A study on balanced feeding practices in dairy animals of Mathura district

THESIS SUBMITTED FOR PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE

OF

MASTER OF VETERINARY SCIENCE

IN

VETERINARY AND ANIMAL HUSBANDRY EXTENSION EDUCATION

BY

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Enrolment No V-2573/ 22

COLLEGE OF VETERINARY SCIENCE AND ANIMAL HUSBANDRY

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(2025)

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This is to certify that the thesis entitled **"A study on balanced feeding practices in dairy animals of Mathura district"** submitted by **Dr. Abhijeet Purohit,** Enrolment No. **V-2573/ 22** in partial fulfilment of the requirements for the award of the **Master of Veterinary Science** in **Veterinary and Animal Husbandry Extension Education** of the U.P. Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan, Mathura (UP), India, is a Bonafide research work carried out by him under my supervision and guidance and no part of the thesis has been submitted for any other degree or diploma.

Dated..02/07/2025.....

(Dr. Sanjeev Kumar Singh)
Major Advisor & Chairperson/Professor
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It is certified that the thesis entitled **"A study on balanced feeding practices in dairy animals of Mathura district"** submitted by **Abhijeet Purohit,** Enrolment No. **V-2573/ 22** in partial fulfilment of **Master of Veterinary Science** in **Veterinary and Animal Husbandry Extension Education** at **College of Veterinary and Animal Husbandry , U.P. Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go- Anusandhan Sansthan, Mathura (UP)**, embodies the original work done by the candidate himself. The candidate has carried out his work sincerely and methodically.

We have carefully gone through the contents of the thesis and are fully satisfied with the work carried out by the candidate, which being presented by him for the award of the Degree of this University.

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Veterinary & Animal Husbandry Extension Education

Abbreviation	:	Full Form
%	:	Percentage
&	:	And
/	:	Per
<	:	Less than
>	:	Greater than
AI	:	Artificial Insemination
F	:	Frequency
FAO	:	Food and Agriculture Organization
GDP	:	Gross Domestic Product
Gm	:	Gram
GOI	:	Government of India
Govt.	:	Government
n	:	Number of Observations
NDDB	:	National Dairy Development Board
PRA	:	Participatory Rural Appraisal
RBQ	:	Rank Based Quotient
Sq. Km.	:	Square Kilometer
Std.	:	Standard Deviation
U.P.	:	Uttar Pradesh
SMS	:	Short Message Service
TV	:	Television
ICT	:	Information and Communication Technology
KVK	:	Krishi Vigyan Kendra
SAU	:	State Agricultural University

CV	:	Coefficient of Variation
SE	:	Standard Error
SD	:	Standard Deviation
LSD	:	Least Significant Difference
R^2	:	Coefficient of Determination
Chi^2	:	Chi-Square Value
r	:	Correlation Coefficient
P.AD	:	Partially adopted
AD	:	Adopted
N.AD	:	Not adopted

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ACKNOWLEDGMENTS

"Words cannot give full justice to express such of gratitude"

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 expedition a fabulous one. On completion of my dissertation, I would like to share my feelings for those people without whom this would not have been possible.

I owe special debt of gratitude and honors to most respected mentor and my advisor **Dr. Sanjeev Kumar Singh,** Professor, Department of Veterinary & Animal Husbandry Extension, College of Veterinary science and Animal Husbandry, U.P. Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan Sansthan, Mathura (U.P.), for his inspiring guidance, tender hearted approach, motivation, unstinted interest, incessant help, technical guidance and constant encouragement.

I wish to express special regards and thankful to **Dr. Amit Singh,** HOD and **Dr. Pratikshya Panda,** Assistant Professor, Department of Veterinary & Animal Husbandry Extension, College of Veterinary science and Animal Husbandry, DUVASU, Mathura.

I duly acknowledge my sincere thanks to my advisory committee members **Dr. Mamta,** Assistant Professor and **Dr. Ajay Kumar,** Assistant Professor, Department Livestock Production Management for their valuable advice during my research work.

I am very thankful to Prof. (**Dr.)** Hon'ble Vice Chancellor, **Arun Kumar Madan**, Prof. (**Dr.) Archana Pathak**, Dean PGS., and Prof. (**Dr.) Vikas Pathak** Dean of College of Veterinary Science & Animal Husbandry, DUVASU, (Mathura) for their technical and academic support for successful completion of the work.

The assistance provided by the non-teaching staff of the Extension department, Co.V.Sc. & A.H. cannot be forgotten. So, I heartily thank **Mr. Govind Singh Bhandari, Mr. Arun Kumar** for his technical support and **Mr. Damodar Singh** for his help and cooperation

I express my deepest sense of gratitude to the Almighty for bestowing upon me the strength and perseverance to complete this research work successfully. I owe my sincere and heartfelt thanks to my beloved Grandfather Late **Dr. Ganpatraj Purohit** and my grandmother **Mrs. Shakuntaka Purohit** whose blessings and values have always guided me on the right path. Their wisdom and unconditional love have been the pillars of my strength.

I am deeply thankful to my father **Dr. Raja Purohit** and my mother **Sarita Purohit**, who have been the source of constant support, encouragement, and inspiration throughout my academic journey. Their sacrifices and love are beyond words. A special note of gratitude to my uncle and, **Dr. Anandraj Purohit** and my aunty **Mrs. Sangeeta Purohit**, and late **Dr Rajani Joshi** and uncle **Mr. Sunil Joshi**, whose blessings and emotional support have been equally instrumental in motivating me during this journey. Their unwavering belief in me and their continuous prayers have helped me accomplish this milestone. This work is a tribute to all their love, sacrifices, and blessings.

I also wish to place on record my sincere appreciation to **Dr. Rakesh Kumar Goyal**, **Dr. Jitendra Kumar Chaudhary** and **Dr. Jagdish Kumar Vaishnav** for their invaluable support, expert guidance, and kind assistance in the statistical analysis of my research work. Their timely help, suggestions, and encouragement enabled me to carry out the data analysis part of the study efficiently and accurately

I extend my heartfelt thanks to my respected teachers **Dr. Tribhuvan Sharma**, **Dr. Devi Singh Rajput**, **Dr. Maina Dhaka**, **Dr. Neeraj Sharma**, **Dr. Rajesh Nehra**, **Dr. Hariratna Ahuja**, and **Dr. Shyam Garg** for their constant motivation, academic guidance, and moral support throughout my postgraduate journey. Their teaching, mentorship, and encouragement have been a continuous source of inspiration and have significantly enriched my academic learning and personal growth. **I** am thankful to my seniors (Drs) **Uma Shankar Rawat, Pranita Murlidhar Lawale, Ashutosh Mishra, Sudaksha Saraswat, Yashpal Choudhary, Abhishek Gujjar, Anjana nallapati** and my friends (Drs) **Lavish Chelani, Akshat Kaushik, Ankur Pandey, Anuj Sharma** and my lovely **juniors Varsha, Chanda, Dhruv** and **Ravikant** for their kind attitude and help during my research work. And my batch mated, (Drs). Pushpa, Madhav and Dr. Harsh.

I would also like to thank **Mr. Ravi Chauhan** (M/s Student Photostate & Computer) and his team for the support of decorative work added to the manuscript.

I shall fail in my duties if l do not record my sincere thanks to the farmers for providing me all types of reliable data required for the present investigation from Mathura district without whose support and co-operation the work would not have been completed.

Last but by no means least; I am grateful to the grace of **Almighty,** who gave me courage and patience to complete this piece of work.

Date: 02/07/2025

Place: Mathura

Abhijeet Purohit

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Contents

ABSTRACT

The present study was conducted in Mathura district of Uttar Pradesh with the objective to assess the socio-economic profile, awareness and knowledge levels, adoption behaviour, indigenous feeding practices, and constraints associated with balanced feeding practices in dairy animals. A total of 150 livestock owners were selected through random sampling, and data were collected using a structured interview schedule. The results revealed that the majority of respondents were middle-aged, belonged to nuclear families, and had medium-sized herds and medium to high income levels. Knowledge and awareness regarding balanced feeding were assessed using 23 structured questions, wherein 50% of the respondents were categorized under the low knowledge level. Only 6% showed high knowledge, indicating critical gaps in awareness among rural dairy farmers. A significant positive correlation was observed between family size and awareness score ($r = 0.252$, $p<0.01$), suggesting that households with more members exhibited better awareness levels. Conversely, a negative correlation was found with age ($r = -0.162$, $p<0.05$), implying that younger respondents had relatively higher awareness of scientific feeding practices. The overall adoption index of balanced feeding practices was found to be 58.81%, indicating a moderate level of adoption. Among the six innovation attributes analyzed, Predictability (79.83%) and Observability (73.23%) scored the highest, reflecting farmers' confidence in visible and consistent results. In contrast, Trailability (42.00%) and Compatibility (46.00%) recorded lower adoption, pointing towards infrastructural and attitudinal barriers. The study also documented various indigenous feeding practices for managing animal health conditions such as anorexia, bloat, heat stress, and reproductive disorders using locally available ingredients like jaggery, turmeric, fenugreek, and cumin. Major constraints identified were high feed cost, lack of awareness, improper storage, and seasonal fodder unavailability. It is concluded that focused extension strategies, capacity building, and promotion of cost-effective feeding technologies are imperative to bridge the knowledge–adoption gap and enhance sustainable dairy productivity.

Introduction

CHAPTER-1

INTRODUCTION

Balanced ration feeding provides protein, energy, minerals and vitamins from dry fodders, green fodders, concentrates, mineral supplements, etc. in appropriate quantities to enable the animals to lactate optimally and remain healthy. In order to develop a high producing cow, it is necessary to provide balance ration since birth. The concept of balanced feeding is already practiced by most of the developed countries, where the feed resources are available in abundance, herd sizes are much bigger and the livestock owners are better versed with the scientific practices of feeding and management. However, in most of the tropical countries, herd sizes are smaller and dairy farmers follow traditional feeding practices, causing imbalance of nutrients in terms of protein, energy, minerals and vitamins. In view of this, the concept of ration balancing for smallholder dairy farmers in most of the tropical countries has been a challenge owing to their lack of knowledge and skills (Garg and Sherasia, 2015).

Livestock nutrition in India is characterized by poor balanced diets resulting low productivity of livestock. Ration is the amount of feed that is fed to livestock during a 24 hour period. (Garg and Sherasia, 2015).

As per livestock census report, the total bovine population (cattle, buffalo mithun and yak) in India was 302.79 million (2019) with is an increase of about 1% over the previous census. The total number of cattle in the country in (2019) was 192.49 million, showing an increase of 0.8% over the previous census (DHAD, 2019)

Balanced ration should provide protein, energy, minerals and vitamins from dry fodders, green fodders, concentrates, mineral supplements etc., in appropriate quantities to enable the animal to perform optimally and remain healthy (FAO, 2012).

Ration balancing is still a poorly understood subject at farmers' end and therefore requires intervention from experts. However, these interventions are handicapped by limited reach and lack of interactive approach and dynamism. Further, such interventions hardly adapt to local availability of resources.

In dairy, farmers are maintaining indigenous cattle, crossbred cattle and buffaloes for milk production. To get maximum milk yield from the lactating animals, farmer has to ration balanced feed to their animals which fulfils required energy, protein, mineral and vitamin requirement of the body. Farmers incurs 70-75% of total dairy farming expenditure on feeding of the animals. To make dairy farming profitable, dairy farmer has to cultivate green fodder at his own farm. He can prepare silage, when fodder is surplus. He has to get dry fodder and feed ingredients required for concentrate feed preparation from his own farm. To get maximum yield from dairy animals, farmer has to feed greens either in the form of fresh green fodder, silage or hydroponic fodder (Naik & Prafula, 2010).

Cattle and buffaloes requires five basic nutrients like proteins, carbohydrates, lipids, minerals and vitamins. Each nutrient has its own role in the body, like proteins are required for body growth, to fulfil wear and tear of body and also plays important role in milk production. The main sources of proteins are oil cakes like cotton seed cake, groundnut cake, sunflower meal etc. and other sources are seeds and by-products of black gram, red gram, cowpea, oiled or de-oiled rice bran and wheat bran, etc. Carbohydrates are source of energy which required to run the basic activities of the body. Fats are another source of energy which provides almost 2.5 times more energy than proteins and carbohydrates.

Animals get fats from oil seed cakes and feed supplement like bypass fat. The main sources of carbohydrates are grains like jowar, pearl millets, maize, etc. Maize grain has a higher energy content than other grains hence in most of the animal feeds, ground maize is used as source of energy (13.5MJME/Kg DM). About 15 minerals are required for the good production and reproduction of dairy animals like Calcium, Phosphorus, Magnesium, Sulphur, Copper, Cobalt, etc. Dairy animals can make some vitamins in their own body like B complex, Vitamin C, Vitamin K and Vitamin D in the presence of sunlight but externally we have to provide Vitamin A and Vitamin E. These vitamins are fulfilled either through green fodder or mineral mixture.

Now a days chelated mineral mixture / mineral licks are available in the market. As per the recommendations of manufacturing companies, mineral and vitamin supplement should be given to all type of animals i.e. bulls, heifers, pregnant and lactating animals, etc. Daily feeding of mineral mixture improves milk production

and improves reproductive efficiency of male and female animals. Feeding of mineral mixture improves growth and development in calves and heifers hence heifers show early puberty. It helps to improve feed intake and improves immunity of the animal. Modes of delivering ration balancing services like literature, expert consultancy, information broadcasting modes (newspapers, television, radio, SMS) don't satisfy all of the above-mentioned criteria and therefore have limited usability and impact (Patel and Patel, 2016; Belakeri et al., 2017).

Farmers feed their animals based on their traditional knowledge and information passed through generations with crop residues, locally available one or two feed ingredients like brans, oil-cakes, chunnies, grains etc. and seasonally available green fodders. They rarely offer mineral mixture to their animals or in a very less quantity of 25g to 50g per day. In most of the cases, the quantity of feed/fodder offered to animals is either more or less than the requirements. This leads to an imbalance of protein, energy and minerals in their ration. Animals on such imbalanced ration produce milk sub-optimally, cost of milk production is higher and it affects the health and fertility of animals. Therefore, it is necessary to educate farmers on feeding of balanced ration.

If livestock is not fed scientifically proven balance ration, than it may result in low milk production, poor growth and reproduction , milk production of animals will be lower than their genetic potential, shorter lactation length and increased inter-calving period (Devaki and Mathialagan, 2015). Therefore, the following study was purposed to investigate the following objectives:

1) To study the socio-economic and socio personal profile of respondents
2) To study the awareness and knowledge level of respondents pertaining to balanced ration feeding in dairy animals
3) To study the adoption level of respondents in relation to feeding of scientific balanced ration in dairy animals
4) To study alternate indigenous feeding practices adopted by respondents to improve productivity of dairy animals
5) To study various constraints faced by dairy farmers in feeding balanced ration in dairy animals

Review of Literature

CHAPTER-2

REVIEW OF LITERATURE

1) Age

Bala et al. (2023) majority (44.50%) of the respondents were middle aged followed by young (38.00%) and old (17.50%). Middle age is considered as productive time period in the life of an individual; moreover, younger generation is innovative in taking up dairy farming to new stature.

Jadhav et al. (2021) revealed that most of the dairy farmers were in the middle age group (68.32%) and very few of them could be grouped under young and old age group (15-16%).

Sammaiah (2020) from his study indicate that majority (51.66%) of the respondent belonged to 29-37 years, followed by 20-28 years with 48.33%.

Deka et al. (2019) from his study concluded that 53% of rural women and 49% rural men respondents belonged to middle age group (between 36 to 50 years of age).

Mishra (2019) observed that of dairy farmers (43.34%) were of medium age group i.e. 36-50 years followed by 31% of dairy farmers were from old age category (51-65 years) and remaining one fourth were from young age category.

Mittal (2018) found that majority of the respondents were in the age group of 29-39 years, married, belonged to nuclear and service class families, users of android operating system and having 20-36 apps in their mobile phones.

Warthi (2017) revealed that majority of the respondents (48.34%) belonged to medium age group (35-50 years), followed by 35.84 percent and 15.82 percent in young age and old age category respectively.

Rathod et al. (2016) revealed that majority of the dairy farmers in the study area belonged to the medium age group, ranging from 35 to 61 years.

Kabir (2015) stated that majority (60%) of the respondent's belonged to young age group followed by middle age (27.80%) and old age (12.20%) group.

2) Experience in livestock farming

Sureshbhai (2022) found that nearly two-fifth (38.66%) of the dairy cattle farmers had medium level of experience in dairy farming, followed by 36.68 and 24.66 percent of them had high and low level of experience in dairy farming respectively.

Usadadiya (2021) indicated that majority (53.89%) of the dairy farmers had high level of experience in dairy farming, followed by 38.89 percent and 7.22 percent of them had medium and low level of experience in dairy farming respectively.

Jadhav (2021) revealed that most of the respondents (69.17%) had medium level of experience followed by high level of experience (15.83%) and low level of experience (15.00%).

Kumari (2020) concluded that majority (65.83%) of the dairy farmer were categorized under medium dairy farming experience against 17.50 percent and 16.67 percent under high and low categories respectively.

Singh (2019) observed that majority (51.25%) of the dairy farmers were having low experience in dairy farming ranging between 10 to 20 years followed by 23.75 percent respondents with high experience, 15 percent with moderate and 10 percent with very high experience in dairy farming.

Sulakhe (2018) from his study concluded that almost all (90.00%) the respondents had medium level of experience in goat farming followed by high (06.66%) and low (03.33%) experience.

Sahu et al. (2017) revealed that majority of the dairy farmers (65.72%) had medium (08 to 26 years) dairy farming experience, followed by 17.14 percent had low (up to 07 years) and an equal percent of the respondents (17.14%) had high (above 26 years) level of experience.

Belakeri (2016) in his study conducted in Karnataka observed that majority of respondents 66.66% had low experience followed by medium 20.84% and high 12.50% livestock farming experience which is 1-10 years, 11-20 years and 21-30 years respectively.

Sangappa (2015) observed that majority (80.84%) of the dairy stakeholders had high level of experience on dairying, followed by medium (10.83%) and remaining (8.33%) of respondents had low level of experience.

Vidya et al. (2010) in their study reported that 56.67% respondents had more than 12 years of experience, 26.67% had 6 to 12 years' experience and 16.67% had less than 6 years of dairy farming experience.

Raja shekhar M et al. (2017) Majority (61.0%) of dairy farmers in both production systems had medium experience followed by low (24.0%) and high (16.0%) experience in dairy farming with an average experience of 16.79 years.

3) Family size

Upadhyay and Desai (2011) observed that the majority of the 68.33 per cent of the dairy farm women had big family size and 31.67 percent small family size

Meena et al. (2012) reported that 62.67 percent of the dairy farmers had 5-8 family members followed by 21.00 percent with less than 5 family members while 16.33 per cent had more than 8 members.

Gami et al. (2013) observed that majority 53.33 percent of the respondents had medium size family (5-8) followed by large size 32.67 percent (more than 8 members) and 14.00 percent had small size family (up to 4 members).

Patel, & Yadav (2013) showed that most of the dairy farmers i.e, 62.50 per cent had medium family size followed by 21.30 percent have small family size whereas, 16.30 percent had large family size.

Sasane et al. (2013) revealed that majority of respondents 72.73 percent had medium family size.

Lohakare et al. (2015) showed that majority of dairy farmers i.e. 81.43 per cent were having medium family size i.e. 4 to 9 members, followed by 11.42 having big family size and only 7.15 percent had small size families.

Mane et al. (2016) found that more than half of the farmers had medium family size (5 to 9 members) followed by small family size, while 17.00 per cent belonged to the category of large family size with more than 10 members.

Chandrasekar et al. (2017) revealed 51.67 percent of the respondents lived in medium sized families whereas, 38.33 percent were reported to be having small families with two to five members per family. He further revealed that the majority of the respondents were male 94.00 percent and middle aged 58.00 percent with most of them are literates 87.50 percent.

Gopi et al. (2017) in their study found nearly three-fourth (73.33 percent) of the farmers had up to 5 members whereas, the remaining 26.67 per cent had more than 5 members in their family.

Pathade et al. (2017) in their study found that majority of the families (58.34 percent) were having small family size of upto 4 members and about 33.33 per cent of the respondents belonged to medium sized families (5-7 members).

Sahu et al. (2017) revealed that 56.43 percent of the dairy farmers had medium family size (5 to 8 members) whereas, 29.28 per cent of dairy farmers belonged to small family size (up to 4 members) and 14.29 per cent of dairy farmers belonged to large family size (above 8 members).

Hannure et al. (2018) observed that the male majority, i.e., 66 per cent were from middle age group and belonging to general category and 83.3 percent belonged to joint family of large size having more than 4 members with average family size of 6.33 members. All farmers were having small land holding, 41.67 per cent farmers were having large land holding with an average land holding of dairy demonstration farm (DDF) is 3.54 acres.

Koli et al. (2019) observed that 49.00 per cent of the dairy farmers had medium family size (5 to 7 members).

Patel et al. (2020) revealed that majority (68.33%) of the respondents had medium size family (65.56%) followed by small size family (21.11%) and big size family (13.33%).

Kankarne et al. (2017) found that 68.50 per cent of dairy farmers were from medium family (5 to 8 members), 16.50 per cent were from small family (upto 4 members) and only 15.00 per cent of dairy farmers were from large family (9 and above members). The reason behind highest percentage of medium family size may be attributed to the traditional social structure.

4) Family type

Hamadani et al. (2020) observed that 75.32% dairy farmers lived in nuclear families whereas the remaining 24.68% had joint families. Based on size, 22.89, 56.49 and 20.62% farmers had small, medium and large families respectively. Average nuclear and joint family was observed to have 5.07±0.07 and 12.40±0.40 members respectively. On an average, family comprised of 2.18±0.05 adult males 2.32±0.05 adult females, 1.16±0.05 ± male children and 0.95±0.06 female children.

Mane et al. (2015) reported that more than half of the farmers were of medium family size followed by small family size, while 17 percent belonged to the category of large family size.

Ram et al. (2018) conducted a study on the socio-economic profile of unorganized dairy farmers in Junagarh district of Gujarat. They reported that majority (62.5%) of dairy farmers from the middle aged group were illiterate (44.50%), had nuclear type of families (89%), agriculture and animal husbandry as major occupation (64%), medium size of land holding (37%). It was also found that majority (65.5%) of the farmers used mass media for obtaining information about dairy farming practices and were having medium experience in dairying (63.50%

Kaur et al. (2011) found that majority of respondents 63.00 percent belonged to joint families.

Rathod et al. (2011) reported that majority of farm women lived in joint family 65.00 percent while 35.00 percent lived in nuclear family.

Badodiya et al. (2012) observed that majority of the beneficiary respondents 69.33 percent had nuclear family.

Kiran et al. (2012) studied empowerment of rural women in agriculture and found that majority of respondents (67.00%) belonged to joint family.

Kathiriya et al. (2013) observed that common farm women lived in joint family i.e. 65.00 percent while, 35.00 per cent lived in nuclear family.

Chauhan et al. (2015) indicated that most of the dairy farmers 54.40 percent lived in joint family followed by nuclear family 45.60 percent.

Kumari et al. (2015) in their study on socio-personal and socio-economic profile of respondents revealed that majority of the respondents had medium family size and belonged to joint family.

Mahla et al. (2015) observed that 61.87 percent of the dairy farmers had joint family and 38.13 percent had nuclear family with less than four members in Jalore district of western Rajasthan state.

Rathod and Damodar (2015) studied impact of MAVIM activities on empowerment of rural women and found that great majority of women respondents i.e. 85.00 percent had nuclear type of family.

Bhanotra et al. (2016) revealed that in Kathua district of Jammu and Kashmir state 56.67 and 43.33 percent dairy farmers were having joint families with more than seven members and nuclear families with less than five members, respectively.

Sabapara et al. (2016) in their study reported that majority 58.33 percent of dairy owners belonged to nuclear type of family and 41.67 percent to joint type of family.

Gopi et al. (2017) in their study reported that nearly three-fourth, i.e 70.83 per cent of the farmers was from nuclear family, while the rest 29.17 percent were from joint family.

