming because of which farmers clearly understood relevant topics. Good facilities for training viz. classroom facility with chairs, television, educational posters, food, refreshment and good clean environment and loose housing for dairy animals. Trainer covered most necessary topics in deep and some which are less necessary were covered briefly due to less time so the session handling experience was overall good.

The finding of this study was in accordance with Kobba *et al.* (2020) who had observed the relevance of training and clarity of explanation (4.5), Presentation at the Level of Trainees (4.3), coverage of training objective (4.2), Handling of Sessions (4.1), Practical Exposure (4.0), Boarding facilities (4.0), and facilities for Training (3.9). Reddy *et al.* (2012) and Kumar *et al*. (2016) also showed nearby similar results.

4.3 To study knowledge gained by trainees of Micro Training Centres (MTCs)

The study was done on the basis of Pre and Post-training knowledge of dairy farmers.

Table 4.18 Classification of the dairy farmers based on knowledge gained

N=240

Place	Sample / No. of Observation	Before Training Mean	After Training Mean	Mean Gain	Standard Deviation
MTC, Jogaheti Wardha	80	55.84	96.56	40.72	7.15
MTC, Bina, Nagpur	80	56.45	95.23	38.78	7.02
MTC, Kamnapur Ghusali, Amravati	80	59.03	97.29	38.26	7.74

From Table No. 4.18, it is observed that the dairy farmers attending the training at MTC, Wardha showed the maximum gain in knowledge at a mean score of 40.72 per cent followed by 38.78 per cent and 38.26 per cent for farmers trained at MTC, Nagpur and MTC, Amravati respectively.

These findings correlate with the findings of Marriammal *et al.* (2018) who had found overall knowledge level of women dairy farmers was moderate (48.33%), followed by good (27.34%) and poor (24.33%) and near similar results were reported by Kobba *et al.* (2020) and Kumar *et al.* (2016) too.

4.4 To ascertain the constraints encountered by dairy farmers

Constraints are difficulties or problems in the process of doing the work. In the present study, various constraints regarding feeding constraints, health care, breeding management and management constraints were selected by communicating with specialists on the subject. For the present study, the constraints in implementing the dairy technologies were recorded for trainees of MTCs. The data was analysed by applying the 'Garrett Ranking' method. The respondents were questioned to rank the constraints in accordance with their order of preference.

4.4.1 Feeding Constraints

Table 4.19 Classification of constraints of feeding faced by the dairy farmers

N=240

Sr. No.	Feeding Constraints (Rank 1-8)	Mean Score	Rank
1	High price of concentrate mixture	62.02	2
2	Low availability of concentrates and mineral mixture in villages	48.25	5
3	High cost of fodder	60.29	3
4	Inadequate knowledge about the scientific feeding of dairy animals	79.15	1
5	Lack of knowledge about process of total mixed ration	37.62	6
6	Low availability of TMR ingredients	32.94	7
7	Lack of knowledge about process of silage making	28.45	8
8	High cost of chaff cutter	52.62	4

Plate: 4.13 Photograph showing personal interview of respondent at MTC Bina, Nagpur

Plate: 4.14 Photograph showing personal interview of respondent at MTC Jogaheti, Wardha

Plate: 4.15 Photograph showing personal interview of respondent at MTC Kamnapur

It is clearly evident from Table 4.19 that the inadequate knowledge about the scientific feeding of dairy animals with a mean score of 79.15 is the foremost constraint faced by dairy farmers followed by the high price of concentrate mixture, high cost of fodder, high cost of chaff cutter, low availability of concentrates and mineral mixture in villages, lack of knowledge about the process of total mixed ration, low availability of TMR ingredients and lack of knowledge about the process of silage making.

Inadequate knowledge about scientific feeding could be due to less availability of sources of information and due to the fact that many good quality products are available in villages those which are required in different amount for various physiological function viz. maintenance, growth, milk production and reproduction of livestock. The high price of concentrate mixture is due to less knowledge about household concentrate mixture preparation. Some farmers were found incapable to produce an ample amount of fodder for their livestock that's why fodder cost was increased.

The finding of this study is in accordance with Tailor *et al.* (2012), Gupta *et al*. (2019) and Kumar *et al*. (2012).

4.4.2 Health Constraints

Table 4.20 Classification of constraints of health faced by the dairy farmers

N=240

Sr. No.	Health Care (Rank 1-7)	Mean Score	Rank
1	Lack of awareness about the importance of vaccination	33.51	6
2	Lack of awareness about the importance of deworming	21.87	7
3	High cost of vaccine and medicine	73.35	1
4	Lack of veterinary aids	71.12	2
5	High cost of treatment of sick animal	56.85	3
6	Lack of knowledge in identifying diseases of animal	43.95	5
7	There is a growing problem of mastitis in	49.40	4

	lactating animal		

It is clearly evident from Table 4.20 that the highest mean score was for the high cost of vaccines and medicine (73.35) and thus was rated as the topmost health constraints faced by dairy farmers followed by lack of veterinary aids, high cost of treatment of the sick animal, there is a growing problem of mastitis in lactating animal, lack of knowledge in identifying diseases of animal, lack of awareness about the importance of vaccination and lack of awareness about the importance of deworming. High Cost of Vaccine and Medicine and veterinary care could be attributed to the growing incidences of the various animal diseases seen in the recent times.

The findings of this study are in consonance with the report of Meena *et al.* (2017), Singh *et al.* (2015) and Rajadurai *et al.* (2018).

4.4.3 Breeding Constraints

Table 4.21 Classification of constraints of breeding faced by the dairy farmers N=240

Sr. No.	Breeding Constraint (Rank 1-2)	Mean Score	Rank
1	Lack of artificial insemination (AI) facility	37	2
2	Lack of good quality semen	63	1

It is clearly evident from Table 4.21 that the major breeding constraint faced by dairy farmers was the lack of good quality semen with a mean score of 63 followed by the lack of A.I. facility with a mean score of 37. Lack of good quality semen is the major constraint because of a smaller number of frozen semen labs in the rural areas and the majority of the farmers are unaware of the importance of good quality semen.

Although good quality semen was provided but due to a lack of knowledge about storage facilities and management of good quality semen, they were unable to utilize it in a scientific manner. On the other hand, due to limited number of field veterinarians in remote areas, the availability of AI facilities were affected in remote areas.