Chandrasekar et al. (2017) observed that the respondents lived in nuclear family *i.e.* 77.00 percent. Respondents were having huge animal husbandry experience 46 percent but had no revelation to formal training. Agriculture and animal farming was found 93.00 per cent in their occupation, low annual income was 50.00 per cent and were marginal land holders, *i.e.,* 89.00 percent.

5) Education

Shukla et al. (2022) concluded that highest number of respondents were educated up to middle level education occupying highest percentage, i.e., 27.78 % followed by primary, secondary, higher secondary and graduation or above were 21.11%, 15.56%, 12.22%, 13.33% respectively and very less percentage of them (10%) of them were illiterate.

Jadhav et al. (2021) revealed that most of the dairy farmers have attended secondary education (39.17%), followed by higher secondary education (30%),

graduation (29.17%), and very few respondents were educated up to primary level (1.66%).

Sammaiah (2020) revealed that majority of the respondents (53.33%) were graduates followed by intermediate education (25.00%), up to high school (13.33%) and post graduate (8.33%).

Ghatare (2019) found that no farmer is illiterate and all of them were equal to or above the middle school education level. It was found that 4.00% of farmers were under middle school education level, about 47.00% of farmers were under high school education level, 22.00% of farmers were higher secondary school level and 27.005 of farmers were graduate and above.

Rajadurai (2018) concluded that 80.00 percent of dairy farmers were educated, whereas 19.10 percent were uneducated. Among educated dairy farmers, 38.20 percent studied up to secondary level and meager number of graduates (4.50%) was involved in dairy farming.

Warthi (2017) revealed that 2.5 percent of the respondents were illiterate, followed by 0.83 percent, 6.66 percent, 8.33 percent, 29.16 percent, 24.16 percent, and 28.33 percent who were functionally literate, up to primary, middle, secondary, higher secondary, and graduate and above respectively.

Singh (2016) revealed that 30.39 % respondents were literate up to secondary level followed by 29.42% educated up to matric standard.

George and Kumar (2015) stated that most of the farmers (37.50%) had completed secondary education, followed by 31.6% have completed graduation.

Raksha (2014) in her study found that majority of the respondents (69%) were illiterate followed by primary (22%), middle (6%) and high school (3%).

6.) Occupation

Shukla et al. (2022) observed that farming occupies 47.78 % followed by farming and livestock together, farming and allied business, farming and labourer work and farming and services as 17.78 %, 14.44 %, 13.33 %, and 6.67 % respectively.

Jadhav (2021) observed that over 80 % of the participants opted dairy farming as subsidiary occupation and less number of respondents (19.17%) having dairy

farming as the main occupation.

Sammaiah (2020) concluded that in case of main occupation majority of the respondents (38.33%) were having agriculture, followed by sheep and goat (33.33%), business (11.66%), labor (10.00%) and service (6.67%). In case of subsidiary occupation, majority of the respondents (30.00%) were labourers, followed by sheep and goat, agriculture, poultry, dairy farmers, business, and service 25.00%, 20.00%, 11.66%, 10.00%, 1.66%, and 1.66% respectively.

Ghatare (2019) observed that 84.00% of farmers had agriculture and dairy as their main occupation, while 9.00% respondents had dairying as a primary occupation followed by 7.00% of respondents involved in dairying along with poultry and business.

Choudhary et al. (2018) found that majority (65.83%) of dairy farmers had dairying and agriculture occupation whereas 21.67 and 12.50 percent of dairy farmers were having dairying, agriculture and other occupations followed by dairy farmers.

Warthi (2017) revealed that all the respondents had dairy as their main occupation followed by 89.17 percent, 25 percent, 9.17 percent, and 4.17 percent respondents were also involved in agriculture, service, business and labor respectively along with dairy as their main and primary occupation.

7.) Annual income

Singh (2022) observed that maximum number of respondents (55.43%) had high annual income followed by 41.65 percent respondents had medium annual income and only 02.92 percent respondents had low annual income.

Jadhav (2021) reported that majority (66.67%) of the respondents had earned higher level of annual income (more than 1, 06, 979) whereas 20.00 % were in lower level of income (up to 76,092) and 13.33% fell under medium level income (76,092 to 1, 06, 979).

Mahesh et al. (2020) reported that more than half (53.00%) of dairy farmers had low dairy income followed by 26.00 percent of them had high income and 21.00 percent of them had medium annual income.

Ghatare (2019) revealed that majority (83%) of dairy farmers had medium (30000-330000) income, whereas 03.00% and 14.00% were having low (up to 3000)

and high (more than 330000) income respectively.

Santhoshini (2018) observed that majority of the farmers (52.76%) belonged to medium income category with an annual income of Rs. 40,000 to Rs. 80,000 followed by low income (27.17%) with less than Rs. 40,000 and high (20.07%) income category with more than Rs. 80,000 per annum.

Warthi (2017) revealed that majority of the respondents (46.67%) had medium (200000-600000) income while 40 percent and 13.33 percent were having low (up to 200000) and (more than 600000) income respectively.

Belakeri (2016) majority of the respondents had medium income followed by high (21.66%) and low (20.00%) family income.

8.) Operational Land holding

Singh (2022) observed that most of the respondents (38.75%) were small farmers who had 2.5-5.0 acre land followed by 32.92 percent medium farmers who had land between 5-10 acres, 21.67 percent respondents had land up to 2.5 acres and 06.66 percent had land upto 10 or more than 10 acres.

Jadhav (2021) revealed that majority of the dairy farmers (48.33%) were having semi medium land size followed by small land size (27.50%), medium (09.17%), marginal land size (08.33%), landless category (04.17%) and (2.50%) were in the large land size category.

Khandait (2020) most (72.91%) of the respondents had marginal and small land holding followed by 19.58 percent of farmers are landless. Only around 7.00 percent of the respondents had medium to big size of land holding.

Sammaiah (2020) revealed that majority of the respondents (35.00%) were marginal farmers possessed 0.1 to 1.0 ha, followed by small farmers (30.00%) possessed 1.1 to 2.0 ha, landless farmers (26.66%), medium farmers (8.33%) possessed 2.1 to 4.0 ha.

Singh (2019) concluded that majority of the respondents (36.25%) were having medium land holding, followed by semi medium (27.50%), large (20%) and small (15%) land holdings. Only 1.25 percent farmers were having marginal land holding up to 2.5 acres.

Ram et al. (2018) in his study found that majority (37.50%) of the respondents had medium size land holding followed by 27.50 percent with small land holding and 5 percent with marginal land.

Darshan et al. (2017) observed that 35.00 percent farmers had marginal land holdings (up to 1 ha.) and an equal percent (35.00%) were having small land holding (1-2 ha.) followed by medium (12.00%) semi medium (10.00%) and large (8.00%) land holdings.

Siraj (2016) in his study reported that majority of the respondents (80.00%) had smaller land holdings in Daska where respondents had below 5 hectare of land.

Gour (2015) in their study found that majority of the respondents (64-67%) possessed 1-2 hectare of land and belonged to small farmers category, 22% were landless, while 13.33%, of the respondents had less than 1 hectare of land and fell in the marginal farmer's category.

10.) Herd size

Sureshbhai (2022) from his study concluded that more than two-fifth (44.67%) of the dairy cattle farmers had medium herd size of milch animal, followed by 34.66 and 20.67 percent of them had large and small herd size respectively.

Jadhav et al. (2021) observed that most of the dairy farmers (45.00%) covered under this study were holding medium herd size followed by 34.17% of farmers comes under large herd size and 20.83% of dairy farmers have small herd size i.e. up to 2 animals.

Kumari (2020) concluded that three-fourth (76.66%) of the dairy farmers had medium herd size with 4-14 animals followed by an equal percent of the respondents (11.67%) had low and large herd size.

Ghatare (2019) results show that majority (70.00%) of dairy farmers belonged to medium herd size (5-21) followed by 9.00% and 21.00% who had small (<5) and large (>21) herd size respectively.

Santhoshini (2018) found that more than three fourth of the dairy farmers (77.16%) had medium herd size, followed by large (14.17%) and small (8.66%) herd size in Telangana zone.

Warthi (2017) revealed that majority of the dairy entrepreneurs belonged to the medium herd size (6-10) followed by 24.17 percent and 10.83 percent who had small (<6) and large (>10) herd size respectively.

Belakeri (2016) observed that majority (62.50%) of the respondents belonged to the category of medium herd size followed by small (26.66%) and large (10.84%).

11.) Milk production

Singh (2021) revealed that majority (38.18%) of the respondents had lactating animals that produce 5 to 9 liters of milk per day, followed by 35.45 percent and 26.36 percent of the respondents had lactating animals that produce more than 9 liters and less than 5 liters of milk respectively.

Jadhav et al. (2021) revealed that maximum respondents belonged to medium category of milk production (51.67%) followed by high category (25.83%) and low category (22.50%) of milk production.

Kumari (2020) observed that majority (80.83%) of the dairy farmers were medium milk producers followed by high (10.84%) and low (8.33%) milk producers.

Mahesh et al. (2020) observed that most of the respondents (44.00%) belonged to low milk production category (less than 5 liters/day), 39.00 percent of respondents belong medium milk production category (5-10 liters/day) and only 17.00 percent were belong to high milk production category (more than 10 liters/day).

Sachan et al. (2018) found that 42.00 percent of the respondents were in medium category (8-13 liters/day) of milk, followed by 41.00 percent and 17.00 percent respondents in low (>8 liters/day) and high (<13 liters/day) category of milk production respectively.

Warthi (2017) revealed that majority (74.16%) of the dairy entrepreneur's herd fell in low (<34 liters) category of milk production followed by 21.67% and 4.17% belonged to large (>36) and medium (34-36) category of milk production respectively.

12.) Milk Consumption pattern

Singh (2021) observed that more than half (53.03%) of the respondents consumed 2 to 3 liters of the milk per day which was followed by 36.06 percent

and 10.91 percent of the respondents who consumed less than 2 liters and more than 3 liters of milk per day basis for household consumption purpose. He further reported that majority of the respondents (39.70%) sold 4 to 7 liters of milk per day followed by 35.45 percent and 24.85 percent of the respondents who sold less than 4 liters and more than 7 liters of milk respectively.

Deshmukh (2021) observed that majority of the commercial dairy farming category (80.52%) fall in medium followed by 11.04 percent and 8.44 percent of the respondents had large and small quantity of domestic milk consumption respectively whereas in traditional dairy farming category 80.82 percent, 17.12 percent and 2.06 percent respondents had medium, small, and large quantity of milk consumption respectively.

Warthi (2017) revealed that majority (69.17%) of the dairy entrepreneurs were in small (<3 liters/day/household) category of milk consumption while 17.50% and 13.33% respondents were in medium and high category of milk consumption respectively.

Kumar et al. (2016) reported that maximum number of private dairy and dairy cooperative (59.00% and 68.00%) belonged to low milk consumption category, 32.00 percent members of the private dairy and 17.00 percent members of dairy cooperatives were in the medium milk consumption category while only 9.00 percent of private dairy member and 15.00 percent members of dairy co-operative members were in the high milk consumption category.

Avhad (2011) observed that large number of dairy farmers (54.17%) was in the medium category of milk consumption followed by 20.00 percent and 12.50 percent respondents who had low and high milk consumption respectively.

Nagajan (2021) observed that majority of the dairy farmers (49.00%) were in medium category of milk sale followed by 35.00 percent and 16 percent were in small and large category of milk sale respectively.

Koli et al. (2020) revealed that majority of the respondents (92.50%) had medium level of milk sale category i.e. 12 to 34 liters/day, followed by only 04.50 percent had high (above 34 liters/day) level of milk sale category.

Mahesh et al. (2020b) observed that most of the respondents (39.00%) sold 5- 10 liters/day of milk under the medium category of milk sale and 31.00 percent of them belong to low milk sale category (less than 5 liters/day).

Tatya Saheb (2019) found that majority (92.50%) of the dairy farmers had medium level of daily sale of milk, i.e., 12 to 34 liters followed by 4.50 percent and 3.00 percent had high (above 34 liters/day) and low (up to 11 liters/day) levels of daily sale of milk respectively.

Rai et al. (2017) in their study revealed that majority (45.63%) of the respondents had low level of milk sale, whereas 39.37 percent and 15.00 percent had medium and high level of milk sale respectively.

Warthi (2017) revealed that majority (77.50%) of the dairy entrepreneurs belonged to low (<33) category of daily milk sale while 11.67% and 10.83% of the dairy entrepreneurs had medium (33 to 36) and high (>62) category of daily milk sale respectively.

Singh (2016) found that majority (60.00%) of the respondents were not selling any milk. Only 14.44 percent of the respondents belonging to medium category sold 4-8 liters of milk per day and rest of the respondents had a milk sale of less than 4 liters per day (18.89%) and more than 8 liters per day (06.67%) under low and high sale category groups respectively.

Lohakare et al. (2015) observed that majority (74.76%) of the respondents had medium level of milk sale followed by high milk sale (14.29%) and (10.95%) low milk sale.

Avhad (2011) observed that maximum number (70.00%) of the dairy farmers were selling milk up to 16 to 27 liters per day and fell under category of medium level of milk sale followed by 17.50 percent of farmers who sold milk less than 16 liters per day and 12.50 percent of farmers selling milk more than 27 liters per day.

Social Participation

Shukla et al. (2022) revealed that most of the farmers (36.67%) were having membership of one organization whereas 33.33%, 30.00%, 4.44% were found to be non-participant, participant in more than one organization and public leadership respectively.

Jadhav (2021) revealed that majority of the dairy farmers (75.84%) were members of some organizations/co-operatives and few were not at all a member of any organization (24.16%) and none of the respondents were office bearer.

Singh (2021) reported that majority (56.36%) of the respondents had medium level of social participation, followed by 27.88 percent and 15.76 percent of the respondents had low and high social participation respectively.

Ghatare (2019) concluded that 57.00% of dairy farmers have low level of social participation, followed by 39.00% having medium and 4.00% having high level of social participation.

Warthi (2017) revealed that majority of the respondents (87.50%) having medium level of social participation followed by 12.50 percent having high level of social participation.

Sources of information utilized

Mohammad (2006) revealed that 70.31 per cent of the respondents belonged to medium class and receives information through mass media contact.

Dhole (2009) observed that the nature and occurrence of dairy farm woman applicant in different mass media like radio, exhibition, television and newspaper etc.

Jai Sridhar et al. (2013) revealed that the dairy co-operatives milk market was 38.67 percent and the milk product market was. 31.33 percent. Overall 66.67 percent of the respondent had high information consumption.

Singh et al. (2016) observed that the 89.21 percent farmers met their information requirements from Pashu Palan Mela Animal Welfare Camps and 85.29 per cent got needed information from television and newspapers.

Extension agency contact

Ashwar et al. (2011) revealed that majority 61.00 per cent of the respondents had medium level of extension contact whereas, 23.33 and 15.00 per cent of the respondents had low and high level of extension contacts, respectively.

Upadhyay and Desai (2011) revealed that majority 65.83 per cent of the respondents had medium level of extension contact whereas 22.50 and 11.67 percent of the respondents had high and low level of extension contacts respectively.

Meena et al. (2012) observed that most of farmers (71.67%) had medium level of extension contact followed by low 20.33 percent farmers.

Kale (2012) reported that 55.00 per cent of the women dairy farmers had high extension participation whereas, 26.00 per cent of them had medium, followed by low extension participation by 19.00 percent of women.

Ainlawar et al. (2012) found that majority of respondents (51.66%) had medium extension contact, 26.66 percent of the cattle rearers had high extension contact and meager of respondents (21.66 %) had low extension contact.

Patel et al. (2015) more than one third 31.67 percent of the livestock owners had medium level of extension contact followed by 26.66 percent and 21.66 percent of them had high and very low level of extension contact respectively. Only 11.67 per cent and 08.34 percent of livestock owners had very high and low extension contact.

Sabapara et al. (2016) revealed that majority (70.67%) of the respondents have medium level of extension contacts followed by 17.67 and 11.67 percent with high and low level of extension contacts respectively.

Singh et al. (2016) reported that majority of dairy farmers were in low level of extension contact category to the tune of 89.17 percent whereas, 10.83 percent of them hailed to medium level of extension contact.

Patel et al. (2018) revealed that majority 75.00 percent of the respondents have medium level of extension participation, followed by 15.00 and 10.00 percent with high and low level of extension participation, respectively.

Girish et al. (2020) found that majority (50.55%) of the respondents belonged to low category of contact with extension personnel and mass media exposure enunciated that maximum number of respondents belong to a maximum level 59.44 per cent of contact to mass media.

MASS MEDIA

Singh et al. (2016) reported that 89.21% of the farmers received information through Pashu Palan Melas and animal welfare camps, while 85.29% gained awareness through TV and newspapers, showing high levels of mass media usage for extension services.

Kumar and Singh (2018) found that 62.00% of dairy farmers had medium level of mass media exposure, 24.00% had high, and 14.00% were categorized under low exposure. TV and radio remained major sources, while mobile-based apps were still underused.

Sharma and Yadav (2020) concluded that 59.40% of the respondents had medium mass media exposure, followed by 28.10% with high exposure and 12.50% with low. The study stated that mobile phone-based advisory services significantly boosted awareness where available.

Ali and Verma (2021) observed that 65.20% of farmers used WhatsApp groups and YouTube channels as part of their regular information sources. Among them, 38.00% were categorized under high exposure, 45.00% under medium, and 17.00% under low.

Rani et al. (2017) reported that 68.10% of the dairy farmers had medium access to mass media, mainly through TV and FM radio, while 21.30% had high and 10.60% had low exposure. Mass media access was positively correlated with education and income.

Knowledge and awareness of balanced feeding practices

Reddy and Reddy (2007) indicated that approximately 60% of dairy farmers acknowledged the importance of green fodder, demonstrating a moderate level of awareness. However, knowledge gaps persisted in areas related to mineral supplementation and concentrate feeding. A statistically significant association was found between herd size and awareness levels.

Sharma and Meena (2020) revealed that a substantial proportion of respondents (62.5%) exhibited a high level of awareness pertaining to balanced feeding practices. The study further established a significant association between educational attainment and exposure to mass media with heightened awareness scores.

Patil et al. (2009) reported that 55.11% of respondents had medium knowledge, followed by 24.00% with high knowledge, and 20.89% with low knowledge. Significant positive correlations were observed between knowledge levels and socio-economic factors like education, herd size, income, and milk production, emphasizing the influence of personal attributes on feeding awareness.

Karki and Ansari (2023) reported that out of 240 farmers, 65.00% exhibited medium awareness, 32.08% showed low knowledge, and only 2.92% had high knowledge about scientific feeding and dairy management. The study underlined a critical need for awareness generation and training programs to bridge the prevailing knowledge gaps in hill regions.

Mithun et al. (2024) analyzed farmers awareness of feeding practices disseminated through digital and traditional media and found that 21.67% of dairy farmers had high awareness 58.33% had medium, and 20.00% had low knowledge regarding balanced feeding practices. The study stressed that digital platforms and improved education can significantly enhance awareness of balanced feeding.

Sabapara et al. (2013) revealed that among dairy farmers, 71.00% had medium knowledge, 15.50% high, and 13.50% low regarding balanced feeding. The study recommended extension-based field demonstrations to improve practical understanding and address feeding-related misconceptions.

Singh et al. (2021) focused on farmers in KVK adopted and non-adopted villages. In KVK villages, 20% of farmers had high knowledge**,** 60% had medium**,** and 20% had low**,** while in non-KVK villages, 10% had high**,** 50% medium**,** and 40% low knowledge. The study highlighted the role of institutional training in improving awareness about balanced feeding practices.

Gorai et al. (2024) reported that Farmer Producer Company **(**FPC) members had 37.50% high, 53.33% medium, and 9.17% low knowledge**,** whereas non-members had 13.33% high, 60.84% medium, and 25.83% low knowledge**.** This indicates that collective institutional exposure has a positive impact on balanced feeding knowledge among farmers.

Meena (2014) found that the majority of respondents had medium awareness regarding feeding practices**,** especially in dry animal and lactating animal nutrition, while knowledge about calf and mineral feeding was relatively poor. The study emphasized focused awareness on stage-specific feeding practices to enhance productivity.

Singh et al. (2024) highlighted that 48.79% of dairy farmers had overall moderate knowledge of feeding practices. High awareness was reported for colostrum feeding (97.88%), but poor understanding existed for practices like steaming-up and potassium permanganate use.

Rathod et al. (2020) found that only 19.20% of farmers had high knowledge**,** while 51.70% had medium and 29.10% had low awareness. The authors highlighted the significant role of training and demonstration under the Ration Balancing Programme (RBP) in enhancing feeding literacy.

Rani and Naagar (2021) analyzed balanced feeding awareness among dairy farmers of crossbred cows. Their findings revealed that 30.00% of the respondents had high awareness**,** 45.00% had medium, and 25.00% had low knowledge**.** Education and experience were strongly correlated with the knowledge score, suggesting focused intervention for less experienced or illiterate farmers.

Chaudhary et al. (2024) revealed that 77.2% of respondents had medium knowledge**,** 10.9% had high**,** and 11.9% had low knowledge concerning feeding practices. The study emphasized the need for targeted training programs to enhance farmers' understanding of balanced feeding.

Sharma et al. (2023) revealed that awareness regarding balanced feeding practices was significantly lower in control villages, while farmers under the Ration Balancing Programme (RBP) showed improved milk yield and fat percentage due to better nutritional knowledge and practice adoption.

Singh et al. (2024) revealed that 71% of animals received excess crude protein and energy**,** while 65% lacked calcium and phosphorus in their diets. The findings reflected poor awareness and improper feed formulation among Indian dairy farmers and stressed the need for structured extension campaigns and ration formulation training.

Relative Advantage

Sharma et al. (2015) reported that 55.00% of dairy farmers in Kapurthala district adopted home-based ration balancing practices due to their observed benefits in improving milk yield and animal health.

Tomar et al. (2023) found that 56.40% of dairy farmers in Muzaffarnagar, Uttar Pradesh adopted scientific feeding practices, as they perceived significant economic gains and productivity enhancement over traditional methods.

Verma and Chauhan (2021) stated that farmers following balanced feeding reported faster post-partum recovery in cows, leading to increased trust in scientific methods. Perceived economic return encouraged wider adoption.

Kumar and Singh (2022) found that balanced feeding led to lower veterinary costs and improved fertility, and 59.25% of respondents accepted its superiority over traditional feeding.

Compatibility

Pandey and Singh (2025) observed that 60.00% of resource-poor farmers in Haryana adopted balanced feeding practices when these were in alignment with their traditional livestock management systems.

Thapa et al. (2019) revealed that 84.92% of organized dairy group members adopted improved feeding practices, primarily because the methods were compatible with their existing routines and group-based dairy models.

Verma and Chauhan (2021) found that 58.60% of farmers resisted adoption due to perceived conflict with local beliefs or feeding rituals, indicating low compatibility in cultural settings.

Ali and Joshi (2021) reported that farmers who had adopted schemes had higher success rates in implementing balanced feeding programs, demonstrating the role of socio-cultural fit.

Complexity

Madke and Hembad (2006) found that only 16.00% of dairy farmers in Bhandara district, Maharashtra adopted scientific feeding practices due to their perceived complexity, especially in calculating rations and understanding feed charts.

Goyal et al. (2025) reported that technical complexity in using cation-based mineral supplements limited adoption, particularly among less-educated farmers, contributing to a low adoption rate.

Gupta et al. (2022) highlighted that use of local language instructions and visual aids helped overcome complexity for semi-literate dairy owners.

Thakur and Rajput (2020) stated that when demonstrations included step-by-step guidance, the complexity barrier reduced significantly and adoption level was improved.

Observability

Rathod et al. (2020) reported that the adoption of ration balancing among dairy farmers in Maharashtra increased significantly after farmers visually observed improvements in animal body condition and milk yield in neighbouring farms.

Thapa et al. (2019) found that 84.92% of farmers adopted balanced feeding practices after observing tangible improvements in productivity among their peer groups

Dixit and Meena (2023) reported that farmers who saw better reproductive outcomes and reduced disease frequency shifted more confidently to balanced feeding.

Trialability

Meena (2014) reported that farmers in Jhansi district showed increased adoption after they were allowed to trial balanced feeding practices through on-farm demonstrations. The ability to experiment in a controlled environment boosted their confidence.

Goyal et al. (2025) also observed that trial use of mineral supplements on small animal groups led to higher adoption, particularly where farmers achieved short-term improvements in productivity.

Kumar et al. (2023) stated that trialability was particularly useful in tribal areas where traditional beliefs dominated; phased trials ensured credibility.

Predictability

Kumar et al. (2016) found that predictable benefits such as improved fertility and reduced calving intervals encouraged consistent adoption of balanced feeding practices among dairy farmers in Rewa district.

Pandey et al. (2025) reported that 72.60% of farmers in Haryana continued to use scientifically formulated rations due to consistent improvements in milk yield and reduction in veterinary costs over time

Singh and Chauhan (2020) reported that predictability of balanced feeding benefits was closely associated with repeat adoption cycles in organized dairy clusters.

Indigenous feeding practices

Patel et al. (2020) reported that 64.80% of farmers used roasted fenugreek seeds mixed with jaggery to stimulate appetite in anorexic dairy animals. The practice was favoured due to its cost-effectiveness and ease of preparation from local ingredients.

Ravikumar et al. (2016) found that 58.20% of farmers administered turmeric and asafoetida mixed in warm water to treat bloat in cattle. This method was recognized for its quick relief and absence of side effects.

Dash et al. (2016) observed that 61.40% of farmers reduced feed intake and used buttermilk and green fodder during summer months to mitigate heat stress in dairy animals. These practices helped maintain hydration and body temperature.

Meena and Singh (2023) reported that 55.70% of farmers fed warm gruel made of wheat bran and jaggery during winter to reduce cold stress. Additionally, mustard oil massages were practiced to enhance blood circulation in animals.

Mehta et al. (2021) stated that 60.25% of dairy farmers used sesame seed and jaggery preparations during late pregnancy to prevent milk fever. Adoption of area-specific mineral mixtures also helped to reduce incidences significantly.

Bhatt and Sharma (2015) found that 62.80% of farmers applied turmeric and neem paste externally to affected udders to treat mastitis. This ethnoveterinary remedy showed effectiveness in early-stage infections.

Patel et al. (2017) documented that 68.40% of farmers used garlic, neem leaves and amla powder in feed to boost immunity and improve digestion. These additives were believed to reduce disease occurrence in dairy animals.

Dutta et al. (2021) stated that 59.60% of farmers added fenugreek, ginger, or ajwain powder to daily feed rations to improve rumen function and appetite. These additives were adopted due to their local availability and palatability.

Sharma and Rajput (2023) reported that 51.75% of respondents used ayurvedic herbs such as ashwagandha and shatavari in calf feed to promote growth and weight gain. These practices were regionally promoted by local healers.

Sinha et al. (2016) highlighted that 47.30% of farmers used brick powder, ash, or lime as mineral substitutes in regions lacking access to commercial mineral mixtures.

Thakur et al. (2018) revealed that 63.20% of buffalo keepers provided cottonseed cake, sesame and jaggery-based feed during estrus to enhance fertility.

Singh and Yadav (2021) reported that 56.50% of farmers added garlic and wheat bran in feed post-insemination to support hormone activity and conception rate.

Meena and Patel (2025) found that 60.00% of dairy farmers used decoctions of dry ginger, cottonseed cake, and jaggery to treat anoestrus in cows. This method was popular due to its warming effect and perceived hormonal stimulation.

Rajput and Dixit (2023) documented that 53.10% of farmers used turmeric-sesame paste and herbal tonics after insemination to prevent repeat breeding. The method was promoted in awareness camps and field visits.

Rao and Sharma (2022) observed that 49.80% of dairy farmers administered a paste of papaya leaf and mustard oil post-calving to manage retained placenta. This method was low-cost and required no veterinary intervention.

Constraints

Sharma and Yadav (2020) reported that 64.00% of farmers considered lack of knowledge as a major constraint in adopting balanced feeding, while 52.00% expressed concern about the high cost of mineral mixtures and lack of easy access to input supply shops.

Patel and Yadav (2021) found that 71.33% of the dairy farmers were unaware of area-specific mineral mixtures, while 66.67% stated that absence of demonstration and technical guidance was a significant hurdle in feeding animals balanced rations.

Rani et al. (2019) concluded that irregular supply of feed ingredients (63.50%), non-availability of formulated concentrate mixture (58.00%), and poor motivation from extension workers (54.70%) were prominent constraints in rural dairy regions.

Singh and Kumar (2022) revealed that 69.20% farmers lacked basic information on nutrient content of feeds and 61.50% of respondents reported lack of ration balancing training as a hindrance in implementation.

Verma and Chauhan (2020) indicated that 59.80% farmers had difficulty in accessing reliable and low-cost feed ingredients, while 48.30% found the balanced feeding process complex and time-consuming.

Dixit et al. (2023) observed that high cost of compound cattle feed (64.70%), lack of separate storage space for feed (57.20%), and influence of traditional beliefs (42.10%) limited the adoption of scientifically balanced feeding systems.

Ali and Rathi (2020) mentioned that 66.00% of respondents were not aware of recommended feeding quantities, and 60.30% lacked access to weighing devices and measuring equipment for ration preparation.

Meena et al. (2021) stated that 72.50% of farmers faced seasonal scarcity of green fodder and 61.25% could not afford commercial feed supplements for ration balancing.

Joshi and Thakur (2019) found that lack of farmer interest (54.00%), poor access to veterinary guidance (50.25%) and limited exposure to success stories (45.00%) were major barriers to balanced feeding.

Kumar and Singh (2022) highlighted that 68.75% farmers followed traditional feeding norms passed from previous generations and only 39.50% had exposure to training programs related to ration formulation.

Sinha and Rajput (2023) revealed that lack of government support (61.80%), high input cost (59.90%) and unavailability of branded mineral mixtures (55.60%) were the key constraints in adoption of balanced rations.

Gupta et al. (2021) found that 65.00% of the dairy farmers cited difficulty in understanding feed labels and nutrition charts while 52.00% reported mistrust in packaged feed manufacturers.

Kumari and Rani (2020) mentioned that 70.00% of farmers lacked digital access to mobile advisory services or ration balancing apps that could otherwise support real-time decisions.

Chand et al. (2021) revealed that majority of farmers fed boiled methi grain to dairy animals in morning (empty stomach) at the rate of one kg for five days for correcting the case of late maturity and anoestrus. At the same time a handsome number of farmers were feeding bajara with jaggery and bajara with guar.

Sharma et al. (2019) stated that for treatment of repeat breeding some livestock owners fed 250 gm overnight soaked ajwain (Trachyspermum ammi) to animal for five days. Along with this, for treatment of anoestrus 10 gm seed of kayfal (Myrica nagi) fed to animal for continuous three days.

Parmar J. (1999) stated that 100gm powder of root or bark of the Convolvulus microphyllus Sieber (Morning glory) mixed with 300 ml of water and boiled for 10 min then this concoction is filtered and then cooled, fed the animals once a day for 3 days.

Materials and Methods

CHAPTER-3

MATERIALS AND METHODS

Research Methodology is the blue print of an investigator's design. Research methodology is a systematic exploration into the study of methods and tools used in order to establish facts and tangible conclusions. Research design enables the investigators to answers research questions objectively, accurately and economically as possible. This section describes the methodology adopted in conducting research under the following headings:

3.1 Locale of the study

3.2 Research Design and sampling plan

3.3 Variables and their measurements

3.4 Operationalization of variables

3.5 Tools and techniques used for data collection

3.1. LOCALE OF THE STUDY

3.1.1. BRIEF DESCRIPTION OF THE STUDY AREA ABOUT UTTAR PRADESH

Uttar Pradesh, being one of the populated state in India, shares its borders with Nepal on the North, Uttarakhand the northwest, Haryana on the west, Rajasthan on the southwest, Madhya Pradesh on the south and south-west and Bihar on the east. Established in 1950. state is divided in 18 divisions and 75 districts. Cultivable land is 82% of the geographical land. The economy of the Uttar Pradesh is the third largest state economy in India. Uttar Pradesh falls under three agro-climatic zones viz., (a) Middle Gangetic Plains, (b) Upper Gangetic Plains, (c) Central plateau and hill plateau. A report based on a National Statistical Office (NSO) survey reveals seventy three percent literacy rate. Agriculture is the leading occupation in Uttar Pradesh and plays a vital role in the economic development of the state and hence contributes 8.4% of India. Uttar Pradesh is also has the largest number of mobile subscribers in the country, a total of 121.60 million mobile phone connections out of 861.66 million in India, according to the telecom regulator, Telecom Regulatory Authority of India (TRAI). The two major rivers of the state are Yamuna and Ganga. . the forest cover in the state is 6.1 percent of the state's geographical area. Uttar Pradesh

government has launched various schemes to improve the productivity and income of dairy farmers' viz., Nand Baba milk mission scheme, that ultimately lead to enhance the income of dairy farmers.

This study was conducted in Uttar Pradesh for the following reasons-

1. Uttar Pradesh state is having highest population of cattle and buffalo (18.83 and 23.81 million), which comprises 32 per cent share of whole country bovine population.
2. The state is one of the highest producers of milk in country (15.72% of share in total milk production).
3. Animal husbandry statistics revealed that Uttar Pradesh shows growth rate of 6.99% in milk production for the year 2022-2023.
4. Per capita availability of milk in the state is 392 gm/day. which is lower than national average (471 gms/day)
5. Total human population of the state is highest in country, so provide ample opportunity to the investigator.
6. The economics of Uttar Pradesh (table 3.1) is based mainly on agriculture and around 65% of the total population is dependent on agriculture. Contribution of agriculture sector is significant in the economic development of the state.
7. To maintain annual growth rate of 8.7% in financial year 2021-22 the department of agriculture had produced 315.7 million tonnes of food grain.
8. Recently, government has launched mobile veterinary unit in the state.
9. The state has highest buffalo population.

Table 3.1: Some salient Information about the Study area

S.No.	Particulars	Uttar Pradesh	Mathura
1.	Area (In Sq.km)	243,286 sq km	3,340 sq km
2.	Population	207,644,568	2,547,184
3.	Population Density	828/sq. km	763/sq. km
4.	Literacy percentage	70%	68.57 %
5.	Sex ratio	908 girls per 1000 boy	870 girls per 1000 boy

(Ministry of home affairs, GOI, Census, 2011)

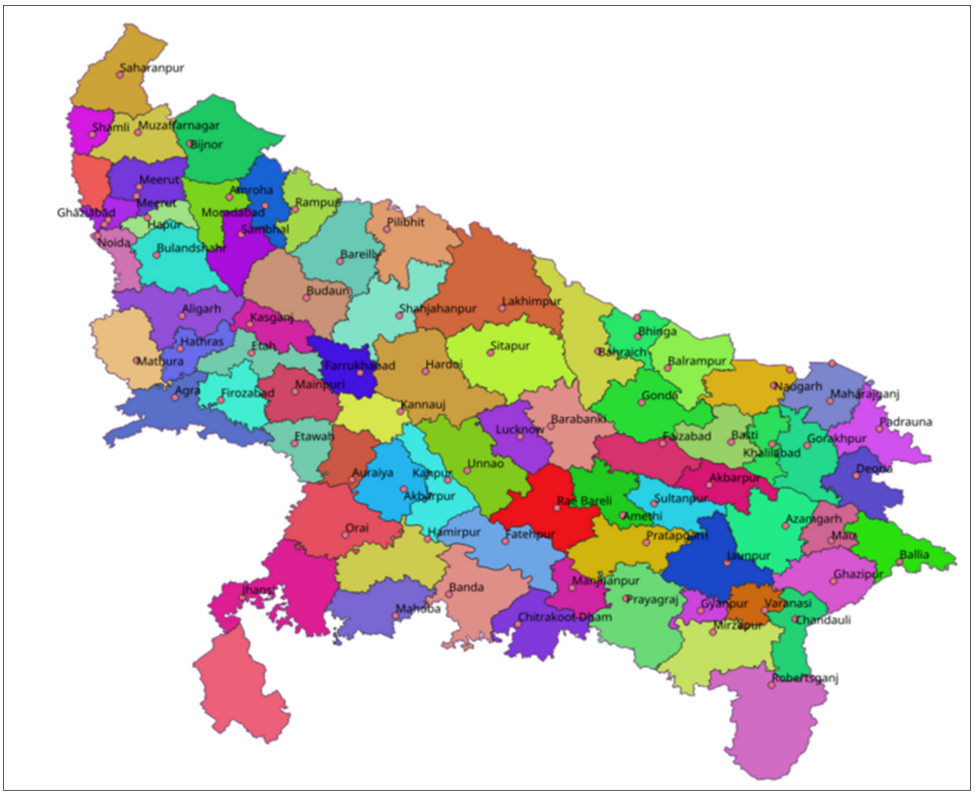


Plate 1: Map of Uttar Pradesh

Plate 2: Map of Mathura district indicating selected blocks

3.2 RESEARCH DESIGN AND SAMPLING PLAN

3.2.1 RESEARCH DESIGN

According to Kerlinger (1964), research design is the plan, structure and strategy of investigation so as to obtain answers to research questions and to control variance. Expost facto research deign was used for the present study as the phenomena has already occurred.

3.2.2 SELCTION OF DISTRICT

This study was conducted in Mathura district of Uttar Pradesh which was purposively selected for the study. Mathura district was purposively selected for the following reasons:

1. Many old names in this area are derived from their physical characteristics related to animals, i.e., Brij means a herd, the constant means of a nomadic tribe; Gokul means a herd of kine; Goverdhan means a rearer of kine; Mathura means to churn; Math means a pail of milk; Dadhiganaw (contracted into Dadhi + Ganaw). Dadhi means curd and Ganaw means people. These examples speak volumes about this area that animal husbandry has been their way of livelihood and one of the most important occupations.

2. The unearthed local rich treasure of antiquarian values of human-animal association that prevailed in the area and have been preserved and depiction could be observed through many antiques at Mathura museum.

3. Further, Mathura district is the study town for the investigator and he due to numerous activities of the university of field level, familiar with that particular area and also well conversant with the local dialect. Thus, it was advantageous to opt for, and select this area.

4. Mathura is known for cattle rearing since ancient times.

Mathura geography has a major influence on its climate and topography. Mathura lies between the coordinates 27°41' North latitude and 77°41' East longitudes.

Table 3.2: Livestock population scenario in Mathura district

S.No.	Livestock	Number
1.	Cow	2142436
2.	Buffaloes	576556
3.	Goats	64681
4.	Pigs	11360
5.	Sheep	24099

(Livestock census, 2019)

This city in Uttar Pradesh is located on the beautiful banks of the river Yamuna. Mathura, popularly known as Brij Bhoomi is 145 km south of the capital city, New Delhi. Total population of Mathura district is 2,541,894 in which 70.32 per cent rural population and 29.68 per cent urban population and constitutes 1.27 percent of total population of Uttar Pradesh. Mathura was an economic hub, located at the junction of important caravan routes. Today, it is a fast expanding city with over 2.5 million residents. The district has been divided into four tehsils and ten Blocks with Geographical Area of 3340 Sq Km. Mathura has 89 nyaya panchayat 479 gram panchayat and 736 revenue villages. According to the 2011 census on Mathura Nagar Palika Parishad, 95.4% of the people identified were Hindi speakers, 2.6% as Urdu speakers and 1.4% as speakers of Braj Bhasha. It is also a hub for production of milk based sweet.

3.2.3 SELECTION OF THE BLOCKS AND VILLAGES

There are ten blocks in Mathura district, of which five blocks were selected randomly to cover the entire district and from each block two villages were randomly selected, . Thus, comprising a total of ten villages.

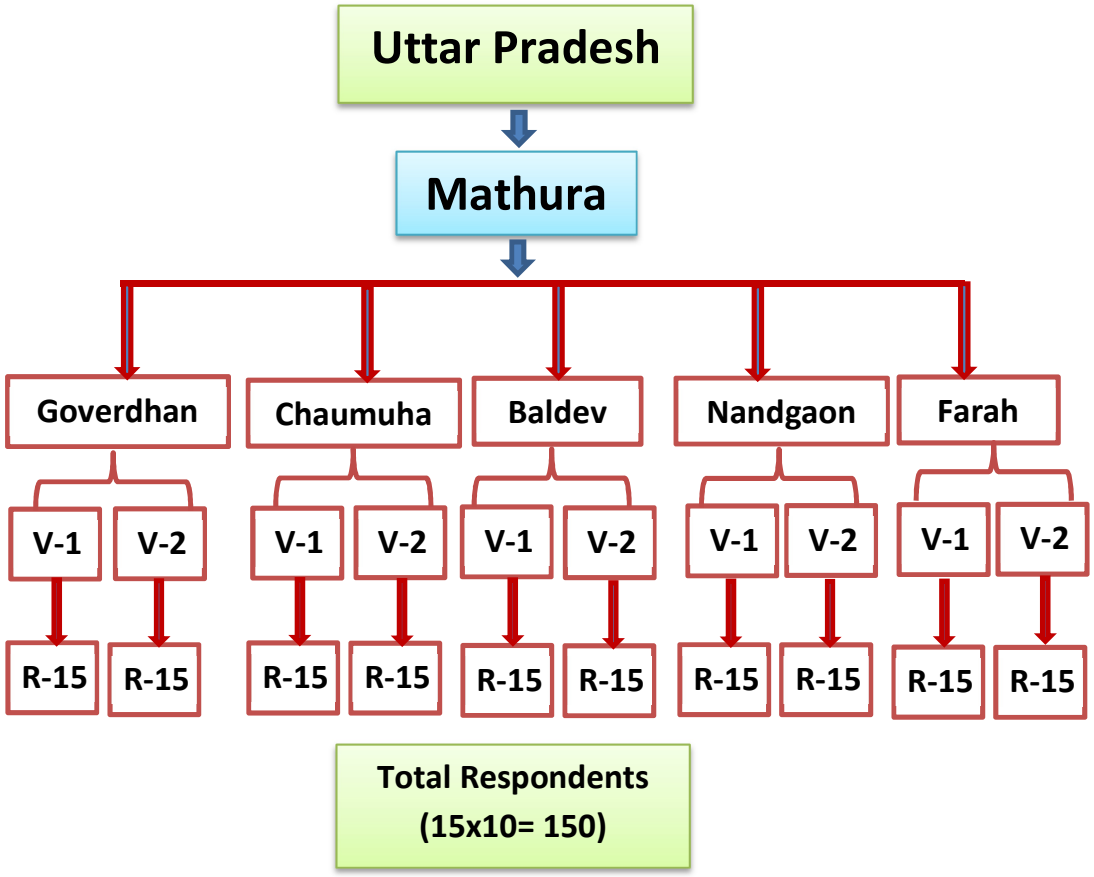


Plate 3: Sampling Plan

Plate 4: Collecting data from Goverdhan block

Plate 5: Collecting data from Chaumuha block

Plate 6: Collecting data from Baldeo block

Plate 7: Collecting data from Nandgaon block

Plate 8: Showing collecting data from Farah block

Table 3.3: List of villages, block and number of respondents from selected districts

S. No.	Blocks	Villages	Number of respondents
1.	Govardhan	Borpa	15
		Sonsa	15
2.	Choumuhan	Choumuhan rural	15
		Ajnokh	15
3.	Baldeo	Bandi	15
		Choli	15
4.	Nandgaon	Nandgaon rural	15
		Badangarh	15
5.	**F**arah	DhanaTeja	15
		Bamuri	15
Total	**05**	**10**	**150**

3.2.4 SELECTION OF THE RESPONDENTS

Fifteen respondents were selected randomly from each village thus comprising a total of 150 respondents subjected to the condition that:

i. Respondents were having at least one livestock unit.

ii. At least 2 years of rearing experience in dairy farming.

3.3 VARIABLES AND THEIR MEASUREMENTS

For any study in social science research, it is customary to precisely mention the variables used for the study with their working concepts and measurement procedures. In view of the review of literature and consultation with the experts, relevant variables were selected for the study. The under mentioned table mentions the selected variables and their operational definition and measurement procedures. The following (Table 3.4) under-mentioned variables are undertaken for the present study.

Table 3.4: Variables and their measurement

S. No.	Variables	Measurement
1.	Age	Direct questioning
2.	Family Size	Direct questioning
3.	Family Type	Schedule was developed
4.	Experience in Livestock Farming	Schedule was developed
5.	Education	
6.	Total Annual Income	
7.	Occupation	
8.	Land Holding	
9.	Herd Size	
10.	Milk Production	
11.	Milk Consumption	
12	Milk Sale	
13	Social Participation	
14	Mass Media Exposure	
15	Source of Information (Extension Agency Contact)	
16	Awareness and Knowledge Level	
17	Adoption of Indigenous Feeding Practices	Schedule was developed
18	Adoption Level of Balanced Feeding	Adoption index
19	Constraints Faced by Respondents	Rank based

3.4 OPERATIONALIZATION OF VARIABLES

3.4.1 AGE

It is referred to the chronological age of the livestock owners selected for the study and is operationalized as number of completed years of the respondents at the time of data collection and it is determined by direct questioning. The respondents according to age were classified in following three categories (Census report, GOI, 1981).

S. No.	Category	Years
1.	Young	<35years
2.	Middle	35-50years
3.	Old	>50 years

3.4.2. FAMILY TYPE:

It refers to the composition of family the respondent belongs to, whether joint or nuclear type.

a. The nuclear type refers to the family consisting of husband, wife and their unmarried children.

b. The joint denoted the family founded on blood relations of many people and consisting of a large group of blood relatives with a fringe of spouses living together.

3.4.3. FAMILY SIZE:

In a system of organized relationship family is categorised as a basic institution as it involves in workable and dependable ways of meeting basic social needs. For the present study, family size is defined as the total number of members residing in the family. It was categorized as small, medium and large on the basis of equal class interval.

S. No.	Category	Family Members
1	Small	Up to 5 members
2	Medium	6-8 members
3	Large	More than 8 members

3.4.4. EDUCATION:

It refers to level of formal education attained by an individual respondent. The farmers were classified into seven categories namely illiterate, functionally literate, primary, middle, secondary, higher secondary and graduate or above. Score has been given for each category of the respondents as given below:

S. No.	Category	Score
1.	Illiterate	0
2.	Functionally literate	1
3.	Primary	2
4.	Middle	3
5.	Secondary	4
6.	Higher Secondary	5
7.	Graduate and above	6

3.4.5. OCCUPATION:

The source of income or state of livelihood, occupation refers to the source of earning through agriculture, dairying, business, labor, service etc. As respondents were deliberately selected as dairy farmer, so, primary occupation of respondents was dairy farming. It was also facilitated with other subsidiary occupations which were mentioned following:

S.No.	Occupation on	Score
1.	Dairy	1
2.	Dairy + Agriculture	2
3.	Dairy + Business + Agriculture	3
4.	Dairy + Labour	4
5.	Dairy + Service + Agriculture	5
6.	Dairy + Horticulture	6

3.4.6. OPERATIONAL LAND HOLDING:

It is operationally defined as the actual land operated by an individual family at the time of investigation. The respondents were classified into landless, marginal, small, semi-medium, medium and large categories as follows (Census report, GOI, 2001).

S. No.	Category	Score
1.	Landless (0 ha)	0
2.	Marginal (< 1 ha)	1
3.	Small (1-2 ha)	2
4.	Semi - medium (2- 4 ha)	3
5.	Medium (4 -10 ha)	4
6.	Large (> 10 ha)	5

3.4.7. ANNUAL INCOME

It is operationally defined as the income generated from various sources in one year by the respondent family at the time of investigation. Annual income of respondents was categorized on the basis of mean and standard deviation.

S. No.	Category	In Rupees
1.	Low income group	Less than 45000
2.	Medium income group	45001-109500
3.	High income group	Above109501

3.4.8 HERD SIZE

It refers to the total number of cattle, buffaloes own by the respondent at the time of investigation. Herd size of respondents was classified on the basis of mean and standard deviation.