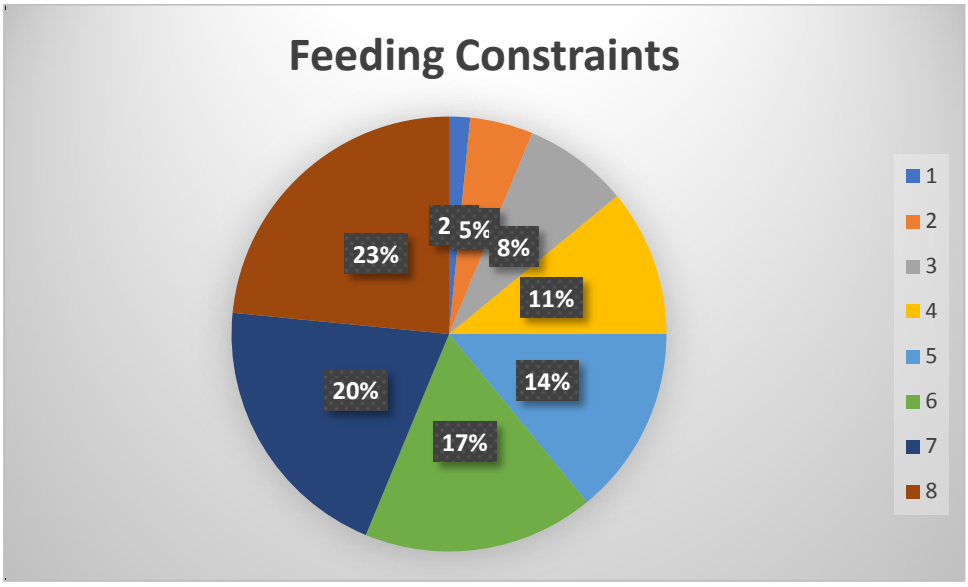

Fig. 4.17 Classification of constraints of feeding faced by the dairy farmers

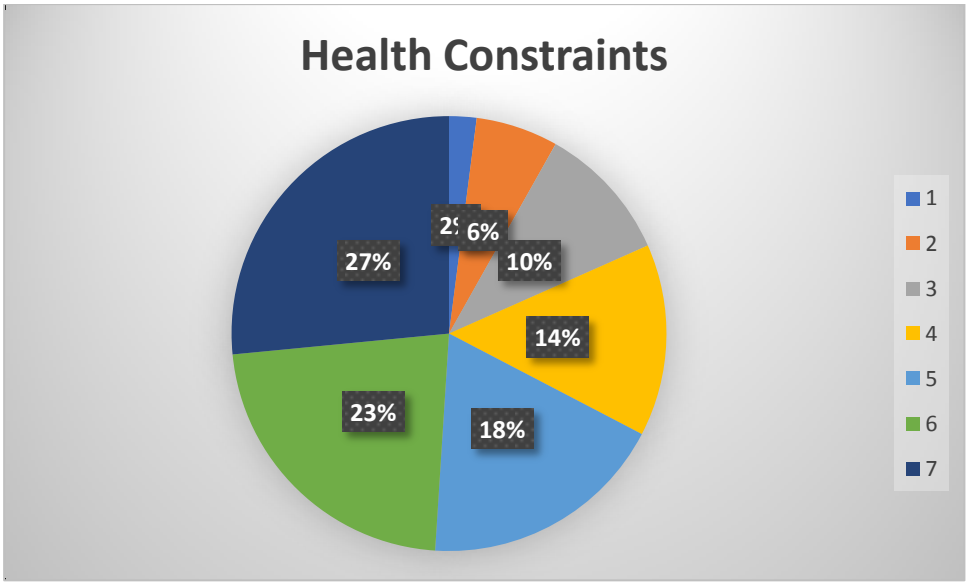

Fig. 4.18 Classification of constraints of health faced by the dairy farmers

The findings of this study are near similar to that of Shisode *et al.* (2009) and Rajadurai *et al.* (2018).

4.4.4 Managemental Constraints

Table 4.22 Classification of Constraints of management faced by the dairy farmers N=240

Sr. No.	Management (Rank 1-5)	Mean Score	Rank
1	Lack of knowledge about the management of calf and pregnant animal	57.25	2
2	High calf mortality rate	52.29	3
3	Poor housing of dairy animals	37.77	4
4	Lack of proper knowledge about clean milk production	75	1
5	Waste disposal is a major problem	27.5	5

As absorbed from above Table 4.22 lack of proper knowledge about clean milk production was a major constraint among the routine management practices with a mean score of 75, followed by lack of knowledge about the management of calf, pregnant animals, high calf mortality, poor housing of dairy animals and waste disposal. As clean milk production is a scientific concept and it had many steps, farmers were unable to follow the protocols due to lack of knowledge. Farmers were not aware of the nutritional requirement of pregnant animals and calves. They were lacking knowledge about caring and managemental practices that should be carried out during the pregnancy of animals. In the case of management of calves, farmers lacked information about calf starter, weaning, colostrum feeding and care and management.

The findings of the study are in alignment with the report of Meena *et al.* (2017) and Tailor *et al.* (2012).