S. No.	Category	Number of livestock
1.	Small	Less than 2
2.	Medium	3-4 animal
3.	Large	Above 4

3.4.9. EXPERIENCE IN LIVESTOCK REARING

It refers to the actual number of years of experience of the respondent in dairy farming. It was be classified on the basis of mean and standard deviation.

S. No.	Category	Experience
1.	Low	Upto 5 years
2.	Medium	5 years
3.	High	Above 5 yars

3.4.10. MILK PRODUCTION

Average milk yield was calculated for the total number of milch animals owned by the livestock owners at the time of the study. On the basis of total volume of milk produced the respondents were categorized into three categories, viz., low, medium and high milk producers.

S. No.	Category	Milk in litre /day
1.	Low	Up to 5.5 litres
2.	Medium	5.5-16.5 litres
3.	High	more than 16 litres

3.4.11. MILK CONSUMPTION

Milk consumption was calculated for total milk consumed by the family members. Total milk consumed by the family members were categorized into three categories, viz., low, medium and high milk consumers.

S.No.	Category	Milk in litre /day
1.	Low	Less than 3 litres
2.	Medium	3-5 litres
3.	High	More than 5 litres

3.4.12. MILK SALE

Milk sale was calculated for total milk produced in the respondent's farm minus total milk consumed. on the basis of total milk sale, respondents were categorized into three categories, viz., low, medium and high milk sale.

S. No.	Category	Milk in litre /day
1.	Low	<2 litter
2.	Medium	2-4 litter
3.	High	>4 litter

3.4.13. SOCIAL PARTICIPATION

Social participation referred to the degree of involvement of the respondents in any formal and or informal social organization. The respondents were assigned, score one for KVK, 2 for cooperative societies (PCDF), 3 for self-help group and 4 for government department Based on the total score obtained by the respondents, the respondents were classified as follows:

S. No.	Category	Response
1.	KVK	1
2.	Cooperatives Societies (PCDF / Other)	2
3.	Self-help groups	3
4.	Government departments	4

3.4.14. MASS MEDIA EXPOSURE

The mass media exposure was operationalized as frequency of exposure and the use of different electronic and print media, viz. radio, television, newspaper, mobile phone, internet/website/apps, farm literature, Kisan mela/Pashu mela, campaign/exhibition, documentary on dairy farming for obtaining information by the respondents. The frequency of utilization was categorized into three categories: always Some times and never and score 1, 2 and 3 were given respectively.

S. No.	Item	Responses		
		Always (1)	Some-times(2)	Never(3)
1.	Radio			
2.	Television			
3.	Magazines			
4.	Newspaper			
5.	**Social Media platforms**	**Always (1)**	**sometimes(2)**	**Never(0)**
5.1	Mobile apps			
5.2	Whats aap			
5.3	Telegram			
5.4	Facebook			
5.5	Twitter			

3.4.15. SOURCE OF INFORMATION (EXTENSION AGENCEY CONTACT)

To assess the extent of contact and information-seeking behaviour of dairy farmers from extension agencies, a structured schedule was developed that included both physical and digital sources. The respondents were asked whether they accessed various institutional and ICT-based sources for obtaining knowledge and updates regarding balanced feeding practices in dairy animals.

The sources were broadly classified into two categories:

1. **Extension Agencies:** This included traditional and institutional information sources such as: Krishi, Vigyan Kendra (KVKs) Government Departments Farmers' Producer Organizations (FPOs) and State Agricultural Universities (SAUs).
2. **ICT Tools:** Under this category, digital and mobile-based tools were included, such as Mobile Phone, Websites and Web Portals Each source was assessed through a binary response format:
   Yes (Score-1) – indicating that the respondent utilized the source and No (Score-) – indicating non-utilization

S. No.	Items	Category	Responses	
			Yes (1)	No (2)
1)	Extension agencies	Krishi Vigyan Kendra		
		Government Departments		
		Farmer producer organization's		
		SAU's		
2)	ICT Tools	Mobile phones		
		Websites /web portals		

3.4.16. Knowledge and Awareness level

Knowledge is understood information possessed by one individual about a particular thing, act or process. It is one of the most important sub-areas of human behaviour, which affect the covert and overt behaviour of human beings. The responses were scored by assigning (1) mark for each correct answer and (0) for incorrect responses. After collecting the responses from all the farmers, individual total scores were calculated, followed by the computation of mean scores.

Respondents were then categorized into three levels low, medium, and high using the class interval method. To explore the relationship between knowledge level and selected socio-economic and personal variables, correlation analysis was conducted with respect to landholding size, family size, age, experience in livestock farming, milk production, herd size, and family type.

3.4.17 Adoption Index

Adoption Index (AI) is an aggregation of adoption of different dimensions of balanced feeding practices in India which are adopted by the livestock owners. It can help in identifying the suitable model state for setting the targets while planning for future growth and development. Adoption of balanced feeding practices was studied.

$$\text{Adoption Index } = \frac{O\text{btained score}}{Maximum\ obtainable\ score}\ x\ 100$$

The respondents were asked to give their option about adoption of these practices on three points continuum i.e., fully adopted, partially adopted and not adopted the practice and the scores of 2, 1 and 0 were allotted respectively. Rank order can be calculated according to the frequencies and percentages of respective categories.

3.4.18 INDIGENOUS FEEDING PRACTICES

Indigenous Traditional Knowledge (ITKs) used by respondents

Indigenous traditional knowledge is the local knowledge - knowledge that is unique to a given culture or society where its knowledge passes from generation to generation. It is the knowledge that people have gained through inheritance from their ancestors. Here, the ITKs used for the treatment of various aliments such as anorexia, bloat, heat stress, cold stress, milk fever, feed additive, alternative source of minerals, anoestrus, ROP (retention of placenta), repeat breeding, growth inducer, mastits, conception and were identified so as to assess the existing practices followed by the respondents.

3.4.19 Constraints

For the present study, the constraints are operationalized as the situation or circumstances that may impede, restrict or limit the use of livestock oriented mobile applications by respondents. Therefore, taking into account the objective of the study,

it was considered appropriate to know the constraints faced by the users of the livestock oriented mobile applications in the study area. List of all the possible constraints was prepared under infrastructure constraints, technical, economic, and miscellaneous constraints and respondents were asked to indicate their responses to what extent they faced such constraints very severe, severe, not severe faced. The scores were given to these respective categories as 2, 1, 0 respectively. These responses were calculated for ranking various constraints based on frequency and percentage.

S. No.	Constraints	Most Severe (2)	Severe (1)	Not Severe (0)

Rank order can be calculated according to the frequencies and percentages of respective categories. Rank order was given to the observations. First rank was given to that category, whose frequency and percentage were highest and so on. The ranks were denoted by roman capitals.

3.5 TOOLS AND TECHNIQUES USED FOR DATA COLLECTION

A well-structured and pre-tested interview schedule was prepared for collection of data for this study. In formulating the questions and statements for interview schedule, the researcher sought the important guidance from extension scientists, experts and research of literature to make it more accurate and meaningful.

It included:

- **Focused Group Discussion**

  It is defined as semi-structured group discussions with respondents which yield in-depth data on the community level by facilitating interaction between participants.

- **Observation technique**

  It involves the direct observation of respondents in their natural setting.

All selected respondents were interviewed personally by the researcher. Responses of the respondents were collected through interview which was conducted at the farmers' houses.

3.5.1 Statistical analysis

The collected data were edited, complied, scored, tabulated and subjected to suitable statistical techniques viz.

- Frequency and percentage
- Descriptive statistics
- Cumulative square root frequency
- Correlation analysis
- Regression analysis etc.

Results

CHAPTER-4

RESULTS

The data was collected from the respondents of Mathura district and the collected data was analysed and results obtained were included in this chapter. The findings are presented in following heads.

4.1) To study the socio-economic and socio personal profile of respondents

4.2) To study the awareness and knowledge level of respondents pertaining to balanced ration feeding in dairy animals

4.3) To study the adoption level of respondents in relation to feeding of scientific balanced ration in dairy animals

4.4) To study alternate indigenous feeding practices adopted by respondents to improve productivity of dairy animals

4.5) To study various constraints faced by dairy farmers in feeding balanced ration in dairy animals.

4.1. Socio-economic profile of the respondents

Socio-economic profile of the respondents includes age, education, experience, total income, land holding, herd size, milk production per day and milk disposal pattern. Besides this, various sources of information of the respondents were also studied.

4.1.1 Age

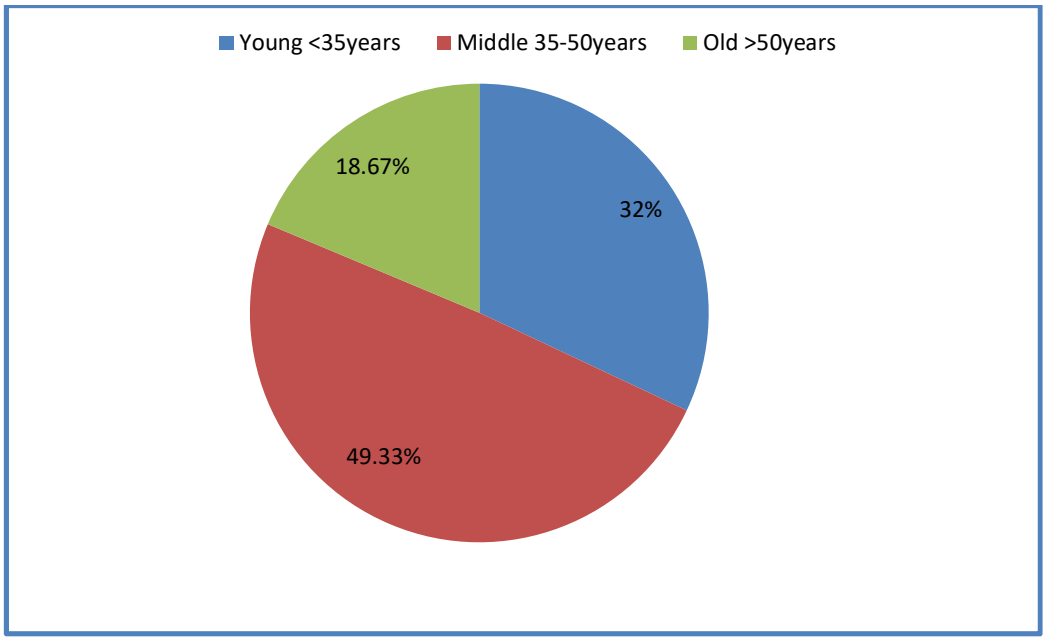
The information related to age of the respondents is important in getting an insight about the potential human resources. The result presented in table 4.1.1 and depicted in fig. 4.1 revealed that majority 49.33, percent of the respondents belong to the middle-aged group followed by the young age group 32.00 percent, and the old age group 8.67 percent.

Table 4.1.1: Distribution of respondents according to age (n=150)

S. No.	Category	Frequency	Percentage
1.	Young (Up to 35 years)	48	32.00 %
2.	Medium (35-50 years)	74	49.33%
3.	Old (More than 50 years)	28	18.67%

Figure 4.1.1: Distribution of respondents according to age

(n=150)



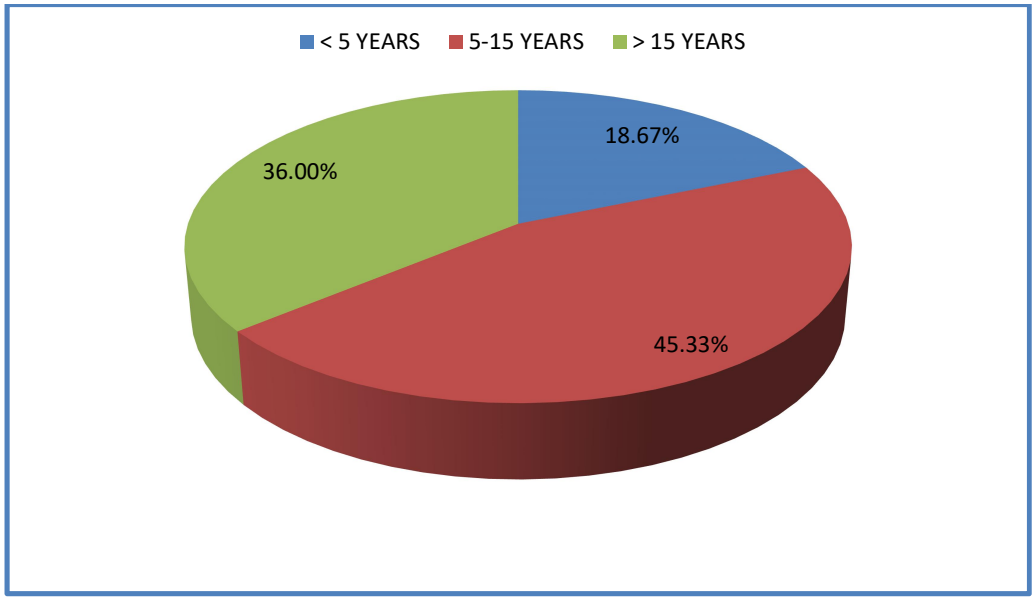
4.1.2: Experience of livestock farming

Experience in livestock farming reflects the level of familiarity and expertise a respondent possesses in managing dairy animals. The information presented in Table 4.1.2 and depicted in Fig. 4.2 shows that the majority of the respondents 45.33 percent had 5 to 15 years of experience in dairy farming, followed closely by 36 percent who had more than 15 years of experience whereas a relatively smaller group 18.67 percent had less than 5 years of experience.

Table 4.1.2: Distribution of respondents according to experience in livestock farming (n=150)

S. No.	Category	Frequency	Percentage
1.	Low (<5 years)	28	18.67%
2.	Medium (5-15 years)	68	45.33%
3.	High (>15 years)	54	36.00%

Figure 4.1.2: Experience of livestock farming (n=150)



4.1.3 Family type:

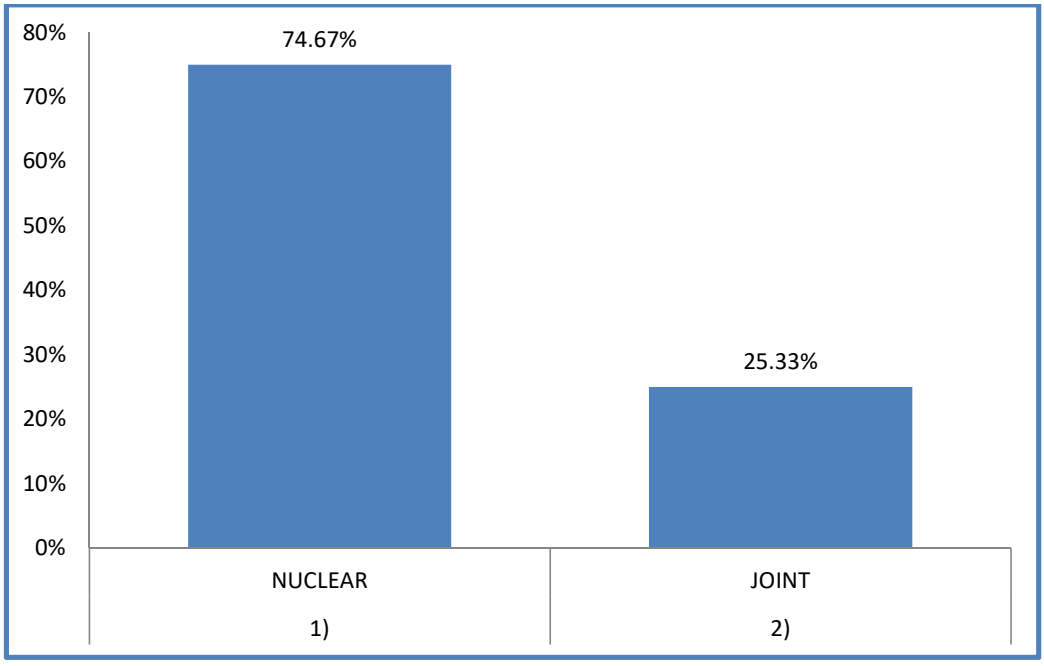
The majority 75.67 percent of respondents belong to nuclear families, while 25.33 percent are from joint families. This suggests a shift towards nuclear family structures in rural areas.

Table 4.1.3: Distribution of respondents according to family type (n=150)

S. No.	Category	Frequency	Percentage
1.	Nuclear	112	74.67%
2.	Joint	38	25.33%

Figure 4.1.3: Distribution of respondents according to family type

(n=150)



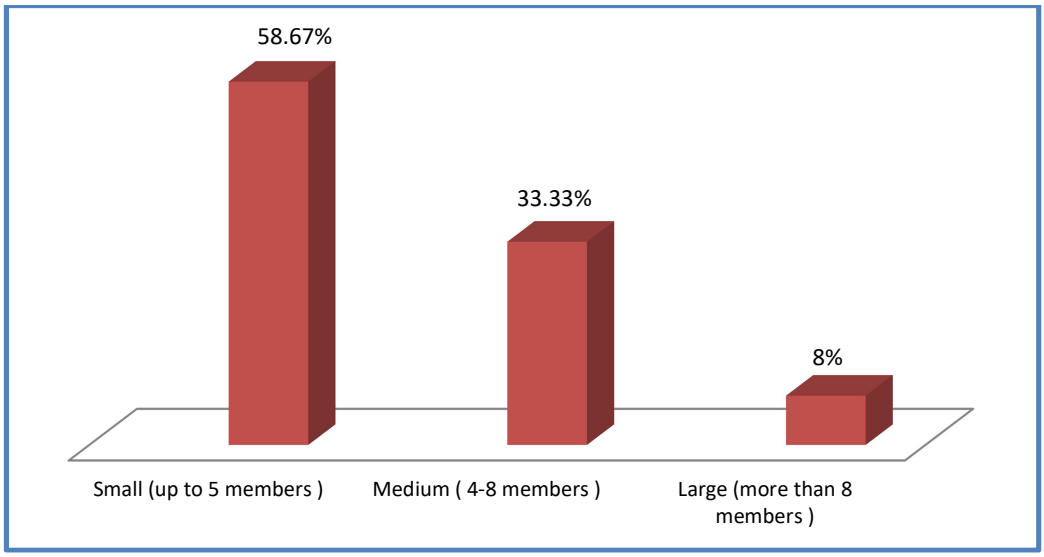
4.1.4 Family size

The data indicates that 58.67 percent of families have up to 5 members, whereas 33.33 percent fall in the medium-size category (4–8 members). Only 8.00 percent have large family sizes, pointing to the prevalence of smaller family units, indicated in Table 4.1.4 and depicted in fig. 4.4 suggested a common trend in family size within the studied population.

Table 4.1.4: Distribution of respondents according to family size (n=150)

S. No.	Category	Frequency	Percentage
1.	Small (up to 5 members)	88	58.67%
2.	Medium (4-8 members)	50	33.33%
3.	Large (more than 8 members)	12	8.00%

Figure 4.1.4.: Distribution of respondents according to family size (n=150)



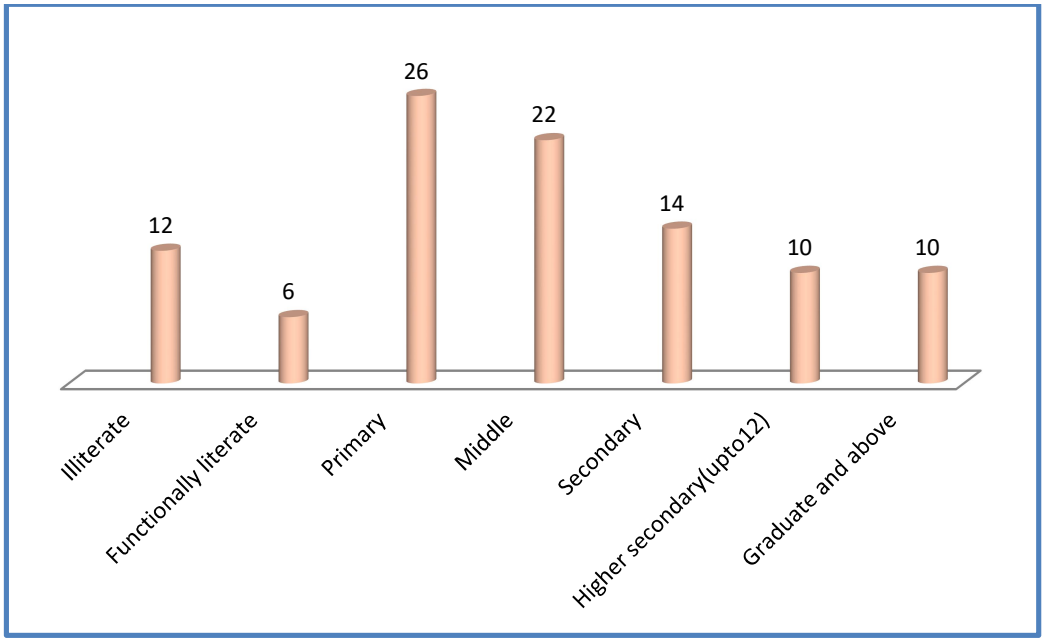
4.1.5 Education

The information presented in Table 4.1.5 and depicted in Fig. 4.5 states that out of total respondents, the highest proportion 26.00 percent had attained primary level of education, followed by middle-level education 22 percent. Around 14 percent of the respondents were educated up to the secondary level, while 10 percent each had completed higher secondary and graduation or above. On the other hand, 12 percent of the respondents were illiterate, and 6 percent were functionally literate, highlighting a portion of the population with limited reading and comprehension abilities. This may hinder their access to written technical knowledge, training manuals, or government schemes related to livestock development.

Table 4.1.5: Distribution of respondents according to Education (n=150)

S. No.	Category	Frequency	Percentage
1.	Illiterate	18	12%
2.	Functionally literate	9	6%
3.	Primary (1-4)	39	26%
4.	Middle (5-8)	33	22%
5.	Secondary (8-10)	21	14%
6.	Higher secondary(up to 12)	15	10%
7.	Graduate and above	15	10%

Fig 4.1.5: Distribution of respondents according to education (n=150)



4.1.6 Milk production

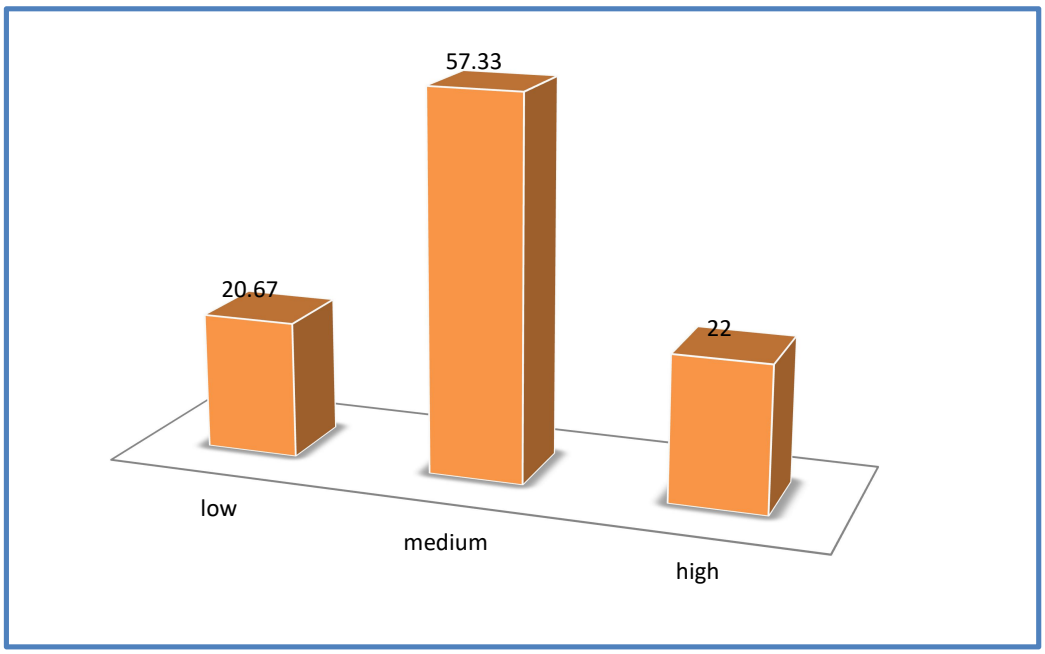
Milk production indicates the average quantity of milk obtained from lactating animals in litres per day. The data presented in Table 4.1.6 and illustrated in Fig. 4.6 reveals that the majority of the dairy farmers 57.33 percent were classified under the medium milk production category (i.e., 19.6–40 litres/day). This was followed by 22.00 percent of the farmers falling under the high production category (more than 40 litres /day), while 20.67 percent were in the low production group (less than 19.6 litres/day).