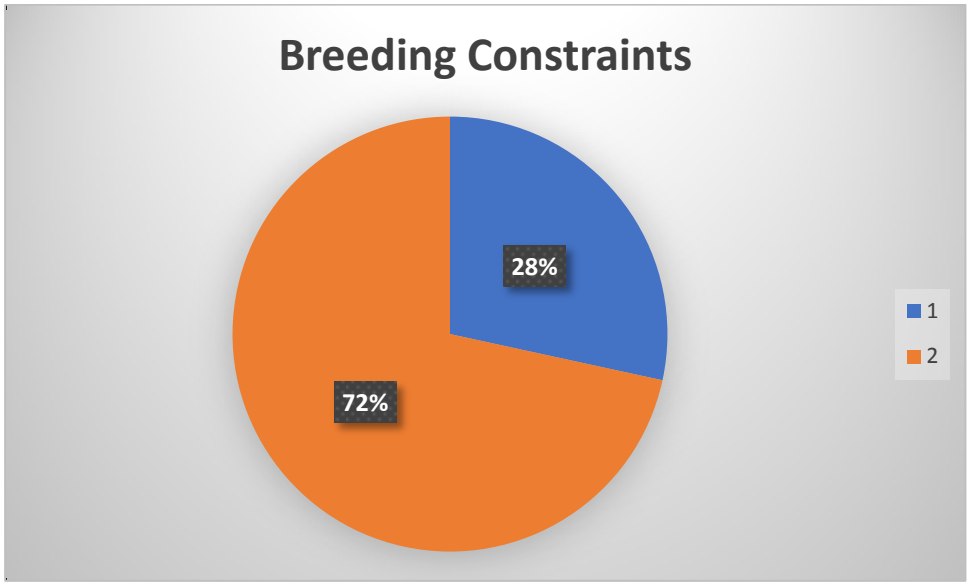

Fig. 4.19 Classification of constraints of breeding faced by the dairy farmers

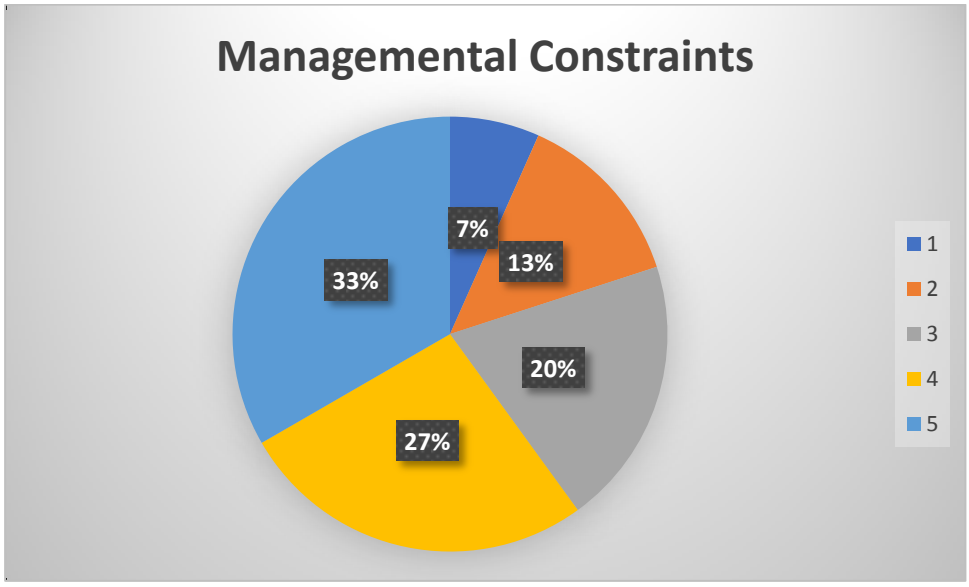

Fig. 4.20 Classification of constraints of management faced by the dairy farmers

SUMMARY AND CONCLUSIONS

One of the fastest growing parts of India's agricultural economy is the dairy sector. Growth of the dairy sector is expanding despite of the fact that investment in this area has been low. Dairy development in India has significantly increased milk output, improved nutritional standards, promoted jobs, and increased money flow in rural regions. Slow dairy development could be caused by lack of scientific dairy management practices or lack of information. To boost the milk production, the National Dairy Development Board began Operation Flood in 1970, ushering the White Revolution. It was responsible for saving the dairy sector from extinction. Conducting training for dairy farmers is a simple way to improve their knowledge of scientific dairy practices. Many researchers found positive impact of scientific training on dairy farmers. Micro Training Centre (MTC) which is established by the Maharashtra Animal and Fishery Sciences University (MAFSU), Nagpur with the financial assistance of the National Dairy Development Board (NDDB), Anand is one such mechanism to ensure farmer to farmer cross learning. The progressive farmer provides training to the beneficiary dairy farmers of Mother Dairy. This training is given at their respective farm site. The rationale for this training is that the one who is trained in MTCs will spread his knowledge to other local dairy farmers.

Hence, to understand Knowledge Gained by Dairy Farmers Through Micro Training Centres (MTCs): A Summative Evaluation was planned with the following specific objectives.

Objectives:

1. To study the socio-economic profile of trainees of Micro Training Centres (MTCs).
2. To assess the effectiveness of training given to the dairy farmer in Micro Training Centres (MTCs).
3. To study knowledge gained by trainees of Micro Training Centres (MTCs).

4. To ascertain the constraints perceived by trainees of MTCs in implementing the dairy technologies.

The present study was carried out in the purposively selected Nagpur, Wardha and Amravati district of Vidarbha region of Maharashtra. Data was collected from the three Micro Training Centres (MTCs) established in these districts. Thus, it was assumed that the number of dairy farmers involved in dairy farming will also be available sufficiently from these districts.

From each Micro Training Centre (MTC), 80 Dairy farmers were selected (3 X 80 = 240). Thus, a total of 240 farmers were randomly selected for the final study with the help of a structured interview schedule with personal dialogue methods and observations.

From the survey of farmers engaged in dairy farming and who were trained in these MTCs', the following salient major findings were observed.

1. Majority of the dairy farmers (63.75 %) were from middle age group i.e. between the age group 31 to 50 years followed by 25.42 per cent were in the old age group i.e. 50 years and above and remaining 10.83 per cent of the respondents belong to the young age group i.e. 18 to 30 years.

2. Majority of the dairy farmers (50.83%) were educated up to secondary school followed by primary education (35.83%), Higher secondary (7.92%) and the remaining 5.42 per cent of the dairy farmers were illiterate.
3. Majority of the respondents (89.17%) were married, while the remainder 10.83 per cent were unmarried and none of them were divorced or widow.

4. Majority of the respondents (95.83%) were male, with only 4.17 per cent of respondents were female.

5. Majority of respondents (56.25%) belong to Other Backward Classes (OBC), followed by Unreserved (20.42%), Schedule Caste (13.75%), scheduled tribes (3.75%), VJNT (3.75%), SBC (1.25%) and few in other categories (0.83%).

6. Study reveals that the majority of the respondents (60.83%) had a medium family size, followed by small (32.92%) and large-sized families (6.25%).

7. Clearly indicated that a three fourth of the respondents were from the joint families and the rest one fourth had nuclear families.

8. Majority of the respondents (45.83%) had medium experience in dairy farming, followed by 37.08 per cent were with low experience and the rest 17.08 per cent had high experience in dairy farming.
9. Majority of respondents possess medium landholding (56.25%), followed by semi-medium (31.25%), landless (8.33%), small landholding (2.92%) and very few had large landholding (1.25%).

10. Majority of the respondents had a large herd size (87.50%), followed by upper medium herd size (11.67%) and a few dairy farmers had lower herd sizes (0.83%).

11. Majority of the dairy farmers had high-medium milk production (43.33%), followed by high milk production (31.67%), low medium milk production (21.67%) and the rest 3.33 per cent dairy farmer reported low milk production.

12. Majority of the dairy farmers had high medium milk sales (46.25%), followed by high milk sales (28.75%), low medium milk sales (20.83%) and few respondents had low milk sales (4.17%).

13. Majority of dairy farmers (62.5%) were in the medium-income group, followed by the low-income group (33.75%) and the remaining had high-income (3.75%).

14. Indicated that cent per cent dairy farmers had attended at least one training on animal husbandry related subjects either from the field workers of Mother Dairy or from other organization.

15. Majority of the dairy farmers (68.75%) have used television regularly for information seeking followed by social media (64.58%) whereas the least

contact was noticed in case of the subject matter specialist category. Within the given range of occasional contact, it was observed that the maximum number of people were in contact with Livestock Development Officers (67.08%).

16. Indicates that majority of the dairy farmers had low social participation (47.50%), followed by 35.83 per cent having high social participation while rest 16.67 per cent of the dairy farmers had medium social participation.

17. The highest mean score about the effectiveness of training indicated that the highest mean score was given for presentation/training imparted by the MTCs farmer (4.97) followed by Relevance of the Course (4.90), Facilities for Training (4.80), Clarity of Explanation (4.37), Training Environment (4.25), Coverage of Training Objectives (4.23) Boarding Facilities (4.20), Handling of Sessions (4.00) and the lowest mean score was for Practical Exposure (3.69). The Overall Effective Index Mean Score was (87.58) for the effectiveness on different aspects of training components.
18. It is observed that the dairy farmers attending the training at MTC, Wardha showed the maximum gain in knowledge at a mean score of 40.72 per cent followed by 38.78 per cent and 38.26 per cent for farmers trained at MTC, Nagpur and MTC, Amravati respectively.
19. It is clearly evident that inadequate knowledge about the scientific feeding of dairy animals with a mean score of 79.15 is the foremost constraint faced by dairy farmers followed by the high price of concentrate mixture, high cost of fodder, high cost of chaff cutter, low availability of concentrates and mineral mixture in villages, lack of knowledge about the process of total mixed ration, low availability of TMR ingredients and lack of knowledge about the process of silage making.
20. The highest mean score was for the high cost of vaccines and medicine (73.35) and thus was rated as the topmost health constraint faced by dairy farmers followed by lack of veterinary aids, high cost of treatment of the sick animal, there is a growing problem of mastitis in lactating animal,

lack of knowledge in identifying diseases of animal, lack of awareness about the importance of vaccination and lack of awareness about the importance of deworming.

21. The major breeding constraint faced by dairy farmers was the lack of good quality semen with a mean score of 63 followed by the lack of A.I. facility with a mean score of 37.

22. Observed the lack of proper knowledge about clean milk production was a major constraint among the routine management practices with a mean score of 75, followed by lack of knowledge about the management of calf, pregnant animals, high calf mortality, poor housing of dairy animals and waste disposal.

CONCLUSIONS

From the above survey of farmers from three different places, the following observations were noted.

1. Participation of females in dairy farming training was found to be very low as compared to male farmers, although female farmers are actively involved in the livestock rearing practices.

2. Dairy owners are usually concerned about the health and production of their livestock so they preferable seek the help of professionals to get their queries solved and attain training to gain knowledge related to aspects of their farming.

3. Farmers after receiving training from MTC's had good experience and got benefitted from it and farmers who were trained by professionals had good bonding, which will help to face and overcome the future problems for the dairy farming.

4. It was noticed that training by professionals and expert faculty at MTC's had direct impact on farming perspective in rearing their livestock to attain their production at the peak level and uplift their economic growth.

SUGGESTIONS FOR FUTURE RESEARCH

Similar studies having good samples size should be planned to get a comprehensive idea of livestock rearing practices being adopted by farmers which are trained by MTC's farmers. These findings could be compared with the non-trained farmers for assessment of the impact of these MTCs. This will give more clear idea about the expansion of such novel extension approach for the dairy farmers. Further, these MTCs can be studied for their social auditing and its impact on the development of dairy farmers and livestock production in the project area.

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Respondent No: _____

DEPARTMENT OF VETERINARY & ANIMAL HUSBANDRY EXTENSION
NAGPUR VETERINARY COLLEGE, NAGPUR

INTERVIEW SCHEDULE

KNOWLEDGE GAINED BY DAIRY FARMERS THROUGH MICRO TRAINING CENTRES (MTCs): A SUMMATIVE EVALUATION

A) SOCIO-ECONOMIC STATUS OF TRAINEES (DAIRY FARMERS) OF MTCs

Place of Training/Micro Training Centre (MTC):
_____

1. Name of Dairy Farmer:
_____

2. Village: _____ Tahsil: _____ District: _____

3. Age: _____

4. Category: A) Open B) SC C) ST D) OBC E) VJNT F) SBC G) Other_____

5. Family Size:

Male	Female	Child	Total

6. Educational Level:

Illiterate	Primary	Secondary	Higher

7. Gender: Male / Female / Transgender

8. Marital Status: Married / Unmarried / Divorced / Widow

9. Family Type: Nuclear / Joint

10. Occupation: Farmer / Service / Business / Landless Labour

11. Do you have Agricultural Land? (Yes / No) If Yes, area: _____ acre.

12. Irrigated Land: acre**.** **Non-Irrigated Land:** acre.

13. Area under fodder cultivation: _____ acre.

14. Herd Size:

Dairy Animal	Male	Female	Calf / Kids	Total
Cattle				
Buffalo				
Goat / Sheep				
Total				

15. Total Milking Animals: _____ a) Cow: _____ b) Buffalo: _____

16. Daily Milk Production: _____ litres/day

17. Daily Milk Sale: _____ litres/day

18. Disposal of Milk: A) Self-Consumed

B) Marketing of Milk (Direct Consumer/Restaurant/Dairy Cooperatives/Other _____)

19. Source of Income:

Agriculture	Animal Husbandry	Business	Service	Other
Rs.	Rs.	Rs.	Rs.	Rs.

20. Total Annual Income (Approximately): Rs. _____

21. Experience in Dairy Farming: _____ years.

22. Extension Contact:

Sr. No.	Extension Contact	Regular Contact	Occasional Contact	No Contact
1.	LDO			
2.	Animal Husbandry Department			
3.	Subject Matter Specialist			
4.	Dairy Expert			
5.	T. V.			
6.	Radio			
7.	Newspaper			
8.	Social Media			

23. A.H. Oriented Training Attended: Yes / No If Yes, No. of Days / Duration: _____ day.

24. Social Participation of Dairy Farmers:

Sr. No.	Social Participation	None	Member	Office Bearer
1.	Gram Panchayat			
2.	Panchayat Samiti			
3.	Zilla Parishad			
4.	Co-operative Societies			
5.	Self Help Groups (SHGs)			
6.	Youth Club / Mandal			

B) EFFECTIVENESS OF TRAINING: (5 Point Continuum Scale)

Sr. No.	Content / Particulars	Most Effective	Moderately Effective	Effective	Least Effective	Not Effective
1.	Coverage of Training Objectives					
2.	Relevance of the Course					
3.	Practical Exposure					
4.	Presentation at the Level of Trainees					
5.	Clarity of Explanation					
6.	Handling of Sessions					
7.	Facilities for Training					
8.	Boarding Facilities					
9.	Training Environment					

D) Constraints perceived by trainees of MTCs:

Sr. No.	Constraints	Rank
A.	**Feeding Constraints (Rank 1-8)**	
1.	High Price of Concentrate Mixture	
2.	Low Availability of Concentrates and Mineral Mixture in Villages	
3.	High Cost of Fodder	
4.	Inadequate Knowledge about the Scientific Feeding of Dairy Animals	
5.	Lack of Knowledge about the Process of Total Mixed Ration	
6.	Low Availability of TMR Ingredients	
7.	Lack of Knowledge about the Process of Silage Making	
8.	High Cost of Chaff Cutter	
B.	**Health Care (Rank 1-7)**	
1.	Lack of Awareness About the Importance of Vaccination	
2.	Lack of Awareness About the Importance of Deworming	
3.	High Cost of Vaccine & Medicine	
4.	Lack of Veterinary Aids	
5.	High Cost of Treatment of Sick Animal	
6.	Lack of Knowledge in Identifying Diseases of Animal	
7.	There is a Growing Problem of Mastitis in Lactating Animal	
C.	**Breeding Management (Rank 1-2)**	
1.	Lack of A.I. Facility	
2.	Lack of Good Quality Semen	
D.	**Management (Rank 1-5)**	
1.	Lack of Knowledge About Management of Calf, Pregnant Animal	
2.	High Calf Mortality Rate	
3.	Poor Housing of Dairy Animals	
4.	Lack of Proper Knowledge About Clean Milk Production	
5.	Problem in the Disposal of Waste	

C) Knowledge Gained by Trainees of Micro Training Centre (MTCs) (3 Point Continuum)

क्रमांक:_____

पशुविज्ञान व पशुसंवर्धन विस्तार शिक्षण विभाग
नागपूर पशुवैद्यकीय महाविद्यालय, नागपूर
महाराष्ट्र पशू आणि मत्स्य विज्ञान विद्यापीठ,नागपूर

मुलाखतीचे वेळापत्रक

शीर्षक: " मायक्रो प्रशिक्षण केंद्राच्या माध्यमातून दूध उत्पादक शेतकऱ्यांना मिळालेले ज्ञान: सारांशात्मक मूल्यांकन "

अ) MTC च्या प्रशिक्षणार्थींची (दुग्ध उत्पादक) सामाजिक-आर्थिक स्थिती

प्रशिक्षणाचे ठिकाण/मायक्रो ट्रेनिंग सेंटर (MTC): _____

1. दुग्ध उत्पादक शेतकऱ्याचे नाव:
_____

2. गाव: _____ तहसील: _____ जिल्हा:
_____

३. वय: _____

4. प्रवर्ग: A) खुला B) SC C) ST D) OBC E) VJNT F) SBC G) इतर_____

5. कुटुंबाचा आकार:

पुरुष	स्त्री	बालक	एकूण

6. शैक्षणिक स्तर:

निरक्षर	प्राथमिक	माध्यमिक	उच्च

7. लिंग: पुरुष / स्त्री / ट्रान्सजेंडर

8. वैवाहिक स्थिती: विवाहित / अविवाहित / घटस्फोटित / विधवा

9. कौटुंबिक प्रकार: विभक्त / संयुक्त

10. व्यवसाय: शेतकरी / सेवा / व्यवसाय / भूमिहीन कामगार

11. तुमच्याकडे शेतजमीन आहे का? (होय/नाही) होय असल्यास, क्षेत्रः _____ एकर.