Table 4.1.6: Distribution of respondents according to Milk production

(n=150)

S. No.	Category	Frequency	Percentage
1.	Low (less than 19.6 litter/day)	31	20.67%
2.	Medium (19.6-40 litter/day)	86	57.33%
3.	High (more than 40 litters /day)	33	22%

Figure 4.1.6: Distribution of respondents according to Milk production (n=150)



4.1.7 Milk Consumption

Milk consumption refers to the quantity of milk consumed within the household per day by family members. The data presented in Table 4.1.7 and depicted in Fig. 4.7 shows that 48.00 percent of the respondents consumed 3–5 litres of milk per day, which falls under the medium consumption category. This was followed by 38.67 percent who consumed more than 5 litres per day, and the remaining 13.33 percent reported consumption of less than 3 litres per day.

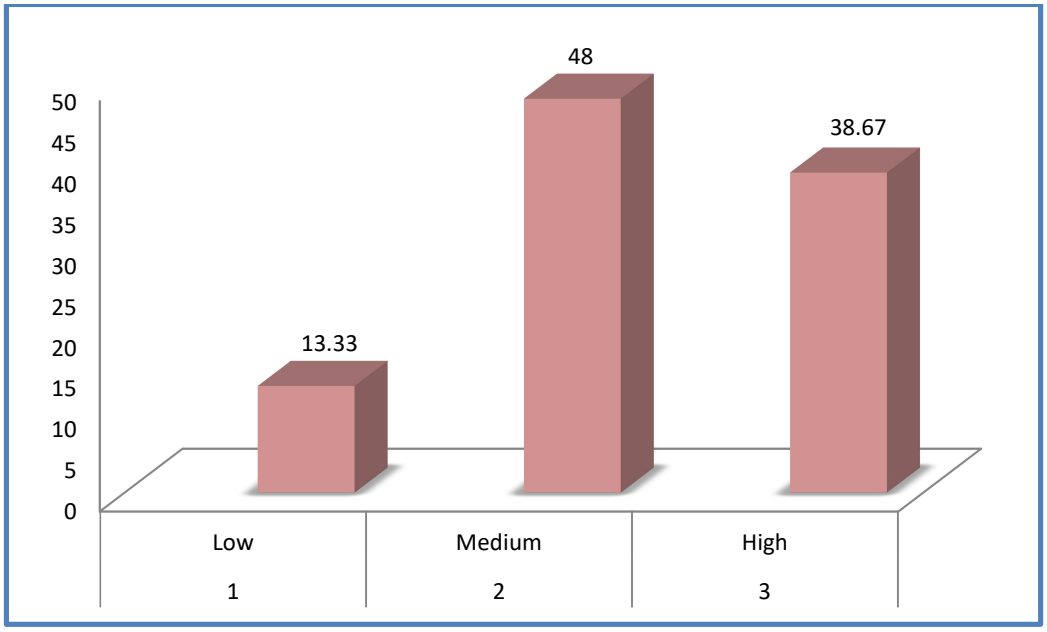
Table 4.1.7: Distribution of respondents according to milk consumption

(n = 150)

S. No.	Category	Frequency	Percentage
1.	Low (less than 3 lit /day)	20	13.33%
2.	Medium (3-5 lit /day)	72	48%
3.	High (more than 5 lit /day)	58	38.67%

Figure 4.1.7: Distribution of respondents according to Milk Consumption

(n=150)



4.1.8 Amount of milk (in Litter /day) sold:

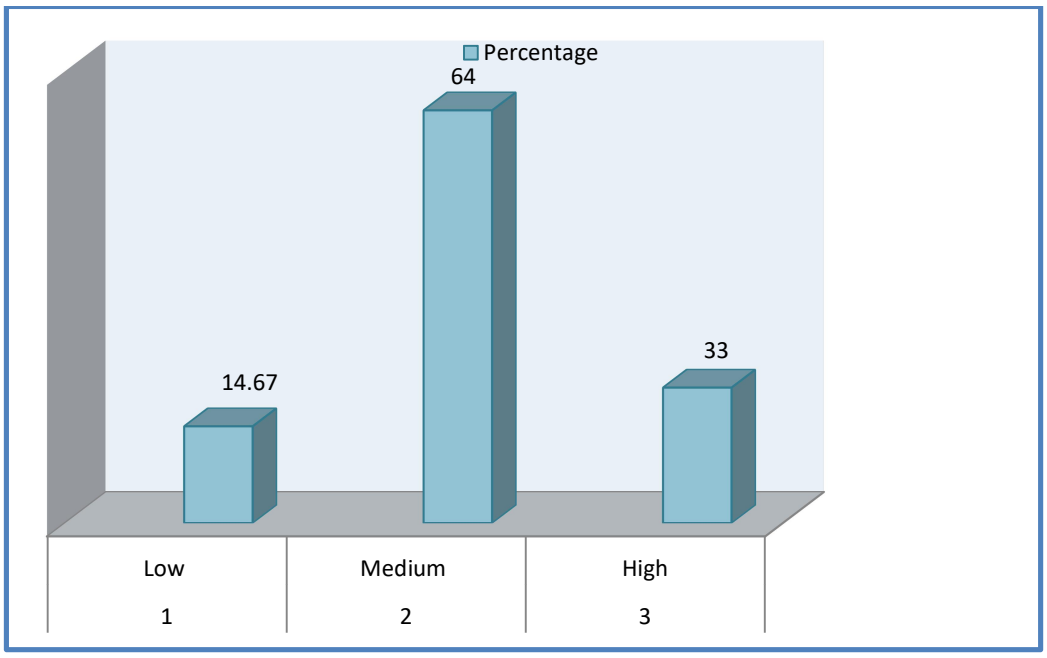
Milk sale reflects the market-oriented behaviour of dairy farmers and their dependency on livestock as a source of income. The data presented in table 4.1.8 and illustrated in Figure 4.8 shows that the majority of respondents 64.00 percent fell under the medium milk sale category, selling 2 to 4 litres of milk per day. This was followed by 21.33 percent of respondents in the high sale category (more than 4 litres/day), while 14.67 percent belonged to the low sale group (less than 2 litres/day)

Table 4.1.8: Distribution of respondents according to amount of milk sold

(n=150)

S. No.	Category	Frequency	Percentage
1.	Low (less than 2 lit/day)	22	14.67%
2.	Medium (2-4 lit/day)	96	64%
3.	High (more than 4 lit/day)	32	21.33%

Figure 4.1.8: Distribution of respondents according to amount of milk (in litre /day) sold (n=150)



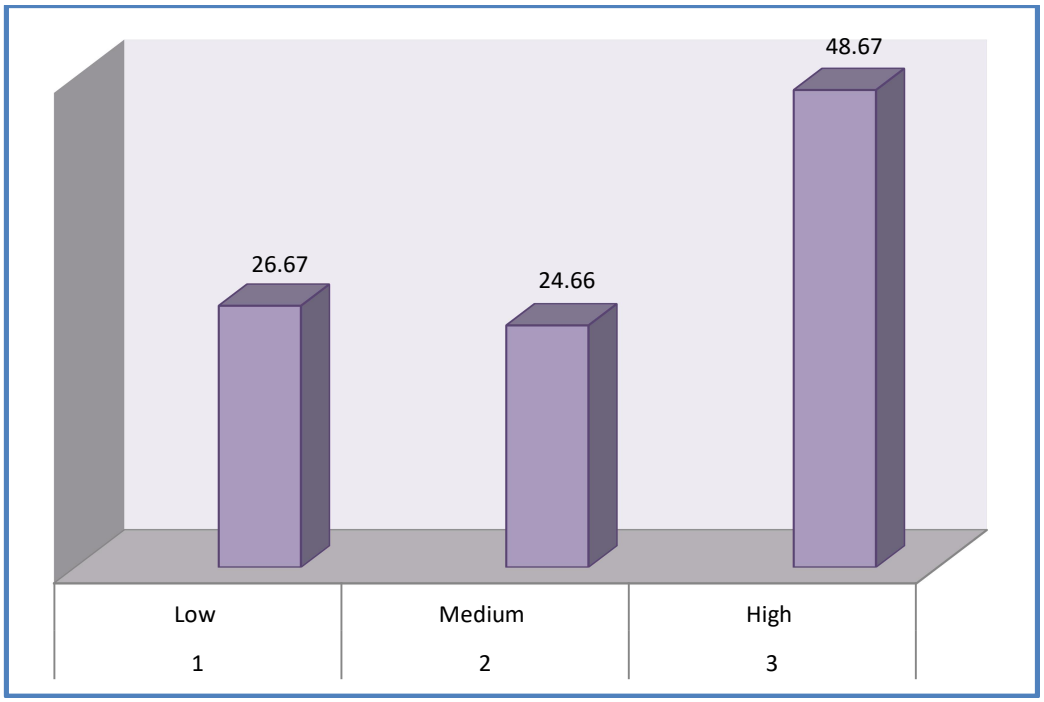
4.1.9 Total income

The income of a household indicates the overall financial position of the family and plays a major role in the adoption of scientific dairy farming practices. The data presented in Table 4.1.9 and depicted in Figure 4.9 reveals that the majority of the respondents 48.67 percent fall under the high-income group (i.e., more than ₹3.85 lakh annually). This was followed by 26.67 percent of respondents in the low-income group (i.e., less than ₹75,000 annually), while 24.66 percent belonged to the medium-income category (₹75,000 to ₹3.85 lakh per annum**).**

Table 4.1.9: Distribution of respondents according to total income (n=150)

S. No.	Category	Frequency	Percentage
1.	Low (Less than 45000)	40	26.67%
2.	Medium (45001-109500)	37	24.66%
3.	High (Above109501)	73	48.67%

Figure 4.1.9: Distribution of respondents according to total income (n=150)



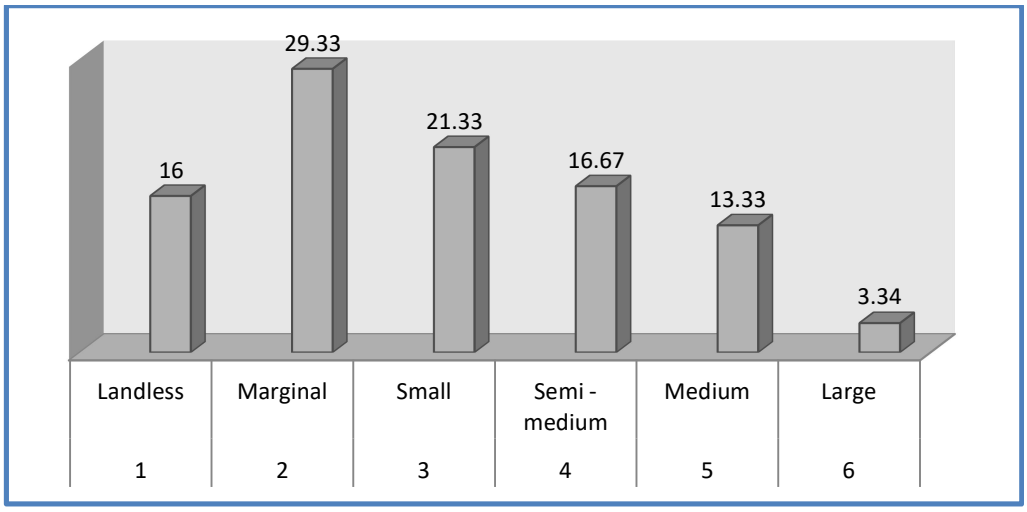
4.1.10 Land holdings

The data presented in Table 4.1.10 and figure 4.10 revealed that the distribution of livestock owners based on the extent of their land holdings. It is evident from the results that a substantial proportion of respondents 29.33 percent fall under the marginal land holding category (i.e., possessing less than 1 hectare of land), followed by small land holders (1–2 ha) accounting for 21.33 percent and semi-medium farmers (2–4 ha) comprising 16.67 percent of the sample. A important finding is that 16 percent of the respondents were found to be landless, suggesting a complete reliance on livestock as a primary or alternative means of livelihood. Additionally, 13.33 percent of the respondents owned medium-sized holdings (4–10 ha), whereas only 3.34% belonged to the large farmer category (>10 ha), indicating low land concentration among livestock farmers in the study area.

Table 4.1.10: Distribution of respondents according to land holdings (n=l50)

S. No.	Category	Frequency	Percentage
1.	Landless (0 ha)	24	16
2.	Marginal (<1 ha)	44	29.33
3.	Small (1-2 ha)	32	21.33
4.	Semi -medium (2-4 ha)	25	16.67
5.	Medium (4-10 ha)	20	13.33
6.	Large (>10 ha)	5	3.34

Figure 4.1.10 Distribution of respondents according to land holdings (n=150)



4.1.11 Herd Size

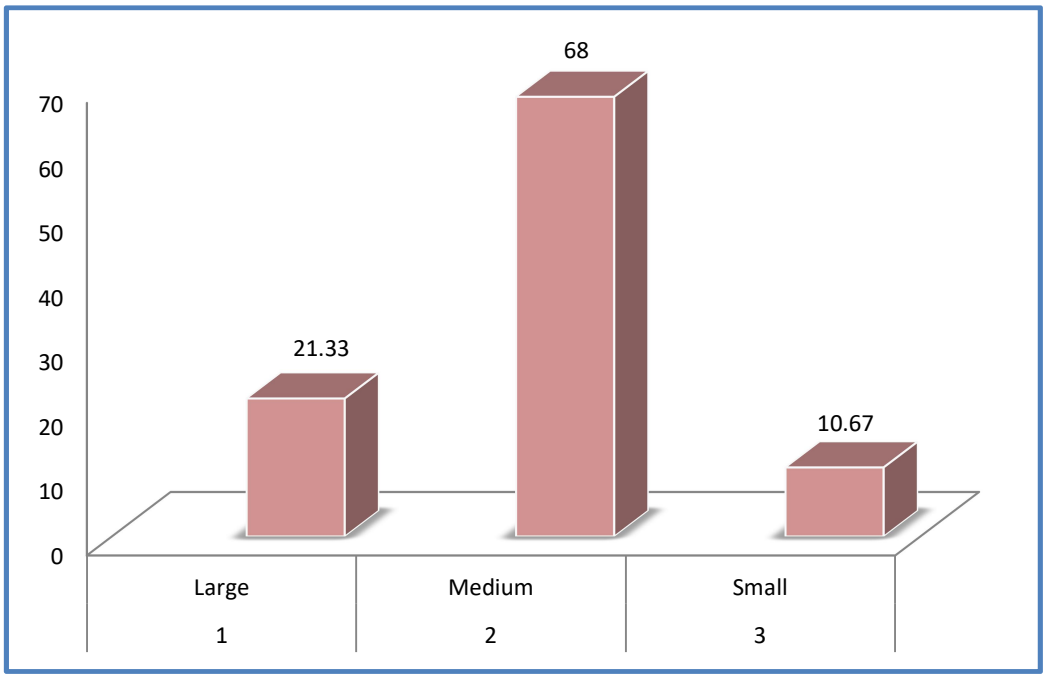
As shown in Table 4.1.11 and Figure 4.11, depicts that 68.00 percent of respondents had medium-sized herds, 21.33 percent had large herds, and 10.67 percent had small herds.

Table 4.1.11 Distribution of respondents according to Herd Size (n=150)

S. No.	Category	Frequency	Percentage
1.	Large	32	21.33%
2.	Medium	102	68%
3.	Small	16	10.67%

Figure 4.1.11: Distribution of respondents according to herd size

(n=150)



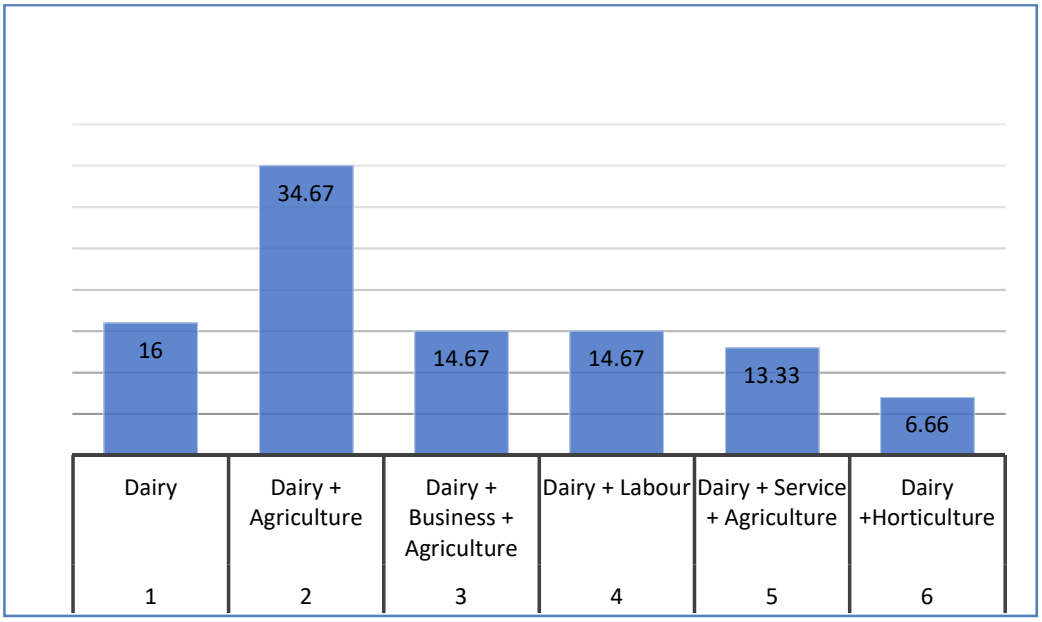
4.1.12 Occupation

Occupation plays a vital role in determining the socio-economic stability and livelihood strategies of dairy farmers. The data presented in Table 4.1.12 and depicted in Figure 4.12 reveals that the majority of respondents i.e., 34.67 percent were engaged in Dairy + Agriculture**,** followed by 16 percent involved in only dairy farming**.** About 14.67 percent each were engaged in Dairy + Business + Agriculture and Dairy + Labour, while 13.33 percent practiced Dairy + Service + Agriculture. A small proportion of 6.66 percent respondent have reported dairy + horticulture

Table 4.1.12: Distribution of respondents according to Occupation (n=150)

S. No.	Category	Frequency	Percentage
1.	Dairy	24	16%
2.	Dairy + Agriculture	52	34.67%
3.	Dairy + Business + Agriculture	22	14.67%
4.	Dairy + Labour	22	14.67%
5.	Dairy + Service + Agriculture	20	13.33 %
6.	Dairy +Horticulture	10	6.66 %

Figure 4.1.12: Distribution of respondents according to occupation (n=150)



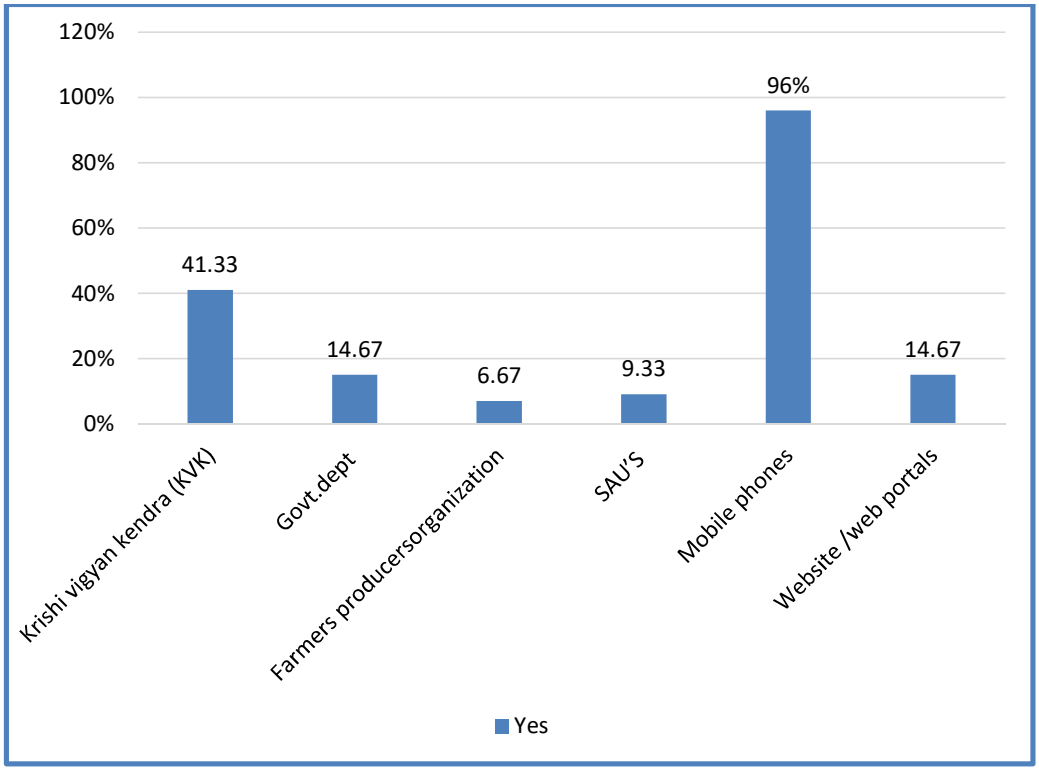
4.1.13 Source of information

The availability and access to information sources largely affect the decision-making ability of farmers. The data in Table 4.1.13 and table 4.13 reveals that 96% of the respondents reported using mobile phones as a source of information. Other sources included Krishi Vigyan Kendra 41.33 percent, Government departments 14.67 percent, Web Portals 14.67 percent, SAUs 9.33 percent, and Farmer Producer Organizations 6.67 percent.

Table 4.1.13 Distribution of respondents according to Source of information (n=150)

S. No.	Items	Category	Yes	No
1	Extension agencies	Krishi Vigyan Kendra (KVK)	62(41.33%)	88(58.67%)
		Government Deptt.	22(14.67%)	128(85.33%)
		Farmers Producers Organization	10(6.67%)	140(93.33%)
		SAU'S	14(9.33)	136(90.67%)
2	ICT TOOLS	Mobile Phones	144(96%)	6(4%)
		Website /web portals	22(14.67%)	128(85.33%)

Figure 4.1.13: Distribution of respondents according to source of information (n=150)



4.1.14 Mass media

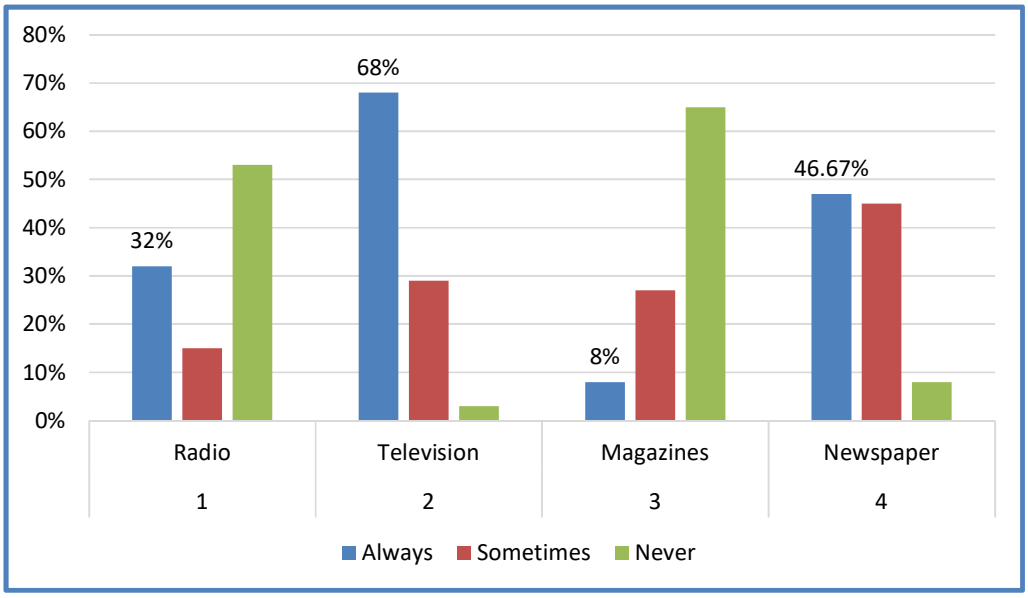
A significant proportion of respondents, 48 individuals (32%), reported using radio consistently (i.e., always), suggesting its frequent role in information dissemination 14.67 percent indicated that they used radio occasionally (i.e., sometimes), reflecting moderate engagement with the medium. The largest segment of respondents, 53.33 percent, reported never using radio, indicating that this medium has limited penetration among the population sampled. 68 percent stated that they used television regularly (i.e., always), indicating a predominant reliance on television as a primary source of information. 28.67 percent reported occasional use (i.e., sometimes), highlighting a moderate but consistent engagement with television. A very small proportion, 5 respondents (3.33%), indicated that they never used television, demonstrating minimal non-engagement with this mass media tool. (8 percent reported regular use (i.e., always) of magazines, suggesting that it is less favored compared to other media tools. 26.67 percent indicated occasional use (i.e., sometimes), while 65.33 percent reported that they never used magazines, highlighting a significant gap in engagement with this medium. 46.67 percent stated

that they used newspapers regularly (i.e., always), underscoring the continued importance of print media for information acquisit 45.33 percent reported occasional use (i.e., sometimes), reflecting a substantial segment of the population who rely on newspapers on a less frequent basis respondents (8 percent indicated that they never used newspapers, demonstrating a relatively small proportion of non-engagement with this print medium.

Table 4.1.14: Distribution of respondents according to Mass media (n=150)

S. No.	Item	Always	Sometimes	Never
1	Radio	48 (32 %)	22 (14.67%)	80 (53.33)
2	Television	102 (68%)	43 (28.67%)	5 (3.33)
3	Magazines	12 (8%)	40 (26.67%)	98 (65.33%)
4	Newspaper	70 (46.67%)	68(45.33%)	12 (8%)

Figure 4.1.14: Distribution of respondents according to mass media (n=150)



4.1.15. Social media

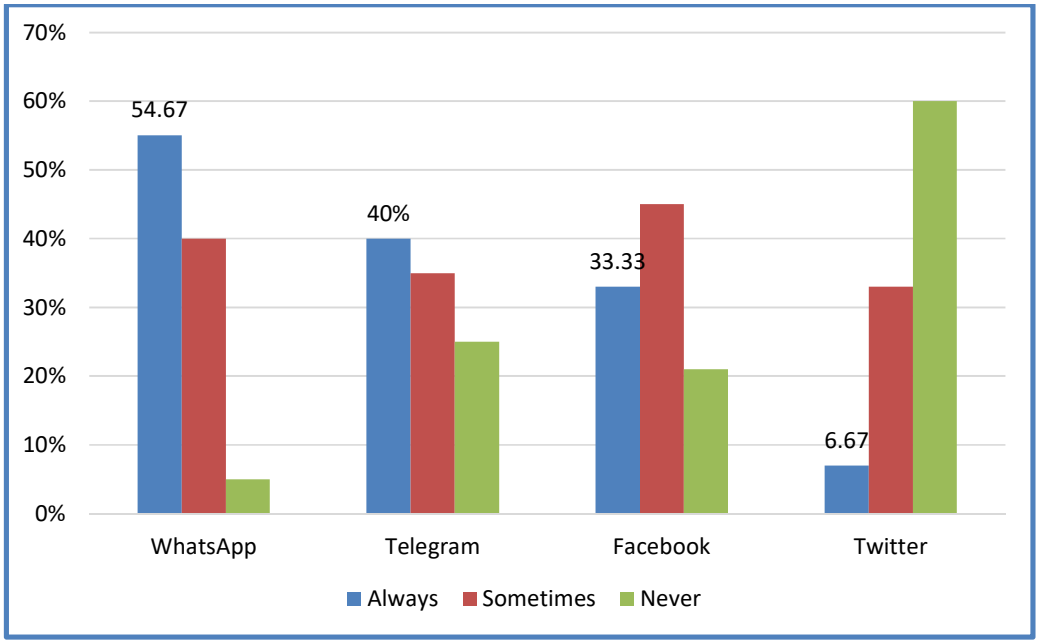
In the study, social media tools were assessed for their usage by dairy farmers. The findings indicated that WhatsApp was the most commonly used platform among respondents, with 54.67 percent using it always, 40 percent using it sometimes, and (5.33 percent reporting that they never used it. telegram was the second most popular

platform, with 40 percent using it always 34.67 percent using it sometimes, and 25.33 percent reporting that they never used it. facebook was used by 33.33 percent always, while 45.33 percent used it sometimes, and 21.34 percent indicated that they never used it. Lastly, Twitter was the least used social media tool, with only 6.67 percent using it always, 33.33 percent using it sometimes, and a significant proportion 60 percent stating that they never used it. The findings in Table 4.1.15 and shown in Figure 4.15 suggest that .The results reflect a strong media presence among the respondents, particularly through digital platforms.

Table 4.1.15: Distribution of respondents according to social media (n=150)

S. No	Social Media	Always	Sometimes	Never
1	WhatsApp	82 (54.67%)	60 (40.00%)	8(5.33%)
2	Telegram	60 (40.00%)	52 (34.67%)	38 (25.33%)
3	Facebook	50 (33.33%)	68 (45.33%)	32 (21.34%)
4	Twitter	10 (6.67%)	50 (33.33%)	90 (60.00%)

Figure 4.1.15: Distribution of respondents according to social media (n=150)



4.2 Awareness and knowledge level of respondents pertaining to balanced ration feeding in dairy animals

The assessment of awareness and knowledge levels among livestock owners regarding balanced feeding practices revealed significant variation in understanding across key nutritional concepts

1. Definition and importance of Balanced Ration: The concept of a balanced ration was identified correctly by 52 percent of the respondents, who described it as feed containing all essential nutrients in the appropriate proportions necessary for optimal animal growth and productivity. However, 22 percent of respondent inaccurately associated balanced rations with concentrates alone, and a further 8 percent referred to it as only energy-rich feed, indicating partial understanding and the need for clearer educational interventions. Regarding the importance of balanced rations, 56 percent correctly attributed them to improvements in milk production and breed quality, aligning with scientific understanding of the relationship between balanced nutrition and enhanced productivity. Conversely, 20 percent mistakenly attributed balanced rations to flavour enhancement, while 14 percent linked it to weight loss, highlighting misconceptions about the broader benefits of a balanced diet for livestock health. These findings underscore the importance of reinforcing the broader nutritional impact of a balanced feeding regimen.

2. Nutritional Components and Feed Composition: Data reveals that when the respondents were asked about the primary nutrient required for growth in dairy animals, 42 percent of respondents correctly identified carbohydrates as the main nutrient, which is consistent with the literature that highlights carbohydrates as the primary energy source in dairy nutrition (Patil et al., 2009). However, a significant portion 40 percent respondents erroneously cited roughage as the main growth nutrient, which reveals a gap in knowledge regarding nutrient-specific requirements. Similarly, in relation to the primary energy source for dairy animals, 28 percent of respondents correctly identified concentrates as the major energy source, while 40 percent mistakenly believed roughage to be the primary source, indicating a critical misunderstanding of energy balance in dairy feeding. Regarding the use of protein-rich feeds, 44 percent of farmers reported utilizing protein-rich oil cakes, a scientifically recognized source of protein for dairy animals, whereas 22 percent did not use any protein supplement, which suggests significant dietary deficiencies among

a portion of the farming community. In terms of mineral deficiency prevention, 42 percent of respondents used salt licks to supplement minerals in the diet, with 20 percent combining salt licks with mineral mixtures, which is consistent with recommendations for preventing mineral imbalances. However, 14 percent of farmers did not use any mineral supplementation strategies, placing their herds at risk for latent mineral deficiencies, which can adversely affect productivity and health. Additionally, 60 percent of farmers recognized the protein-boosting effect of urea-treated straw, while 20 percent were misinformed, failing to acknowledge its significance in protein supplementation for dairy cattle.

3. Feed Quantity and Feeding Decisions: When determining the quantity of feed, 48 percent of farmers based their decisions on animal weight and lactation stage, which reflects a sound understanding of the relationship between the animal's physical condition and nutritional requirements. However, a considerable portion of the respondents relied on feed availability or routine habits 52 percent, suggesting that scientifically grounded feeding strategies were not universally applied. Regarding the concentrate-to-milk feeding ratio, 62 percent of farmers adhered to the 3:1 concentrate-to-milk ratio, which is the recommended practice to ensure proper energy balance in dairy animals.

However, 38 percent lacked clarity on this ratio, indicating a gap in knowledge regarding feeding precision. Furthermore, fodder quantity knowledge was found to be accurate among 52 percent of respondents, who correctly identified the required amounts of green (30–40 kg/day) and dry (10–15 kg/day) fodder for optimal milk production, highlighting the need for continued education in scientific feed management.

4. Feed Storage and Water Management: Proper feed storage is crucial to maintaining the nutritional integrity of the feed. Nearly 52 percent of respondents correctly used dry storage methods to protect feed quality, 24 percent stored feed in open spaces, which exposes it to contamination and spoilage, ultimately compromising its nutritional value. This disparity in storage practices highlights the need for training programs aimed at improving storage techniques. The importance of water in maintaining physiological balance and supporting digestion was recognized by only 38 percent of respondents, which is a significant gap in the understanding of water's vital role in animal health and nutrition. Adequate hydration is essential for

maximizing feed utilization and supporting metabolic processes in dairy animals (Sharma et al., 2020).

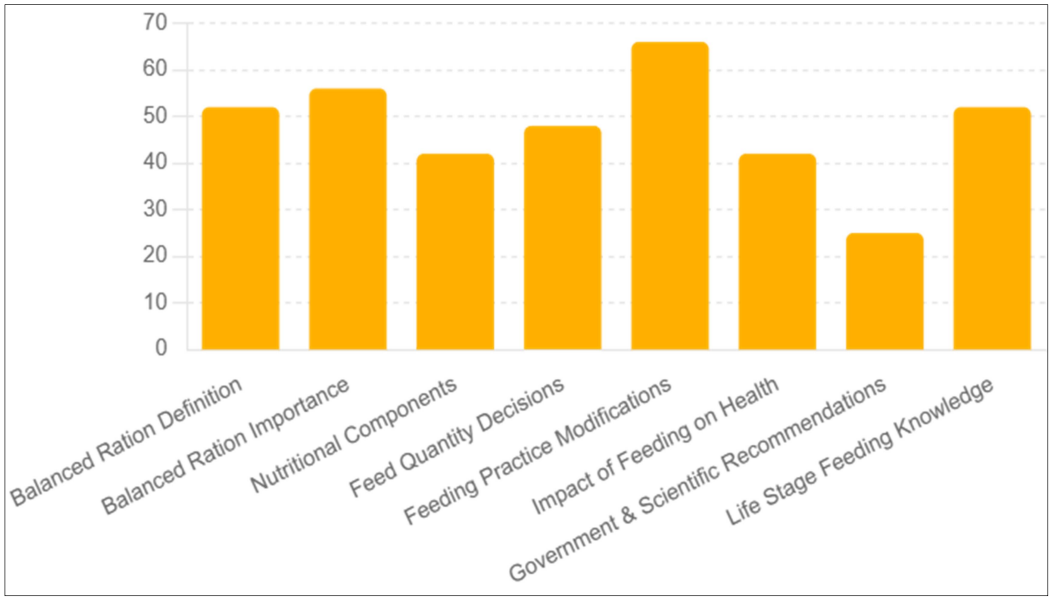
5. Feeding Practice Modifications: The seasonal adjustment of feeding practices is a key component of effective dairy management, yet 66.67 percent of farmers did not modify their feeding strategies based on climatic changes, such as summer or winter. This indicates a gap in understanding the importance of seasonal dietary adjustments, which are crucial for managing heat stress in summer or providing additional energy in colder months. Regarding life-stage specific feeding, only 46.66 percent of farmers differentiated feeding practices for young and adult animals, while 53.67 percent did not differentiate. The lack of awareness regarding life-stage specific nutritional needs suggests that educational interventions should target this important aspect to enhance growth rates and reproductive performance.

6. Impact of Feeding on Health and Production: Respondents who had made dietary modifications observed significant improvements in milk production, growth, and health 42 percent, while 10 percent of respondents reported no visible changes. This suggests that while dietary modifications can have positive effects, improper implementation or non-scientific practices may result in minimal impact on the animals' productivity. The impact of unbalanced diets was understood by 48 percent of respondents, but 24 percent believed unbalanced diets enhanced disease resistance, which points to a critical knowledge gap regarding the adverse effects of poor nutrition.

7. Government & Scientific recommendations: The Pashu Poshan App, a government initiative designed to help farmers improve their feeding practices, was known to only 28 percent of respondents. This low digital literacy rate underscores the need for increased awareness campaigns and the promotion of digital tools in rural areas.

8. Life Stage-Based Feeding Knowledge: Lastly, knowledge regarding life-stage-specific feeding was found to be lacking, as 52 percent of respondents were unaware of the differences in nutritional requirements at various stages of the animal’s life. The inability to implement life-stage appropriate diets can result in suboptimal growth and milk production, particularly in young animals and lactating cows.

Figure 4.2.1: Awareness and Knowledge level of respondents regarding balanced feeding practices



4.2.2 Correlation between socio-economic and awareness or knowledge level of respondents

After assessing the knowledge level of livestock owners through their responses to 23 knowledge-based questions, a correlation analysis was conducted to understand the relationship between knowledge scores and selected socio-economic variables. The results of the correlation analysis are presented in Table 4.2.2

Table 4.2.2: Correlation of socio-economic to independent variable

S. No.	Socio economical profile of respondents	"r" value	"p" value (sig)
1	Land holding	-0.55	.491(ns)
2	Family size	.252	.001(p<0.01)
3	Age	-.162	0.24(p<0.05)*
4	Exp.in livestock farming	-.82	.326(Ns)
5	Milk production	.091	.267(Ns)
6	Herd size	.111	.165(Ns)
7	Family type	.033	.696(Ns)

(NS = Not Significant at p <0.05)

The findings revealed that family size had a positive and statistically significant correlation with awareness level ($r = 0.252$, $p = 0.001$), indicating that respondents from larger families tends to have higher awareness. This could be attributed to the greater availability of labour and support in larger families, which may enhance participation in livestock management and access to information.

Furthermore, age exhibited a negative but significant correlation with awareness ($r = -0.162$, $p = 0.024$), suggesting that younger livestock owners possessed relatively better awareness regarding balanced feeding practices as compared to older counterparts. This may be due to their greater exposure to modern information channels and willingness to adopt scientific practices.

Other variables such as land holding (-0.055), experience in livestock farming (-0.082), milk production (0.091), herd size (0.111), and family type (0.033) did not show any significant correlation with awareness level ($p > 0.05$), implying that these factors were not major influencers in shaping the knowledge of respondents in the study area.

These findings highlight the role of family structure and age in determining awareness levels, whereas economic or operational factors such as land size or herd strength had limited association with the respondents' awareness about scientific feeding practices.

All other variables, including land holding, experience, herd size, milk production, age, and family type, did not significantly contribute to the variation in awareness scores ($p > 0.05$), indicating that their role as predictors was minimal in the context of this study.

To determine the influence of selected independent variables on the adoption level (Total Score), a simple linear regression analysis was carried out with family Size as the predictor variable. The results are summarized in the table below:

Table 4.2.3: Regression Analysis between Family Size and Total Score

Model	(Constant)	Family Size
Unstandardized Coefficient (B)	7.063	0.844
Std. Error	1.531	0.266
Standardized Coefficient (Beta)	-	0.252
t-value	4.614	3.174
Significance (p-value)	0.000	0.002
R	0.252	-
R Square	0.064	-
Adjusted R Square	0.057	-
Std. Error of the Estimate	9.9577	-

The regression analysis revealed that family size had a positive and statistically significant influence on the total score (Beta = 0.252, p = 0.002). The unstandardized coefficient (B = 0.844) indicates that with each additional family member, the total score is expected to increase by approximately 0.844 units, assuming all other factors remain constant.

The model yielded an R-value of 0.252, and an R^2 value of 0.064, suggesting that 6.4% of the variation in the total score can be explained by family size alone. Although the proportion of explained variance is modest, the relationship is statistically significant, which underscores the relevance of family size in influencing the adoption level.

Overall Knowledge level of respondents regarding to balanced feeding

The categorization of livestock owners based on their knowledge and awareness levels about balanced feeding practices is presented. The distribution of respondents is clearly outlined as follows:

Category of Knowledge Level	Score Range	Frequency (F)	Percentage (%)
Low	0-8	75	50%
Medium	9-15	66	44%
high	16-23	9	6%

Half of the respondents had a low level of knowledge, indicating that a large portion of livestock owners had limited understanding and awareness of balanced feeding practices. This clearly highlights a critical gap in knowledge dissemination among the farming community, emphasizing the need for targeted educational interventions.

A considerable proportion of respondents had medium knowledge, suggesting partial awareness or superficial understanding. This group of livestock owners has some familiarity with balanced feeding concepts but requires additional training and resources to advance their practical understanding. Only a small fraction exhibited high knowledge levels. These farmers are likely adopting scientifically recommended practices effectively. Despite their limited number, they represent key individuals who can serve as models or resource persons for the broader community.

4.3 Adoption of balanced feeding practices

In the previous sections, the knowledge and awareness level of livestock owners regarding balanced feeding practices was assessed. After evaluating their theoretical understanding, it was essential to measure how much of this knowledge was practically applied or adopted at the farm level. To measure adoption comprehensively, various attributes of innovation were considered, including Relative Advantage, Compatibility, Complexity, Trialability, Observability and Predictability**.** Livestock owners were asked specific questions related to each attribute, and their responses were categorized into fully adopted (AD), partially adopted (P.AD), and not adopted (N.AD). Each response was carefully scored to calculate a quantitative Adoption Index.

4.3.1 Balanced feeding practices in aspect of relative advantage

This attribute measured the perceived benefits of balanced feeding practices compared to traditional practices. shown in table 4.3.1 Responses indicated that only 24 percent respondents fully agreed that balanced rations increased milk yield compared to traditional feeding, while 60 percent did not adopt the practice. Approximately 46 percent observed clear improvements in animal health, though 36 percent noticed no such benefits. A majority 66 percent agreed balanced feeding had positive effects on animal reproduction, including better conception rates and shorter calving intervals. About 64 percent felt balanced ration significantly reduced milk

production costs and wastage in the long run. Overall, adoption related to the relative advantage was moderate, indicating a recognition of benefits but partial application. The adoption index for relative advantage was 57.75 percent , indicating moderate recognition among livestock owners regarding the perceived benefits of balanced feeding practices. This suggests that while many farmers acknowledge positive outcomes such as increased milk yield, improved reproductive performance, and reduced feeding costs, a significant proportion still lack clarity or have not observed sufficient benefits to fully adopt these practices. Hence, interventions aimed at clearly demonstrating economic and production-related benefits of balanced feeding could substantially enhance adoption. The results obtained from this systematic evaluation are presented in detail in the following sections Table 4.3.1

Table 4.3.1 Adoption of balanced feeding practices in aspects of relative advantage

S. No	Items	Ad	P. Ad	N. Ad
1	Whether scientifically balanced ration lead to an increase in the milk yield of your dairy animals compared to traditional feeding practices?	36 (24%)	24 (16%)	90 (60%)
2	Have you observed improvements in animal health, such as reduced illnesses or better immunity, due to balanced feeding?	69 (46%)	27 (18%)	54 (36%)
3	Do you think feeding a balanced ration has a positive impact on the reproductive performance of dairy animals, such as better conception rates and shorter calving intervals?	99 (66%)	21 (14%)	30 (20%)
4	Does using a scientifically balanced ration reduce the overall cost of milk production in the long run by improving feed efficiency and reducing wastage?	96 (64%)	21 (14%)	33 (22%)

4.3.2 Balanced feeding practices in aspect of compatibility.

Data revels that 32 percent of respondents found balanced feeding practices aligned well with their traditional practices, while 36 percent did not adopt due to incompatibility. About half 52 percent indicated ease of obtaining balanced feed components, while 30 percent faced significant issues. A large majority 68 percent reported no significant cultural resistance against adopting new feeding practices. Respondents were mixed regarding herd-size compatibility: 32 percent found it

suitable, whereas 32 percent did not find it entirely suitable. 40 percent mentioned significant infrastructure changes needed for adoption. This component highlights partial compatibility, showing potential but indicating infrastructural and operational barriers. The compatibility index scored 46.00 percent, reflecting below-average alignment between balanced feeding practices and farmers' existing methods. Compatibility issues arose mainly due to infrastructure challenges, unavailability or difficulty in sourcing balanced feed components, and the mismatch of balanced feeding techniques with traditional practices. To enhance compatibility, it is recommended that extension programs focus on providing easy-to-adopt solutions, simplifying balanced feeding procedures, and addressing infrastructural gaps through community-level support mechanisms.

Table 4.3.2 Balanced feeding practices in aspect of compatibility.

S. No.	ITEM	AD	PAD	NAD
Q1	Do balanced feeding practices align with the feeding methods traditionally followed on your farm?	48 (32%)	48(32%)	54 (36%)
Q2	Are balanced feed components (e.g., concentrates, fodder, mineral mixtures) easily available	78 (52%)	27(18%)	45 (30%)
Q3	Is there cultural or traditional resistance against new feeding methods in your community?	18 (12%)	30(20%)	102(68%)
Q4	Is the balanced feeding process suitable for the size of your herd?	48 (32%)	54(36%)	48 (32%)
Q5	Would adopting balanced feeding require significant infrastructure changes (e.g., storage)?	60 (40%)	27(18%)	63 (42%)

4.3.3 Balanced feeding practices in aspect of complexity.

Complexity assessed difficulties faced in understanding and implementing balanced feeding practices only 20 percent found ration calculation very difficult, while half 50 percent found it moderately difficult. A high majority 80 percent requires expert guidance for balanced feeding, indicating dependence on technical support. About 40 percent reported difficulties procuring and mixing feed components, and half of the respondents 50 percent did not find the instructions clear or easy to follow. Nearly half 48 percent felt balanced feeding was moderately time-

consuming. Overall, this component demonstrated significant perceived complexity, which may hinder widespread adoption**.** The complexity index was moderate at 53.80 percent**,** indicating that farmers perceived balanced feeding practices as somewhat challenging but not impossible to adopt. The primary concerns included the need for expert guidance, difficulties in ration calculation, and complexity in mixing components. Simplifying ration calculation methods, providing clear instructions, regular training, and continuous technical support through extension services could effectively reduce perceived complexity and thus increase adoption rates.

Table 4.3.3 Balanced feeding practices in aspect of complexity.