12. बागायती जमीनः एकर. बिगर बागायत जमीनः एकर.

13. चारा लागवडीखालील क्षेत्रः _____ एकर.

14. कळपाचा आकारः

दुग्धजन्य जनावरे	नर	मादी	वासरू / करडू	एकूण
गाई – गुरे				
म्हैस				
शेळी/मेंढी				
एकूण				

15. एकूण दूध देणारे जनावरेः _____ अ) गायः _____ ब) म्हैसः _____

16. दररोज दूध उत्पादनः _____ लीटर/दिवस

17. दररोज दूध विक्रीः _____ लीटर/दिवस

18. दुधाची विल्हेवाटः अ) स्वयं सेवन

ब) दुधाचे विपणन (थेट ग्राहक/रेस्टॉरंट/दुग्ध सहकारी संस्था/इतर _____)

19. उत्पन्नाचा स्रोतः

कृषी	पशुसंवर्धन	व्यवसाय	नौकरी	इतर
रु.	रु.	रु.	रु.	रु.

20. एकूण वार्षिक उत्पन्न (अंदाजे): रु. _____

21. दुग्धव्यवसायातील अनुभवः _____ वर्षे.

22. विस्तार संपर्क:

क्र.	विस्तार संपर्क	नियमित संपर्क	अधूनमधून संपर्क	संपर्क नाही
1.	LDO			
2.	पशुसंवर्धन विभाग			
3.	विषय विशेषज्ञ			
4.	डेअरी तज्ञ			
5.	टी. व्ही.			
6.	रेडिओ			
7.	वर्तमानपत्र			
8.	सोशल मीडिया			

23. A.H. ओरिएंटेड प्रशिक्षणात भाग घेतला: होय / नाही असल्यास, दिवसांची संख्या / कालावधी: _____ दिवस.

24. दुग्ध उत्पादक शेतकऱ्यांचा सामाजिक सहभाग:

क्र.	सामाजिक सहभाग	कोणीही नाही	सदस्य	पदाधिकारी
1.	ग्रामपंचायत			
2.	पंचायत समिती			
3.	जिल्हा परिषद			
4.	सहकारी संस्था			
5.	बचत गट (SHGs)			
6.	युथ क्लब/मंडळ			

ब) प्रशिक्षणाची प्रभावीता: (५ पॉइंट कंटिन्युम स्केल)

क्र.	सामग्री / तपशील	बहुतेक प्रभावी	माफक प्रमाणात प्रभावी	प्रभावी	कमीत कमी प्रभावी	प्रभावी नाही

1.	**प्रशिक्षण उद्दिष्टांचे कव्हरेज**					
2.	**अभ्यासक्रमाची प्रासंगिकता**					
3.	**प्रॅक्टिकल एक्सपोजर**					
4.	**प्रशिक्षणार्थींच्या स्तरावर सादरीकरण**					
5.	**स्पष्टीकरणाची स्पष्टता**					
6.	**सत्रांची हाताळणी**					
7.	**प्रशिक्षणासाठी सुविधा**					
8.	**बोर्डिंग सुविधा**					
9.	**प्रशिक्षण पर्यावरण**					

ड) MTC च्या प्रशिक्षणार्थींनी लक्षात घेतलेल्या अडचणी:

क्र.	**मर्यादा**	**रँक**
A.	**आहाराची मर्यादा (रँक 1-8)**	
1.	खुराक मिश्रणाची उच्च किंमत	
2.	गावांमध्ये सांद्रता आणि खनिज मिश्रणाची कमी उपलब्धता	
3.	चाऱ्याची उच्च किंमत	
4.	दुग्धजन्य प्राण्यांच्या वैज्ञानिक आहाराविषयी अपुरी माहिती	
5.	एकूण मिश्रित रेशनच्या प्रक्रियेबद्दल ज्ञानाचा अभाव	
6.	TMR घटकांची कमी उपलब्धता	
7.	सायलेज बनविण्याच्या प्रक्रियेबद्दल ज्ञानाचा अभाव	
8.	चाफ कटरची उच्च किंमत	
B.	**आरोग्य सेवा (रँक 1-7)**	
1.	लसीकरणाच्या महत्त्वाबाबत जागरूकतेचा	

	अभाव	
2.	जंतनाशकाच्या महत्त्वाबद्दल जागरूकतेचा अभाव	
3.	लस आणि औषधांची उच्च किंमत	
4.	पशुवैद्यकीय सहाय्यांचा अभाव	
5.	आजारी प्राण्याच्या उपचाराचा उच्च खर्च	
6.	प्राण्यांचे रोग ओळखण्यात ज्ञानाचा अभाव	
7.	स्तनपान करणाऱ्या प्राण्यांमध्ये स्तनदाहाची समस्या वाढत आहे	
C.	**प्रजनन व्यवस्थापन (रँक 1-2)**	
1.	A.I चा अभाव सुविधा	
2.	चांगल्या दर्जाच्या वीर्याचा अभाव	
D.	**व्यवस्थापन (रँक 1-5)**	
1.	वासरू, गरोदर जनावरांच्या व्यवस्थापनाबाबत ज्ञानाचा अभाव	
2.	उच्च वासरांचा मृत्यू दर	
3.	दुग्धजन्य प्राण्यांचे निकृष्ट निवारा	
4.	स्वच्छ दूध उत्पादनाबाबत योग्य ज्ञानाचा अभाव	
5.	कचऱ्याच्या विल्हेवाटीत समस्या	

क) मायक्रो ट्रेनिंग सेंटर (MTCs) च्या प्रशिक्षणार्थींनी मिळवलेले ज्ञान (3 पॉइंट कॉन्टिन्युम):

Questionnaire

Name: **MTC Village:**

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1) What are the different varieties of fodder?

a) Maize b) Jowar c) Berseem d) All of the above

2) How much amount of colostrum we should feed to the calf?

a) 10% of body weight b)15%of body weight c) more than 15% of body weight

3) After how many hours of birth, a newly born calf should be feed colostrum?

a) within 1-2 hours b) within 3-4 hours c) more than 4 hours

4) How much additional concentrate feed should be given to a pregnant cow/ buffalo at 7-8 months of pregnancy?

a) 1 kg concentrate feed b) 1.5 kg concentrate feed c) 2kg concentrate feed

5) How do you take care of the pregnant animal?

a) Separate the pregnant animal from the rest of the animals b) Prevent a pregnant animal from being injured by slipping on a stable floor c) Both a and b

6) After how many days of insemination, cow or buffalo should be checked for pregnancy?

a) Between 45-60 days b) Between 61-90 days c) More than 90 days

7) Time of insemination in cattle or buffalo?