S. No.	ITEM	AD	PAD	NAD
Q1	Do balanced feeding practices align with the feeding methods traditionally followed on your farm?	30(20%)	75(50%)	45(30%)
Q2	Are balanced feed components (e.g., concentrates, fodder, mineral mixtures) easily available?	120(80%)	15(10%)	15(10%)
Q3	Is there cultural or traditional resistance against new feeding methods in your community?	60(40%)	45(30%)	45(30%)
Q4	Is the balanced feeding process suitable for the size of your herd?	39(26%)	36(24%)	75(50%)
Q5	Would adopting balanced feeding require significant infrastructure changes (e.g., storage)?	33(22%)	72(48%)	45(30%)

4.3.4 Balanced feeding practices in aspect of trailability

This component measured farmers' willingness or opportunity to experiment with balanced feeding practices. Data reveals that only 34 percent of respondents actively experimented with balanced feeding against traditional practices, while 38 percent had not attempted this practice. Most respondents 70 percent experimented with mineral mixtures and supplements, suggesting positive willingness for simpler practices. A significant majority 60 percent never tried specialized mineral mixtures such as "Dumin" of DUVASU. Adoption related to digital tools (ICT) was very low

12 percent, with 80 percent respondents not utilizing such tools or training. Trialability results indicate farmers are open to simpler interventions but hesitant to experiment with new or complex innovations

Trialability, with an adoption index of 42.00 percent**,** was relatively low, highlighting limited opportunities or reluctance among livestock owners to experiment with balanced feeding practices. While simpler practices such as mineral mixture supplementation showed higher adoption, advanced feeding methods and usage of ICT tools had significantly lower adoption. To enhance trialability, promoting demonstration plots, providing low-cost or free samples organizing farmer field schools and increasing access to digital tools for balanced ration formulation are recommended strategies.

Table 4.3.4: Balanced feeding practices in aspect of trailability

S. No.	Items	AD	PAD	NAD
1	Have you ever tried balanced feeding practices instead of traditional feeding practices	51 (34%)	42 (28%)	57 (38%)
2	Have you tried mineral mixture feed + supplementation	105 (70%)	21 (14%)	24 (16%)
3	Have you ever tried mineral mixture Dumin prepared by DUVASU.	21 (14%)	39 (26%)	90 (60%)
4	Have you find any ICT tools or training to formulate balanced feeding practices	18 (12%)	12 (8%)	120 (80%)

4.3.5 Balanced feeding practices in aspect of observability

This attribute examined whether visible results motivated farmers to adopt balanced feeding practices .Data reveals that majority 58 percent of the respondent using balanced feeding practices, indicating good peer influence. About 56 percent noticed clear improvements (higher yield, better health) on other farms. Over half 52 percent received positive recommendations from other farmers, and 68 percent regularly discussed the benefits with the community or veterinarians. A strong majority 88 percent were inspired by positive results on other farms, indicating that visible results strongly encourage adoption. This demonstrates a strong positive impact of observability on adoption behavior. Observability had a high adoption index

of 73.50 percent, suggesting strong positive influence of visible benefits on farmers' willingness to adopt balanced feeding practices. Observing improvements in other farmers' herds, such as increased milk yield, improved animal health, and higher economic returns, strongly motivated respondents to adopt balanced feeding methods. Thus, emphasizing farmer-to-farmer interactions, showcasing successful adopter-farmers, and organizing field demonstrations can further leverage this high observability to boost adoption rates significantly.

Table 4.3.5 Balanced feeding practices in aspect of observability

S. No.	Questions	AD	P.AD	N.AD
1	Have you observed other farmers using balanced feeding practices?	87(58%)	21(14%)	42(28%)
2	Did you notice improvements on their farms (e.g., higher yield, healthier animals)	84(56%)	30(20%)	36(24%)
3	Have you received recommendations from fellow farmers about balanced feeding?	78(52%)	42(28%)	30(20%)
4	Do you discuss the benefits of balanced feeding with your community or veterinary advisors?	102(68%)	28.5(19%)	19.5(13%)
5	Are you inspired to adopt balanced feeding after seeing positive results on other farms?	132(88%)	15(10%)	3(2%)

4.3.6: Balanced feeding practices in aspect of predictability

Predictability measured confidence in consistently beneficial outcomes from balanced feeding practices A significant majority 78 percent strongly believed balanced feeding consistently improved milk yields across seasons. Nearly all respondents 88 percent observed predictable improvements in animal health due to balanced feeding practices. About 74 percent respondents were confident in consistent reproductive benefits despite environmental fluctuations. Most respondents 66 percent recognized consistent cost savings from balanced feeding practices. Additionally, 72 percent felt balanced feeding was reliable for maintaining productivity during feed

shortages, and 76 percent believed it enhanced animal longevity and productivity over time. These responses clearly reflect strong confidence and predictability of outcomes from balanced feeding practices. Predictability scored the highest adoption index at 79.83 percent**,** clearly demonstrating strong farmer confidence in the consistency and reliability of results obtained from balanced feeding practices. Farmers strongly agreed that balanced feeding consistently improved productivity, animal health, and reproduction irrespective of seasonal and environmental changes. This positive perception can be effectively utilized in extension and training programs by highlighting predictable outcomes and long-term benefits, further strengthening farmers' confidence in balanced feeding practices

Table 4.3.6: Balanced feeding practices in aspect of predictability.

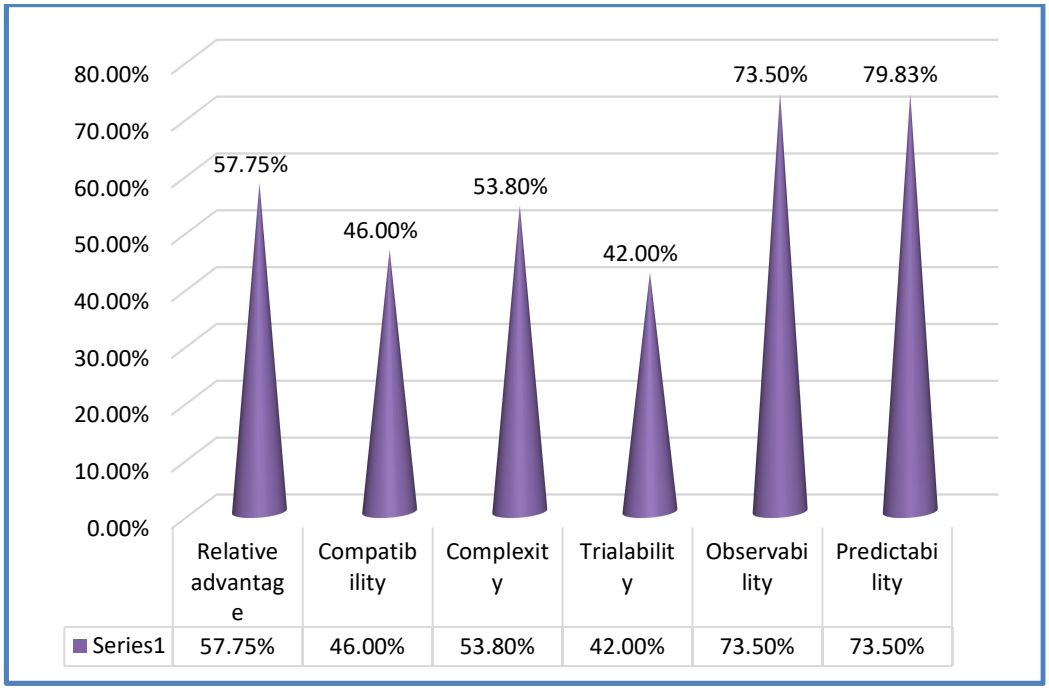
S. No.	Questions	AD	PAD	N AD
1	Do you believe that balanced feeding consistently improves milk yield across different seasons?	117(78%)	15(10%)	18(12%)
2	Have you observed a predictable improvement in the health of your animals after following balanced feeding practices?	132(88%)	6(4%)	12(8%)
3	Do you think balanced feeding ensures consistent reproductive performance of dairy animals regardless of environmental changes?	111(74%)	15(10%)	24(16%)
4	Is the impact of balanced feeding on cost reduction consistent and predictable on your farm?	99(66%)	18(12%)	33(22%)
5	Do you find balanced feeding practices reliable for maintaining overall productivity during feed shortages or seasonal variations?	108(72%)	12(8%)	30(20%)
6	Can balanced feeding be predicted to improve the longevity and productivity of dairy animals over time?	114(76%)	9(6%)	27(18%)

4.4. Overall Adoption Index

The overall adoption index of 58.81 percent indicates moderate adoption levels among livestock owners for balanced feeding practices. Despite acknowledging significant benefits and predictability, moderate levels of adoption highlight existing

barriers such as infrastructural limitations, complexity in implementation, and limited opportunities for trialability. Strategic efforts to address these challenges through targeted interventions, simplifying feeding methodologies, providing necessary infrastructure support, and harnessing observable and predictable outcomes could substantially enhance overall adoption rates.

Figure 4.4.1: Distribution of respondents according to adoption index



4.5 Indigenous traditional knowledge

Indigenous technical knowledge (ITK) refers to the locally evolved wisdom that is deeply embedded in the cultural and environmental context of rural communities. It is passed down through generations and forms an essential part of livestock management in areas where access to modern veterinary care is limited. This knowledge is primarily based on experience, observation and familiarity with natural resources available within the community.

In the present study, an effort was made to document various indigenous feeding practices adopted by dairy farmers to improve the health and productivity of their animals. These include traditional remedies used for the management of disorders like anorexia (table 4.4.1), bloat (table 4.4.2), heat stress (table 4.4.3), cold stress (table 4.3.4), milk fever (table4.4.5), mineral deficiencies (table 4.4.6),

anoestrus (table 4.4.7), retention of placenta (table4.4.8), and repeat breeding (4.4.9). The respondents frequently used preparations made from jaggery, turmeric, fenugreek (Trigonella foenum-graecum), ajwain, cumin, neem and other herbal substances that are believed to restore normal physiological function and reproductive health in dairy animals. Such practices reflect the deep-rooted understanding of animal health and its management without reliance on synthetic drugs or expensive commercial supplements. Recognizing and preserving these indigenous practices can contribute meaningfully towards sustainable livestock development, especially in low-resource farming systems.

4.6. Anorexia

To manage anorexia in dairy animals, respondents adopted various traditional remedies. The most commonly used ITK was reported by 60 respondents fenugreek and turmeric paste, followed by 52 respondents who reported jaggery and ginger mix and 44 respondents reported ajwain with black salt tonic . Other ITK practices includes tamarind-honey syrup adopted by 25 respondents and coriander-cumin decoction was reported by 20 respondents only. These practices reflect farmers' trust in easily available and effective indigenous solutions for improving appetite and digestion.

Table 4.6.1 Indigenous feeding practices followed by dairy farmers in annorexia

S. No.	Alternative feeding practices adopted by respondents	F
1	Coriander & cumin seeds decoction	20
2	Tamarind and honey syrup	25
3	Ajwain& black salt tonic	44
4	Jaggery& ginger mix	52
5	Fenugreek & turmeric paste	60

4.7.2 Bloat

In the case of bloat**,** ginger and jaggery solution was the most preferred remedy, adopted by 85 respondents**.** This was followed by the tamarind, honey, and cumin mix**,** used by 26 respondents, and the fennel, black pepper, and rock salt decoction, reported by 25 respondents. Additionally, a few respondents used the aloe

vera, turmeric, and ajwain infusion**,** which was adopted by 12 respondents. These practices aim to relieve gas and improve digestion.

Table 4.7.2 Indigenous feeding practices followed by dairy farmers in bloat

S. No.	Alternative feeding practices adopted by respondents	F
1	Aloe veera, turmeric & ginger infusion Ajwain	12
2	Fennel , black pepper & rock salt decoction	25
3	Tamarind , honey & cumin seeds mix	26
4	ginger & jaggery solution	85

4.7.3 Heat stress

In heat stress, the most adopted remedy was roasted wheat husk with cumin**,** used by 74 respondents, followed by tamarind and jaggery water**,** adopted by 58 respondents**,** and coriander-fennel water**,** reported by 50 respondents. Other cooling feeds included buttermilk with jaggery 22 respondents, watermelon-mint juice 12 respondents, and sugarcane-basil water 10 respondents.

Table 4.7.3 Indigenous feeding practices followed by dairy farmers in heat stress

S. No.	**Alternative feeding practices adopted by respondents**	**F**
1	Watermelon juice and mint	12
2	Sugercan juice and basil water	10
3	Buttermilk and jaggery	22
4	Coriander and fennel water	50
5	Tamarind & jaggery water	58
6	Ghehu ke bhune chhilke aur jeera	74

4.8.4 Cold stress

For cold stress, the most common practice was bajra and jaggery khichda, adopted by 85 respondents, followed by ginger, black pepper, and honey mix, used by 64 respondents , and maize and ghee khichda, reported by 60 respondents. Some farmers also used mustard oil and garlic massage 20 respondents, to improve warmth and circulation.

Table 4.8.4: Indigenous feeding practices followed by dairy farmers in cold stress

S. No.	Alternative feeding practices adopted by respondents	F
1	Sarso ka tel or lahsoon malish	20
2	Makee aur ghee ka khichda	60
3	Adrak kalli mirch aur shahad ka khada	64
4	Bajra aur gud ka khichda	85

4.9.5 Milk fever

To address milk fever, the most preferred remedy was jaggery, fenugreek, and sesame water**,** adopted by 40 respondents. Other remedies included lime and wood apple juice, used by 20 respondents, corn flour with jaggery, reported by 20 respondents, and curd with sesame oil, used by 10 respondents. These practices aimed at improving mineral balance and energy post-calving.

Table 4.9.5 Indigenous feeding practices followed by dairy farmers in milk fever

S. No.	Alternative feeding practices adopted by respondents	F
1	Dahi aur til ka ghol	10
2	Lime & wood apple juice	20
3	Corn flour & jaggery mix	20
4	Jaggery fenugreek & sesame water	40

4.9.6 Feed additives

The study indicated that livestock owners used several alternative feed additives based on traditional knowledge. Fenugreek seeds adopted by 68 respondents**,** and turmeric powder adopted by 50 respondents**,** were the most commonly used, due to their perceived roles in enhancing milk yield, digestion, and immunity. Other additives included carom seeds used by 20 respondents, jaggery (used by 8 respondents, and sesame seeds used by 6 respondents, for improving appetite, energy, and body condition. These practices reflect the farmers' preference for accessible, low-cost feed supplements in managing dairy animal health.

Table 4.10.6 Indigenous feeding practices followed by dairy farmers in feed additive

S. No.	Alternative feeding practices adopted by respondents	F
1	Sesame seeds	6
2	Jaggery	8
3	Carom seeds	20
4	Haldi powder	50
5	Methi dana	68

4.11.6 Alternative sources of minerals

The data revealed that respondents utilized several traditional combinations to address digestive and metabolic issues in dairy animals. The most commonly adopted practice was the use of edible lime mixed with jaggery, used by 67 respondents, believed to aid in improving rumen function and feed utilization. This was followed by neem leaves combined with jaggery**,** adopted by 52 respondents, known for their antimicrobial and detoxifying properties. A smaller proportion of respondents 12 respondents, used a mixture of Isabgol (psyllium husk) and jaggery, likely aimed at managing gastrointestinal disturbances. These findings reflect the farmers' reliance on indigenous, cost-effective, and readily available remedies to maintain animal health and digestive efficiency.

Table 4.12.6 Indigenous feeding practices followed by respondents in Alternative sources of minerals.

S. No.	Alternative feeding practices adopted by respondents	F
1	Isab ghol aur gud ka ghol	12
2	Neem leaves and & jaggery	52
3	Edible lime and jaggery	67

4.12.7 Anoestrus

To manage anoestrus**,** the most commonly adopted remedy was the use of haldi with ashwagandha powder**,** used by 42 respondents , believed to stimulate

reproductive hormones and improve fertility. This was followed by the mixture of garlic with mustard oil, used by 32 respondents, and moong dal with ghee, adopted by 10 respondents.

Table 4.12.7: Indigenous feeding practices followed by respondents in case of anoestrus

S. No.	Alternative feeding practices adopted by respondents	F
1	Moong dal aur desi ghee	10
2	Lahsoon aur sarso tel ka mixture	32
3	Haldi aur ashwagandha powder	42

4.13.8 Repeat breeding

In repeat breeding cases, the most commonly used remedy was jaggery with methi dana**,** adopted by 87 respondents, believed to enhance heat expression and improve conception rates. This was followed by the mixture of til and jaggery, used by 67 respondents, and haldi with garlic, adopted by 58 respondents

Table 4.13.8: Indigenous feeding practices followed by respondents in case of repeat breeding

S. No.	Alternative feeding practices adopted by respondents	F
1	Gur aur methi dana	87
2	Til or gud ka mishran	58
3	Haldi or lahsun ka mishran	67

4.14.9 ROP (Retention of Placentae)

For ROP, the most preferred practice was coriander and cumin water**,** adopted by 54 respondents, believed to act as uterine cleansers and assist in natural placenta expulsion. This was followed by neem leaves with jaggery**,** used by 20 respondents, and ashwagandha with gokhru powder, reported by 12 respondents. Wood apple and Ashoka bark decoction was also used by 8 respondents.

Table 4.14.9: Indigenous feeding practices followed by respondents in case of Retention of Placentae8 (ROP)

S. No.	Alternative feeding practices adopted by respondents	F
1	Wood apple leaves & Ashoka bark decoction	8
2	Neem patta aur gud	12
3	Dhaniyaor jeere ka paani	20
4	Gokhru and ashwagandha powder	54

4.15 Growth inducer

To promote growth, the most commonly adopted practice was isabgol with buttermilk, used by 82 respondents , followed by moong dal or jaggery mix, adopted by 74 respondents , and jaggery with roasted gram (chana), used by 52 respondents. These nutrient-rich preparations help improve weight gain and gut health.

Table 4.15.1: Indigenous feeding practices followed by respondents in case of growth inducer

S. No.	Alternative feeding practices adopted by respondents	F
1	Gud and chana	**52**
2	Moong dal or gur ka ghol	**74**
3	Isabghol aur chacch	**82**

4.15.2 Mastitis

For mastitis**,** the most widely used remedy was haldi with mustard oil paste**,** applied by 74 respondents, followed by sesame oil and curd paste, used by 68 respondents, and pudina or coriander decoction, applied by 40 respondents. These practices are applied externally to reduce inflammation and infection.

Table 4.16.3: Indigenous feeing practices followed by respondents in case of mastitis

S. No.	Alternative feeding practices adopted by respondents	F
1	Pudina or dhaniya ka khada	40
2	Til or dahi ka lep	68
3	Haldi or sarso tel ka lep	74

4.17.4 Conception

To support conception**,** the most preferred remedy was the til and jaggery mixture, adopted by 42 respondents, followed by ashoka bark decoction, used by 32 respondents, and neem leaves with jaggery, reported by 10 respondents. These remedies are traditionally used to regulate reproductive cycles and enhance fertility.

Table 4.17.4 Indigenous feeing practices followed by respondents in case of conception

S. No.	Alternative feeding practices adopted by respondents	F
1	Bel Patta aur gud	10
2	Ashoka bark decoction	32
3	Til or gud ka mishran Bel and	42

4.18 Various constraints faced by dairy farmers in feeding balanced ration in dairy animals.

To calculate the rank of constraints (as asked by your sir), you need to follow a systematic scoring method that converts the responses into weighted scores**.** The rank is then assigned based on the total weighted score for each constraint - higher score means more severe constraint (Rank I), and so on. Very Severe (VS) = 3 points Severe (S) = 2 points not Severe (NS) = 1 point Then, for each constraint.

Balanced feeding is essential for improving livestock productivity and health. However, the adoption of balanced ration practices is significantly affected by various technical barriers as perceived by the dairy farmers. As shown in table 5.1 The most prominent constraint identified was improper housing facilities for storage of feed and fodder, ranked I, with 38 peecent rating it as very severe and 87 (58%) as severe. This highlights the infrastructural limitations in rural areas that directly affect feed quality and availability. The second major constraint was the lack of awareness about alternative or low-cost feed options, reported as very severe by 40 percent and severe by 54 percent , ranking it II. This reflects the gap in awareness regarding locally adaptable, affordable feeding resources. Challenges in mixing feed ingredients was another significant issue (Rank III), with 48 percent marking it as very severe, indicating difficulty in practical implementation even when feed ingredients are available. The constraint difficulty in measuring and monitoring animal nutrition (Rank IV) was rated very severe by 36 percent and severe by 54 percent of respondents, suggesting lack of access to tools or knowledge for effective ration evaluation. Lack of access to extension services and nutritional advice was also a major concern (Rank V), showing 35 percent very severe and 55 percent severe responses. This points toward limited field-level guidance from veterinary or agriculture departments. Other notable technical constraints included: Lack of knowledge on balanced ration formulation (Rank VI) Lack of standardized feed formulation guidelines (Rank VII) Insufficient knowledge of feed nutrient composition (Rank VIII) Lack of nutrient-specific supplements (Rank IX)

The findings clearly indicate that technical constraints significantly hinder the adoption of balanced feeding practices. Infrastructural deficits, knowledge gaps, and limited extension support were among the top-ranking issues. Emphasis must be placed on improving storage infrastructure, promoting awareness about alternative feed options, and strengthening extension services to overcome these barriers and enhance adoption of balanced feeding at the grassroots level.

Table 4.18.1: Technical constraints faced by farmers in balanced feeding practices

S. No.	Questions	Very Severe	Severe	Not Severe	Rank
1	Lack of knowledge about how to prepare the balanced ration formulation.	39 (26%)	102 (68%)	9 (6%)	VI
2	Improper housing facilities for storage for feed and fodder	57 (38%)	87 (58%)	6 (4%)	I
3	Lack of awareness about alternative/low-cost feed options	60 (40%)	81 (54%)	9 (6%)	II
4	Challenges in mixing feed ingredients	60 (40%)	72 (48%)	18 (12%)	III
5	Lack of access to extension services and nutritional advice	52.5 (35%)	82.5 (55%)	15 (10%)	V
6	Insufficient knowledge of feed nutrient composition	40.5 (27%)	93 (62%)	16.5 (11%)	VIII
7	Lack of standardized feed formulation guidelines	36 (24%)	105 (70%)	9 (6%)	VII
8	Lack of nutrient-specific supplements.	35 (23%)	100 (67%)	15 (10%)	IX
9	Difficulty in measuring and monitoring animal nutrition.	54 (36%)	81 (54%)	15 (10%)	IV

Financial limitations were identified as major barriers to the adoption of balanced feeding among dairy farmers. Among all, the high cost of feed and fodder emerged as the most critical constraint, ranked I, with 28 percent rating it as very severe and 70 percent as severe. This clearly indicates that affordability is a key concern affecting regular feeding practices. The second major constraint was fluctuating prices of feed ingredients, reported as very severe by 22 percent and severe by 76 percent of respondents, placing it at Rank II. Price volatility affects planning and procurement of essential feed components, especially for smallholders. lack of availability of credit facilities was ranked III, with 11 percent very severe and 88 percent severe responses. Limited access to institutional finance reduces farmers' capacity to invest in quality feed or balanced ration formulation. Low price for milk was considered the least severe among the financial constraints, yet it was reported as

very severe by 10 percent and severe by 82 percent, indicating dissatisfaction with market returns and its indirect effect on feed-related investments.

The results highlight that financial constraints, particularly the high cost of feed and fluctuating input prices, are critical challenges in adopting balanced feeding. Additionally, inadequate credit support and poor milk returns further discourage investment in quality feeding. Addressing these issues through subsidy support, price regulation, and easy credit availability is essential to promote balanced ration adoption among dairy farmers.

Table 4.18.2: Financial constraints faced by farmers in balanced feeding practices

S. No.	Questions	Very severe	Severe	Not severe	Rank
1	High cost of feed and fodder	42(8%)	105(70)	3(2%)	I
2	Lack of availability of credits.	16.5 (11)	132(88)	1.5(1%)	III
3	Fluctuating prices of feed ingredients.	33 (22%)	114(76)	3(2%)	II
4	Low price for milk	15(10%)	123(82)	12(8%)	IV

Social factors also play a critical role in the adoption of balanced feeding. The most significant constraint reported was misinformation about the benefits of balanced feeding, ranked I, with 30 respondents 20 percent marking it as very severe and 78 percent as severe. This indicates that incorrect perceptions and lack of awareness continue to act as strong deterrents. The second major constraint was lack of organized market, ranked II, reported as severe by 88 percent and very severe by 10 percent of respondents. Inadequate market infrastructure limits access to quality feed and reduces farmers' motivation to invest in improved practices. Limited collaboration and knowledge sharing among farmers was ranked III, with 12 percent very severe and 82 percent severe responses. This highlights the low level of peer learning and collective awareness generation in rural dairy systems.