a) Between 12-18 hours after the onset of heat b) Between 18-24 hours after the onset of heat c) Immediately after the onset of heat d) After 24 hours of the onset of heat

8) After how many days does cattle/ buffalo repeats its heat cycle?

a) 21 days b)14 days c) 30 days

9) When should cow or buffalo be served after calving?

a) Within 60- 90 days b) 90-120 days c) More than120 days

10) how much time does a cow or buffalo usually take to drop the placenta after calving?

a) After 12-24 hours b) After 24 hours c) After 36 hours

11) What is the ration of heifer?

a) Required less amount of nutrient for its growth b) Require additional nutrients for its growth c) Same concentration as a maintenance ration for its growth

12) At what age heifer shows its first heat?

a) 15 months b) 12-14 months c) 18 months d) 20 months

13) What is balance feeding?

a) Feeding of various feed ingredients in proportionate quantity according to the age and body weight of an animal

b) Feeding of green fodder and concentrate c) Feeding of concentrate mixture

14) Ration For Lactating Animals above 5 litre/day of milk?

a) 1 kg concentration for 3ltr. extra milk b) 1kg concentrate for 2ltr. extra milk c) 1kg concentrate for 1ltr. extra milk

15) In which form a mineral mixture should be given?

a) Mineral brick b) Powder form c) Liquid form d) All of the above

16) How to prepare a total mixed ration?

a) Green fodder + dry fodder + concentrate b) Green fodder + concentrate c) Dry fodder + concentrate d) Dry fodder + green fodder

17) Which is the best fodder for the preparation of silage?

a) Maize b) Lucerne+ Berseem c) Napier d) other fodder

18) Objective of Silage Making?

a) To preserve green fodder b) To preserve dry fodder c) To preserve concentrate d) To preserve green & dry fodder

19) Time is required for silage making?

a) 30-45 days b) 60-80 days c) 80- 100 days d) Above 100 days

20) Different Ingredients in Silage Making?

a) Green Fodder, Salt, Molasses b) Dry Fodder, Green Fodder, Salt c) Salt & Green Fodder

21) **Benefits of Total Mixed Ration & Silage in the Feed?**

a) Minimum Wastage of Feed b) Easy for Digestion c) Both a & b

22) **Benefits of Chaffed Feed?**

a) To minimize the feed wastage b) It saves the energy of the animal c) To increase the palatability of feed d) All of the above

23) **Minerals are essential for?**

a) Growth b) Production c) Reproduction d) All of the above

24) **Most suitable time for deworming is**?

a) Before vaccination b) Pre-monsoon c) Both a & b

25) **Vaccination is used to?**

a) To prevent the disease b) To produce active immunity c) Both a & **b**

26) What are the symptoms of mastitis?

a) Hot, painful and swelling of the udder b) Change the color of milk to yellowish or brownish c) Flakes/clots found in milk d) All of the above

27) **CMT test is used for the diagnosis of?**

a) **Mastitis** b) Brucella c) Foot & Mouth Disease d) Haemorrhagic Septicemia

28) **Methods for prevention of mastitis involve?**

a) Udder Cleaning b) Teat Dipping c) Complete milking d) All of the above

29) **What are the types of housing systems?**

a) Loose Housing b) Head-To-Head c) Tail-To-Tail d) All of the above

30) How much dry period one should allow for a lactating, pregnant cattle/ buffalo?

a) 51-60 days b) 41 -50 days c) 31-40 days

31) **Steps in Clean Milk Production Practices include?**

a) Udder Cleaning b) Mopping with Cotton Cloth c) Teat Dipping in KMNO4 d) Daily Wash Milking Animal e) All

32) Which method do you follow for cleaning the milk pail?

a) Rinse the pail with a weak detergent solution and then wash with warm water b) Wash the pail with warm water c) Wash the pail with ordinary water

33) **Which method do you follow for milking?**

a) Full Hand b) Knuckling c) Stripping d) Machine milking e) all of the above

34) For how much time animal should be kept standing after milking?

a) Keep it standing for 15-30 minutes by offering feed b) Keep it standing for 30 min to 1 hour c) Keep it standing for more than 1 hour by offering feed

35) How do you dispose of cow/buffalo dung?

a) Biogas production b) Fertilizer c) To make land fertile d) All of the above

36) Biogas can be produced from?

a) Waste b) Dung c) Cow urine d) All of these

प्रश्नावली

नाव: गाव:

1) चाऱ्याच्या विविध जाती कोणत्या आहेत ?

अ) मका ब) ज्वारी क) बरसीम ड) वरील सर्व

2) वासरांना चीक किती देता ?

अ) १० % वजनांप्रमाणे ब) १५ % वजनांप्रमाणे क) १५ % पेक्षा अधिक वजनांप्रमाणे

3) वासरू जन्मल्यानंतर किती तासांनी त्याला चीक पाजायला पाहिजे ?

अ) १ ते २ तासांमध्ये ब) ३ ते ४ तासांमध्ये क) ४ तासांपेक्षा अधिक

4) ७ व ८महिन्याच्या गाभण गाई व म्हैसीला गाभणकाळात अतिरिक्त किती खुराक द्यायला पाहिजे ?

अ) १ kg खुराक ब) १.५ kg खुराक क) २ kg खुराक

5) गाभण जनावराची काळजी कशी घेता ?

अ) गाभण जनावराला वेगळं ठेवणे ब) जखम होणे व पाय घसरन्यापासून थांबवणे क) अ आणि ब दोन्ही

6) गाय किंवा म्हैस रेतन केल्यावर किती दिवसांनी गाभण आहे का नाही तपासायला पाहिजे ?

अ) ४५ ते ६० दिवसादरम्यान ब) ६१ ते ९० दिवसादरम्यान
क) ९० दिवसापेक्षा अधिक

7) गाय किंवा म्हैशीचे रेतन करण्याची योग्य वेळ ?

अ) माजावर आल्यावर १८ ते २४ तासात ब) माजावर आल्यावर १२ ते १८ तासात क) माजावर आल्यावर २४ तासानंतर
ड) माजावर आल्यावर लगेच

8) जनावर किती दिवसांनी परत माजावर येते ?

अ) २१ दिवस ब) १४ दिवस क) ३० दिवस

9) गाय किंवा म्हैशीचे विल्यानंतर किती दिवसांनी रेतन करता ?

अ) ६० ते ९० दिवसांदरम्यान ब) ९० ते १२० दिवसांदरम्यान
क) १२० दिवसापेक्षा अधिक

10) विल्यानंतर गाय व म्हैसीचा किती वेळानी झार पडायला पाहिजे ?

अ) १२ ते २४ तासानंतर ब) २४ तासानंतर क) ३६ तासानंतर

11) कालवडीचा आहार काय असतो ?

अ) त्याच्या वाढीसाठी कमी प्रमाणात पोषक तत्वांची आवश्यकता असते ब) त्याच्या वाढीसाठी अतिरिक्त पोषक तत्वांची आवश्यकता असते क) त्याच्या वाढीसाठी देखभाल आहार प्रमाणेच खुराक

12) कालवडीचे माजावर येण्याचे वय काय असते ?

अ) १५ महिने ब) १२ ते १४ महिने क) १८ महिने ड) २० महिने

13) संतुलित आहार म्हणजे काय ?

अ) जनावरांच्या वयानुसार आणि शरीराच्या वजनानुसार विविध खाद्य घटकांना समांतर आहार देणे
ब) हिरवा चारा आणि खुराक देणे क) खुराक देणे

14) ५ लिटर पेक्षा जास्त दूध देणाऱ्या गाई व म्हैसीला अतिरिक्त किती खुराक द्यायला पाहिजे ?

अ) १ kg खुराक ३ लिटर अतिरिक्त दुधाला ब) १ kg खुराक २ लिटर अतिरिक्त दुधाला क) १ kg खुराक १ लिटर अतिरिक्त दुधाला

15) खनिज मिश्रण कोणत्या स्वरूपात देता ?

अ) चाटन वीट ब) पावडर स्वरूपात क) द्रव्य स्वरूपात ड) वरील सर्व

16) संपूर्ण मिश्रित आहार (TMR) कसा तयार करतात ?

अ) हिरवा चारा + सुका चारा + खुराक ब) हिरवा चारा + खुराक

क) सुका चारा + खुराक ड) हिरवा चारा + सुका चारा

17) मुरघास तयार करण्यासाठी कोणता चारा सर्वोत्कृष्ट आहे ?

अ) मका ब) ल्युसर्न आणि बरसीम क) नेपियर
ड) इतर चारा

18) मुरघास बनवण्याचे उद्दिष्ट ?

अ) हिरवा चारा जतन करणे ब) कोरडा चारा जतन करणे

क) खुराक जतन करणे ड) हिरवा, खुराक आणि कोरडा चारा जतन करणे

19) मुरघास तयार होण्यासाठी लागणारा वेळ ?

अ) 30-45 दिवस ब) 60-80 दिवस क) 80-100 दिवस ड) 100 दिवसांपेक्षा अधिक

20) मुरघास बनवण्याचे वेगवेगळे साहित्य ?

अ) हिरवा चारा, मीठ, गुळाचे पाणी ब) सुका चारा, हिरवा चारा, मीठ क) मीठ आणि हिरवा चारा

21) खाद्यामधील संपूर्ण मिश्रित आहार आणि मुरघासचे फायदे ?

अ) खाद्याचा किमान अपव्यय ब) पचनास सोपे क) अ आणि ब दोन्ही
ड) वरीलपैकी काहीही नाही

22) बारीक चाऱ्याचे फायदे कोणते आहेत ?

अ) खाद्याचा अपव्यय कमी करण्यासाठी ब) जनावरांच्या ऊर्जेची बचत होते क) खाद्याची रुचकरता वाढवण्यासाठी ड) वरील सर्व

23) खनिजाचे फायदे कोणते आहेत ?

अ) शरीराची वाढ ब) उत्पादन क) प्रजनन
ड) वरील सर्व

24) जंतनाशकासाठी सर्वात योग्य वेळ कोणती आहे ?

अ) लसीकरणापूर्वी ब) मान्सूनपूर्व क) अ आणि ब दोन्ही

25) लसीकरण कशासाठी वापरले जाते ?

अ) रोग टाळण्यासाठी ब) सक्रिय प्रतिकारशक्ती निर्माण करण्यासाठी
क) अ आणि ब दोन्ही

26) कासदाह / दगडी रोगाची लक्षणे कोणती आहेत ?

अ) सडामध्ये सूज येणे व सड गरम आणि त्रासदायक होणे ब) दुधाचा कलर पिवळा व तपकिरी होणे क) दुधामध्ये गाठी आढळून येणे
ड) वरील सर्व

27) कॅलिफोर्निया स्तनदाह चाचणी कशासाठी वापरली जाते ?

अ) कासदाह / दगडी रोगासाठी ब) ब्रुसेला क) पायाचे आणि तोंडाचे आजार ड) घटसर्प

28) स्तनदाह प्रतिबंधक पद्धतीमध्ये कशाचा समावेश आहे ?

अ) कासेची साफसफाई ब) थन धुवणे क) पूर्ण दूध काढणे
ड) वरील सर्व

29) गोठा तयार करण्याचे कोणते प्रकार आहेत ?

अ) मोकळा गोठा ब) डोके कडे डोके क) शेपूट कडे शेपूट
ड) वरील सर्व

30) दूध देणाऱ्या गाभण गाई/म्हैशीला भाकड काळ किती द्यावा ?

अ) ५१ ते ६० दिवस ब) ४१ ते ५० दिवस क) ३१ ते ४० दिवस

31) स्वच्छ दूध उत्पादन करण्याच्या पद्धतींमध्ये कशाचा समावेश होतो ?
अ) कासेची साफसफाई ब) थन सूती कापडाने पुसणे क) KMNO4 मध्ये सड बुडविणे

ड) दूध देणारे जनावर दररोज धुणे इ) वरील सर्व

32) दुधाचे भांडे धुण्यासाठी खालील पैकी कोणती पद्धत वापरता ?

अ) सोडा व गरम पाण्याने भांडे धुवून घेणे ब) गरम पाण्याने भांडे धुवून घेणे
क) साध्या पाण्याने भांडे धुवून घेणे

33) दूध काढण्यासाठी कोणती पद्धत वापरता ?

अ) पूर्ण हात ब) नॅकल क) स्ट्रिपिंग ड) मशीन
इ) वरील सर्व

34) दूध दिल्यानंतर जनावराला किती कालावधीसाठी उभं ठेवायला पाहिजे ?

अ) आहार देऊन १५ ते ३० मिनिटे उभं ठेवायला पाहिजे ब) आहार देऊन ३० मिनिटे ते १ तास उभं ठेवायला पाहिजे क) आहार देऊन १ तासांपेक्षा अधिक उभं ठेवायला पाहिजे

35) शेणाचे व्यवस्थापन कसे करता ?

अ) बायोगॅस बनवण्यासाठी ब) खतासाठी क) जमिनीची सुपीकता सुधारण्यासाठी ड) वरील सर्व

36) बायोगॅस कशापासून तयार करता येतो ?

अ) कचरा ब) शेण क) गोमूत्र ड) हे सर्व

VITA

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The author also actively participated in various activities of the department viz. training programs related to scientific goat and dairy farming, animal health, disease diagnosis, treatment and vaccination camp, awareness programs and exhibitions, etc.

With the vital support and guidance of his guide, he is able to complete his thesis work. The author can be contacted at kambleavinash54@gmail.com

THESIS ABSTRACT

a)	Title of thesis	:	**"KNOWLEDGE GAINED BY DAIRY FARMERS THROUGH MICRO TRAINING CENTRES (MTC'S): A SUMMATIVE EVALUATION"**
b)	Full name of student	:	**KAMBLE AVINASH CHANDRAKANT**
C)	Name and Address Advisor/ Guide	:	**Dr. VAISHALI V. BANTHIYA** Assistant Professor& Head Department of Veterinary and Animal Husbandry Extension Education, Nagpur Veterinary College, Nagpur.
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ABSTRACT

The present study entitled **"KNOWLEDGE GAINED BY DAIRY FARMERS THROUGH MICRO TRAINING CENTRES (MTCs): A SUMMATIVE EVALUATION"** was carried out in the purposively selected

Nagpur, Wardha and Amravati districts of Maharashtra. Three Micro Training centres established by the Maharashtra Animal and Fishery Sciences University with the financial support of National Dairy Development Board, Gujrat were selected for studying the dairy farmers being trained through these MTCs.

Randomly selected 80 dairy farmers from each MTCs were included to make the final sample of 240 respondents. A pre-tested structured interview schedule was employed in conjunction with personal interview approaches, observations, and information from study reports.

The findings revealed that the majority of the respondents were from middle age group (63.75 %), with education up to secondary school (50.83%), were males (95.83%) from OBC category (56.25%), with medium family size (60.83%), having joint families (75.00%), were married (86.70%), with medium land holding (56.25%), had large herd size (87.50%), with high medium milk production (43.33%), milk sale (46.25%), were from medium annual income group (62.5%), relying on television for extension contact (68.75%), with cent percent of them attending an animal husbandry related training.

Regarding the effectiveness of training it is indicated that the highest mean score was given for presentation/training imparted by the MTCs farmer (4.97) followed by Relevance of the Course (4.90), Facilities for Training (4.80), Clarity of Explanation (4.37), Training Environment (4.25), Coverage of Training Objectives (4.23) Boarding Facilities (4.20), Handling of Sessions (4.00) and the lowest mean score was for Practical Exposure (3.69). The Overall Effective Index Mean Score was (87.58) for the effectiveness on different aspects of training components.

The dairy farmers attending the training at MTC, Wardha showed the maximum gain in knowledge at a mean score of 40.72 per cent followed by 38.78 per cent and 38.26 per cent for farmers trained at MTC, Nagpur and MTC, Amaravati respectively.

Major constraints reported by dairy farmers were inadequate knowledge about the scientific feeding of dairy animals, high cost of vaccines and medicine, lack of good quality semen and inadequate knowledge about clean milk production.

प्रबंध सारांश

अ.	प्रबंधाचे शिर्षक	:	**“मायक्रो प्रशिक्षण केंद्राच्या माध्यमातून दूध उत्पादक शेतकऱ्यांना मिळालेले ज्ञानः सारांशात्मक मूल्यांकन”**
ब.	विद्यार्थ्याचे पुर्ण नाव	:	**कांबळे अविनाश चंद्रकांत**
क.	मार्गदर्शकाचे नांव व पत्ता	:	**डॉ. वैशाली वी. बांठिया** सहाय्यक प्राध्यापक व विभाग प्रमुख पशुविज्ञान व पशुसंवर्धन विस्तार शिक्षण विभाग, नागपुर पशुवैद्यक महविद्यालय, नागपुर
ड.	प्रदान करण्यात येणारी पदवी	:	**स्नातकोत्तर पदवी (एम.व्ही. एस. सी.)**
इ.	पदवी प्रदान करण्याचे वर्ष	:	**२०२३**
फ.	मुख्य विषय	:	**पशुविज्ञान व पशुसंवर्धन विस्तार**
ग.	प्रबंधातील एकुण पृष्ठे	:	**७०**
ह.	सारांशातील एकुण शब्द	:	**३००**
ई.	विद्यार्थ्याची सही	:	
ज.	अग्रेषित करणाऱ्या अधिकाऱ्याची सही, नांव आणि पत्ता	:	**सहयोगी अधिष्ठाता** **नागपुर पशुवैद्यक महविद्यालय,** **नागपुर**

सारांश

“मायक्रो प्रशिक्षण केंद्राच्या माध्यमातून दूध उत्पादक शेतकऱ्यांना मिळालेले ज्ञानः सारांशात्मक मूल्यांकन ” या शीर्षकाचे सध्याचे सर्वेक्षण

महाराष्ट्रातील नागपूर, वर्धा आणि अमरावती जिल्ह्यांमध्ये उद्देशाने निवडले गेले. राष्ट्रीय दुग्ध विकास मंडळ, गुजरात यांच्या आर्थिक सहाय्याने महाराष्ट्र पशू व मत्स्य विज्ञान विद्यापीठाने स्थापन केलेल्या तीन सूक्ष्म प्रशिक्षण केंद्रांची या MTCs द्वारे प्रशिक्षित होणाऱ्या दुग्ध उत्पादक शेतकऱ्यांचा अभ्यास करण्यासाठी निवड करण्यात आली.

प्रत्येक MTCs मधून यादृच्छिकपणे निवडलेल्या ८० दुग्ध उत्पादक शेतकऱ्यांना २४० उत्तरदात्यांचा अंतिम नमुना तयार करण्यासाठी समाविष्ट करण्यात आले. एक पूर्व–चाचणी संरचित मुलाखत वेळापत्रक वैयक्तिक मुलाखत दृष्टिकोन, निरीक्षणे आणि अभ्यास अहवालातील माहिती यांच्या संयोगाने वापरण्यात आले. बहुसंख्य प्रतिसादकर्ते मध्यम वयोगटातील होते (६३.७५%), माध्यमिक शाळेपर्यंतचे शिक्षण (५०.८३%), पुरुष (९५.८३%), OBC श्रेणीतील (५६.२५%), मध्यम कुटुंब आकाराचे (६०.८३%) संयुक्त होते. कुटुंबे (७५.००%), विवाहित (८६.७०%), मध्यम जमीन (५६.२५%), मोठ्या कळपाचा आकार (८७.५०%), उच्च मध्यम दूध उत्पादन (४३.३३%), दूध विक्री (४६.२५%), मध्यम वार्षिक होते उत्पन्न गट (६२.५%), टेलिव्हिजनशी नियमित संपर्क (६८.७५%) १०० टक्के दुग्ध उत्पादक शेतकरी प्रशिक्षणात सहभागी झाले.

प्रशिक्षणाच्या परिणामकारकतेबाबत असे सूचित केले जाते की MTCs शेतकरी (४.९७) द्वारे प्रदान केलेल्या सादरीकरणध्प्रशिक्षणासाठी सर्वोच्च सरासरी गुण दिले गेले (४.९०) त्यानंतर अभ्यासक्रमाची प्रासंगिकता (४.९०), प्रशिक्षणासाठी सुविधा (४.८०), स्पष्टीकरणाची स्पष्टता (४.३७), प्रशिक्षण पर्यावरण (४.२५), प्रशिक्षण उद्दिष्टांचे कव्हरेज (४.२३) बोर्डिंग सुविधा (४.२०), सत्रे हाताळणे (४.००) आणि सर्वात कमी सरासरी गुण प्रात्यक्षिक प्रदर्शनासाठी (३.६९) होते. प्रशिक्षण

घटकांच्या विविध पैलूंवर परिणामकारकतेसाठी एकूण प्रभावी निर्देशांक सरासरी स्कोअर (८७. ५८) होता.

MTCs वर्धा येथे प्रशिक्षणास उपस्थित असलेल्या दुग्ध उत्पादक शेतकर्यांनी सरासरी ४०. ७२ टक्के ज्ञानात कमालीची वाढ दर्शविली, त्यानंतर MTCs नागपूर आणि MTCs अमरावती येथे प्रशिक्षण घेतलेल्या शेतकर्यांनी अनुक्रमे ३८. ७८ टक्के आणि ३८. २६ टक्के मिळवले.

दुग्धोत्पादक शेतकर्यांनी नोंदवलेल्या प्रमुख अडथळ्यांमध्ये दुग्धजन्य जनावरांना शास्त्रोक्त आहार, लसी आणि औषधांची उच्च किंमत, चांगल्या दर्जाचे वीर्य नसणे आणि स्वच्छ दूध उत्पादनाविषयी अपुरे ज्ञान या गोष्टी होत्या.