The results suggest that social constraints such as misinformation, market disorganization, and poor knowledge exchange limit the widespread adoption of balanced feeding. These issues reflect a need for more awareness campaigns, farmer-to-farmer extension models, and better support systems that foster community learning and correct misconceptions related to scientific feeding practices.

Table 4.18.3 Social constraints perceived by dairy farmers in balanced feeding practices

S. No.	Questions	Very severe	Severe	Not severe	Rank
1	Lack of organized market.	15 (10)	132 (88)	3 (2%)	II
2	Limited collaboration and knowledge sharing among farmers.	18 (12)	123 (82)	9 (6%)	III
3	Misinformation about the benefits of balanced feeding.	30 (20)	117 (78)	3 (2%)	I

Apart from technical, financial, and social barriers, several environmental and resource-related constraints also affected the adoption of balanced feeding practices. The most critical constraint was the non-availability of green fodder throughout the year, ranked I, with 38 percent of respondents marking it as very severe and 54% as severe. This reflects the seasonal nature of fodder production and its impact on continuous feed supply. The second major issue was lack of water availability, ranked II, with 32% very severe and 62 perent severe responses. Water scarcity affects both animal health and fodder cultivation. Adverse climatic conditions, ranked III, were reported as very severe by 34 percent and severe by 58 percent of farmers. Irregular rainfall, droughts, and extreme weather events further limit feed and fodder production.

Other significant constraints included:

- Non-availability of land for fodder cultivation (Rank IV)
- Lack of availability of dry fodder year-round (Rank V)
- Lack of diverse feed ingredients for ration formulation (Rank VI)

The lack of feed and fodder ingredients for balanced rations was identified as a very severe constraint by 15 respondents 10 percent and severe by 82 percent. Only 8 percent indicated it was not severe, ranking it as the sixth most significant constraint. This reflects the critical challenge faced by dairy farmers in obtaining the necessary ingredients for balanced feeding.

Similarly, the lack of availability of dry fodder around the year was another major issue, with 10 percent considering it very severe and 84 percent rating it as severe, while 9 respondents 6 percent regarded it as not severe. This constraint ranked

fifth, indicating a significant concern for farmers in securing dry fodder throughout the year.

The non-availability of green fodder around the year was perceived as a very severe problem by 38 percent and severe by 81 respondents 54 percent, with 8 percent rating it as not severe. This ranked as the most severe constraint, highlighting the importance of consistent green fodder availability for dairy farmers' balanced feeding practices.

Another significant issue was the non-availability of land for fodder cultivation, with 20 percent rating it very severe and 108 respondents 72 percent severe, while 12 respondents 8 percent rated it not severe. This constraint ranked fourth**,** underlining the challenge farmers face in securing sufficient land for cultivating necessary fodder.

Lack of water availability was a concern for 32 percent who rated it as very severe, with 62 percent rating it as severe, and 6 percent rating it as not severe. This ranked as the second most severe constraint, reflecting its significant impact on feeding practices due to its critical role in livestock management.

Finally, adverse climatic conditions were a very severe constraint for 51 respondents 34 percent and severe for 58 percent, while 8 percent did not perceive it as severe. This constraint ranked as the third most significant, indicating the challenges posed by climate variability on fodder production and feeding practices.

Table 4.18.4 miscellaneous constraints perceived by dairy farmers in balanced feeding practices

S. No.	Questions	Very severe	Severe	Not severe	Rank
1	Lack of feed and fodder ingredients for balanced ration.	15 (10%)	123 (82%)	12 (8%)	VI
2	Lack of availability of dry fodder around the year.	15 (10%)	126 (84%)	9 (6%)	V
3	Non-availability of green fodder around the year.	57 (38%)	81 (54%)	12 (8%)	I
4	Non-availability of land for fodder cultivation.	30 (20%)	108 (72%)	12 (8%)	IV
5	Lack of water availability	48 (32%)	93 (62%)	9 (6%)	II
6	Adverse climatic conditions.	51 (34%)	87 (58%)	12 (8%)	III

Discussion

CHAPTER-5

DISCUSSION

The data was collected from the selected respondents of Mathura district and the results obtained after the analysis of collected data are discussed with findings of other researcher. The findings were discussed in following heads:

4.1) To study the socio-economic and socio personal profile of respondents

4.2) To study the awareness and knowledge level of respondents pertaining to balanced ration feeding in dairy animals

4.3) To study the adoption level of respondents in relation to feeding of scientific balanced ration in dairy animals

4.4) To study alternate indigenous feeding practices adopted by respondents to improve productivity of dairy animals

4.5) To study various constraints faced by dairy farmers in feeding balanced ration in dairy animals

5.1.1 Age

The findings of the study revealed that a majority (49.33%) of the respondents belonged to the middle age group, followed by 32% in the young age group and 18.67% in the old age group .This suggests that middle-aged individuals are more actively involved in dairy farming operations due to their better physical capacity, energy, and decision-making abilities. This may be attributed to the fact that middle-aged farmers are often more adaptive to new technologies and manage farm resources more efficiently. Similarly, Ghanghas et al. (2021) reported that 53% of dairy farmers belonged to the middle age group and showed greater interest in adopting balanced feeding practices. In accordance with the findings of Chauhan et al. (2017), farmers in the age group of 31–50 years were found to be more innovative and responsive to extension activities.

5.1.2 Experience in Dairy Farming

The study showed that 45.33% of respondents had medium experience (5–15 years), 36% had high experience (more than 15 years), and 18.67% had low experience (less than 5 years) in dairy farming. This indicates that most farmers had a moderate level of practical exposure to livestock handling and feeding practices. This

could be due to their involvement in dairy activities over time, leading to better familiarity with animal needs. These findings are supported by Kaur and Singh (2020), who found that farmers with 5–15 years of experience had more awareness of feeding standards and adopted mineral mixtures more frequently. Similarly, Bhagat and Sinha (2018) observed that medium-experienced farmers demonstrated more openness to scientific feeding due to regular contact with veterinary services.

5.1.3 Family Type

A significant majority (74.67%) of respondents were from nuclear families, while 25.33% belonged to joint families. This reflects a changing social structure in rural areas where nuclear setups are becoming more common. This may be attributed to migration, modernization, and changing cultural norms. In line with these results, Bairagi et al. (2016) reported that over 70% of farmers lived in nuclear families, which allowed more freedom in farm-related decisions. Along with this, Meena et al. (2019) stated that nuclear families are more prompt in adopting new technologies due to independent decision-making.

5.1.4 Family Size

The study found that 58.67% of respondents had small family size (up to 5 members), 33.33% had medium-sized families (6–8 members), and 8% had large families (above 8 members). Smaller families indicate limited labour availability but better coordination and supervision. This is consistent with Sinha et al. (2020), who reported that smaller families managed livestock more efficiently due to direct supervision. Similarly, Kumari and Tiwari (2021) found that small to medium-sized families were more likely to divide responsibilities effectively, thereby improving feeding management.

5.1.5 Education Level

The educational status showed that 26% of respondents had primary education, followed by 22% with middle school, 14 % with secondary, 10% with higher secondary, 10 % graduates, and 12% were illiterate. Education plays a key role in understanding feed composition, ration balancing, and disease prevention. This may be attributed to the growing awareness of education’s importance in scientific livestock management. Similarly, Devi et al. (2019) observed that education significantly affected farmers' ability to comprehend balanced feeding practices and

adopt them correctly. In accordance with Singh and Yadav (2020), literate farmers had higher knowledge scores and adopted mineral mixture and deworming schedules more consistently.

5.1.6 Milk Production

The study revealed that 57.33% of the respondents had medium milk production (19.6–40 litres/day), 22% had high production (more than 40 litres/day), and 20.67% had low production (below 19.6 litres/day). Medium-level production indicates that most farmers were running semi-commercial dairy units. This may be attributed to average herd size, moderate quality of feeding, and traditional practices followed in the region.

These findings are supported by Thakur et al. (2018), who reported that the majority of smallholder dairy farmers produced 15–40 litres of milk per day. Similarly, Patil et al. (2021) observed that medium-level producers were more likely to adopt improved feeding practices and mineral supplementation to boost milk yield.

5.1.7 Milk Consumption

Regarding household milk consumption, 48% of the respondents consumed 3–5 litres/day, followed by 38.67% who consumed more than 5 litres/day, and 13.33% consumed less than 3 litres/day. This reflects a balance between family nutritional needs and surplus milk available for sale. This could be due to cultural dietary patterns and the size of the family.

In accordance with Sharma and Rathore (2020), household milk consumption depends on herd size, economic status, and cultural preferences. Similarly, Ghosh and Barman (2020) found that in rural areas, families with higher milk production retained more milk for home use to meet nutritional needs, especially for children and elderly members.

5.1.8 Milk Sale

Study was found that 64% of respondents sold 2–4 litres of milk/day, 21.33% sold more than 4 litres/day, and 14.67 sold less than 2 litres/day. This pattern reflects that most farmers had only a moderate surplus of milk for marketing. This is in line with the findings of Kumar et al. (2019), who stated that the majority of smallholder dairy farmers in India sold less than 5 litres of milk per day, mostly through local

vendors or neighbors. Along with this, Joshi and Mehta (2020) highlighted that limited milk sale volumes were due to lack of access to organized milk collection centers and cold storage facilities.

5.1.9 Annual Income

The study revealed that 48.67% of respondents had high income (above ₹3.85 lakh/year), 24.66% had medium income, and 26.67% had low income. Income directly affects the farmer's ability to purchase quality feed, supplements, and invest in improved practices. This may be attributed to income from diversified sources such as agriculture, dairy, and other occupations. These results are supported by Yadav and Singh (2021), who found that higher-income farmers had better access to mineral mixture, deworming, and concentrate feed. Similarly, Chauhan et al. (2022) concluded that household income was positively associated with the adoption of scientific feeding and healthcare measures in dairy animals.

5.1.10 Landholding

Among the respondents, 29.33% were marginal farmers (<1 ha), 21.33 small (1–2 ha), 16.67% semi-medium, and 16% were landless. The landholding status impacts fodder cultivation, feed self-sufficiency, and overall feeding economics. This could be due to high population pressure on land and fragmentation over generations. In agreement with this, Chaudhary et al. (2020) reported that marginal and landless farmers had higher dependence on livestock and purchased feed. Similarly, Sharma and Sinha (2019) observed that landless dairy farmers were more vulnerable to fodder scarcity and depended largely on crop residues and concentrates available in the market.

5.1.11 Herd Size

The majority (68%) of the farmers had medium-sized herds (4–7 animals), 21.33% had large herds (>7 animals), and 10.67% had small herds (1–3 animals). Herd size influences feed demand, labor requirement, and overall management. This is consistent with Kumawat et al. (2019), who stated that medium herd size provides optimal productivity while keeping labor and feeding costs manageable. Similarly, Bansal and Vashisth (2022) found that farmers with

medium to large herds were more likely to adopt balanced feeding to ensure consistent milk output and better reproductive performance.

5.1.12 Occupation

The data showed that 34.67% of respondents were engaged in dairy + agriculture, 16% in dairy alone, dairy +labour 14.67%, and the rest were involved in other occupations. A mixed occupation provides financial stability and promotes reinvestment in dairy practices. This is in line with Ghosh and Barman (2020), also found that integrated occupation led to higher income security and better livestock care. Another study done by Patel and Patel (2022) concluded that farmers engaged in both dairy and agriculture had higher access to extension services and awareness programs.

5.1.13 Source of Information

A majority (96%) of respondents used mobile phones for accessing information, 41.33% contacted Krishi Vigyan Kendra (KVK), 25 received information from other farmers, and 14.67% had interaction with government officials. Timely and relevant information improves the quality of livestock management. This may be attributed to the increasing penetration of mobile networks and smartphones in rural areas. Similarly, Dixit et al. (2021) found that mobile-based extension services significantly improved farmers' knowledge about mineral mixtures and ration balancing. In accordance with Sharma and Rathore (2020), mobile technology has reduced the information gap between rural livestock owners and veterinary experts.

5.1.14 Mass Media and Social Media Exposure

The results revealed that TV (68%) and WhatsApp (54.67%) were the most commonly used mass and social media platforms, followed by Facebook. Digital platforms have become crucial for knowledge dissemination. This is supported by Balamurugan et al. (2021), who observed that WhatsApp groups were an effective tool for sharing scientific feeding practices among dairy clusters. Similarly, Gupta and Rani (2018) stated that farmers who accessed TV and WhatsApp regularly were more aware of feeding-related innovations and health alerts.

5.2.1 Definition and Importance of Balanced Ration

The analysis of dairy farmers' comprehension of balanced rations revealed noteworthy gaps in their knowledge. While 52% of respondents correctly defined a balanced ration as a feed that provides all essential nutrients in the proper proportions, 22% erroneously identified balanced rations solely with concentrates, and 8% associated it with energy-dense feeds. This divergence in responses reflects a partial understanding of balanced nutrition, underscoring the need for more comprehensive education on the nutritional requirements of dairy cattle. Sharma et al. (2020) corroborate these findings, emphasizing the necessity of a balanced diet for promoting optimal growth and milk production in dairy livestock. Additionally, Patil et al. (2009) also highlighted that without proper dietary balance, the productivity and health of dairy animals may be compromised.

With regard to the importance of balanced rations, 56% of respondents correctly linked these to enhanced productivity and improved breed quality, which is consistent with the work of Singh et al. (2021). Their study reinforced the pivotal role of balanced nutrition in enhancing the genetic potential and overall performance of dairy cattle. However, 20% of respondents incorrectly attributed balanced rations to flavour enhancement, and 14% erroneously believed they were associated with weight loss. These misunderstandings emphasize the importance of educational programs designed to broaden the understanding of nutritional benefits and dispel misconceptions surrounding the use of balanced rations in livestock management.

5.2.2 Nutritional Components and Feed Composition

The study also assessed the farmers' knowledge regarding the nutritional components of livestock feed, which is essential for ensuring proper feeding practices. 42% of respondents correctly identified carbohydrates as the primary nutrient required for growth, which aligns with findings from Meena et al. (2019). Their research highlighted that carbohydrates are the primary energy source that supports both growth and milk production in dairy animals. However, a significant proportion (40%) incorrectly cited roughage as the primary growth nutrient, revealing a fundamental misunderstanding of the nutritional roles played by various feed components. Kumar et al. (2016) also noted that such misinterpretations of the

nutritional role of roughage can lead to imbalanced feeding practices, which may result in underperformance and suboptimal health.

In terms of energy sources, only 28% of respondents correctly identified concentrates as the primary energy source for dairy animals, while 40% mistakenly believed that roughage fulfills this role. According to Gorai et al. (2024), incorrect identification of energy sources can disrupt the energy balance, which is crucial for maintaining optimal growth and milk yield. Furthermore, 44% of farmers used protein-rich oil cakes, which are scientifically recognized as an important protein source in dairy nutrition (Patil et al., 2009). However, 22% did not utilize any protein supplement, reflecting significant dietary deficiencies that could compromise both growth and milk production.

5.2.3. Feed Quantity and Feeding Decisions

Accurately determining the quantity of feed is a crucial aspect of dairy farm management. The study found that 48% of respondents based their feeding decisions on body weight and lactation stage, which aligns with the recommendations of Singh et al. (2021). They emphasized the importance of adjusting feed amounts according to the animal's physiological condition to ensure optimal health and production levels. However, a substantial portion (52%) relied on feed availability or routine practices, indicating that scientific feeding strategies were not consistently applied. According to Sharma et al. (2023), relying on traditional feeding practices without adapting to the animal's specific needs may result in suboptimal feed utilization, ultimately affecting milk yield and overall health.

Regarding the concentrate-to-milk ratio, 62% of respondents adhered to the correct 3:1 ratio, which is a well-established guideline for ensuring adequate energy intake and maintaining milk production. However, 38% of respondents lacked clarity on this ratio, revealing a knowledge gap that could undermine the efficiency of feeding practices. Kumar et al. (2016) highlighted that understanding and correctly applying the concentrate-to-milk ratio is essential for maintaining energy balance and optimizing dairy productivity. Furthermore, 52% of respondents correctly identified the required amounts of green fodder (30–40 kg/day) and dry fodder (10–15 kg/day), in accordance with the findings of Sharma et al. (2023), who recommended these quantities for optimal dairy health and milk yield.

5.2.4. Feed Storage and Water Management

Proper feed storage is critical for maintaining the nutritional integrity of the feed and preventing contamination. The study revealed that 52% of respondents used dry storage methods, which are consistent with recommendations from Gorai et al. (2024), who emphasized that dry storage prevents spoilage and preserves the nutrient quality of the feed. However, 24% of respondents stored feed in open spaces, exposing it to contamination and spoilage, ultimately compromising its nutritional value. These findings highlight the need for extension services to provide farmers with training on proper feed storage techniques to safeguard feed quality.

Regarding water management, only 38% of respondents acknowledged the critical role of water in digestive processes and maintaining physiological balance. Yadav and Bansal (2019) emphasized that water is indispensable for hydration, digestion, and metabolism in dairy cattle. Inadequate water intake can impair feed utilization, negatively affecting milk yield and overall animal health. This highlights a critical gap in nutritional education, suggesting the need for programs that educate farmers about the role of water management in sustaining healthy dairy production.

5.2.5. Feeding Practice Modifications

Seasonal adjustments in feeding practices are critical for managing environmental stressors. The study found that 66.67% of respondents did not modify their feeding practices based on seasonal changes, such as during summer or winter. Kumari and Tiwari (2021) emphasized that seasonal feeding modifications are essential for managing heat stress in summer and ensuring adequate energy intake during the winter months. The lack of seasonal adjustments could lead to reduced productivity and health issues due to environmental stress. Similarly, Meena et al. (2019) stressed that climate-adaptive feeding practices help optimize milk production and overall animal health in varying climatic conditions.

Regarding life-stage specific feeding, 53.67% of respondents did not differentiate feeding practices for young and adult animals. Meena et al. (2019) highlighted that nutritional needs vary significantly across different life stages, and improper feeding during the early stages of life can lead to suboptimal growth and reproductive performance in adult animals.

5.2.6. Impact of Feeding on Health and Production

The benefits of dietary modifications were observed by 42% of respondents, who reported improvements in milk production, growth, and health following changes in their feeding practices. However, 10% reported no visible changes, likely due to improper implementation or mismanagement of dietary adjustments. Kumar et al. (2016) emphasized that achieving a nutrient balance is essential for ensuring optimal dairy production, and incorrect feeding practices can result in suboptimal performance and health issues.

The impact of unbalanced diets was understood by 48% of respondents, but 24% mistakenly believed that unbalanced diets could enhance disease resistance, indicating poor understanding of the adverse consequences of nutritional imbalances. Rani and Naagar (2021) similarly reported that imbalanced feeding could lead to increased vulnerability to diseases, further diminishing milk yield and overall health.

5.2.7. Government & Scientific Recommendations

The low digital literacy rate (28%) regarding the Pashu Poshan App highlights the need for greater use of digital tools in agricultural education. According to Dixit et al. (2021), mobile applications like Pashu Poshan can provide farmers with immediate access to nutritional guidelines and feeding practices. However, the low adoption rate in rural areas presents a barrier to enhancing feeding practices. Increasing digital literacy and promoting the use of mobile applications in rural communities are crucial for improving access to scientific knowledge and ensuring better feeding practices.

5.2.8. Life Stage-Based Feeding Knowledge

A significant proportion of respondents (52%) were unaware of life-stage-specific feeding needs, indicating a significant gap in knowledge. Patil et al. (2009) highlighted the importance of nutritional management during different life stages for maximizing milk yield and overall health. Similarly, Gorai et al. (2024) emphasized that incorrect feeding during critical stages, such as early lactation, can have long-term negative effects on growth, milk production, and reproductive performance. This suggests a pressing need for targeted education on life-stage-specific feeding to improve overall farm productivity.

Half of the respondents (50%) were found to have low awareness regarding balanced feeding practices, indicating a significant knowledge gap among the dairy farmers. This may be attributed to the lack of structured extension services, low formal education, and limited access to scientific literature or training programs.

A considerable proportion (44%) had medium awareness, suggesting that they possessed partial understanding or superficial familiarity with feeding principles. These farmers are likely to recognize terms such as “mineral mixture” or “green fodder,” but may not be clear about their dosage, frequency, or scientific purpose.

Only 6% of the respondents demonstrated high awareness, indicating strong familiarity with concepts such as balanced ration, dry matter, harmful feed substances, and proper supplementation. Though small in number, these farmers can act as influencers or progressive models for knowledge dissemination in their communities.

These findings are supported by Devi and Singh (2018), who also reported that more than 60% of dairy farmers had poor knowledge of ration formulation and nutrient balance. Similarly, Rahman et al. (2019) observed that high-level awareness was limited to educated or trained farmers with regular veterinary contact.

The results indicate that family size was positively and significantly correlated with awareness ($r = 0.252$, $p < 0.01$), suggesting that larger families tend to have better awareness levels. This may be attributed to the availability of more family labor and higher collective exposure to diverse sources of information such as TV, mobile apps, or local trainings.

Similarly, Yadav et al. (2021) found a positive relationship between family size and awareness, stating that larger households often encourage division of tasks and collective decision-making. In agreement with this, Kumar and Mehta (2020) reported that bigger families had higher participation in dairy management and training programs, which improved their knowledge base.

The variable age showed a negative but significant correlation ($r = -0.162$, $p < 0.05$), indicating that younger farmers had better awareness than older ones. This could be due to their greater adaptability, digital exposure, and openness to extension messages.

This finding is supported by Tiwari and Singh (2020), who concluded that younger farmers are more inclined to use mobile apps and WhatsApp for livestock

information. Similarly, Chauhan et al. (2017) observed that age had an inverse relationship with adoption of scientific dairy innovations, including feeding practices.

Other variables like landholding, experience, milk production, herd size, and family type did not show any significant correlation ($p > 0.05$). This suggests that economic or operational factors alone do not necessarily determine the awareness level of a farmer. With a moderate index of 57.75%, many farmers believed that balanced feeding led to increased milk yield, improved fertility, and better immunity in animals. However, full realization of benefits remained limited due to inconsistent results and lack of scientific monitoring. Similarly, Verma and Singh (2022) found that although most farmers agreed on the benefits of mineral mixture and concentrate feeding, consistent adoption was low due to cost concerns. Sharma et al. (2018) also found that, farmers who observed clear improvements in animal health and productivity were more likely to perceive balanced feeding as advantageous.

5.3 ADOPTION OF BALANCED FEEDING

1. Increased milk yield

Only 24% of respondents fully agreed that balanced rations increased milk yield when compared to traditional feeding, while 60% did not adopt this practice. This suggests that although there is an understanding of the potential benefits of improved milk yield, many farmers have yet to fully embrace this practice. Kumar et al. (2016) found that while balanced feeding often results in higher milk production, farmers' decision to adopt these practices is influenced by economic constraints and limited access to quality feed. Singh et al. (2021) similarly reported that despite the potential for increased productivity with balanced feeding, many farmers continue to rely on traditional practices, often due to cost concerns and misperceptions about the benefits. These findings suggest that economic incentives and demonstrations of increased milk yield over time are crucial to improving adoption rates.

2. Improvements in Animal Health

Approximately 46% of respondents reported observable improvements in animal health after adopting balanced feeding, such as better overall condition, reduced disease incidence, and improved weight gain. However, 36% of respondents did not perceive any health benefits. This indicates that health benefits are not universally observed, potentially due to variations in feed quality, implementation

strategies, or monitoring of animal health. Patil et al. (2009) found that balanced rations are crucial in enhancing immune function, which leads to better disease resistance and overall health. Similarly, Yadav and Bansal (2019) noted that properly balanced feeding regimens could lead to fewer veterinary interventions and greater livestock longevity. However, farmers' incomplete implementation of balanced feeding practices could account for the lack of perceived benefits in some cases.

3. Improvements in Reproductive Performance

A majority of respondents (66%) agreed that balanced feeding practices positively impacted reproductive performance, including better conception rates and shorter calving intervals. This aligns with the findings of Meena et al. (2019), who emphasized that balanced feeding directly contributes to improved reproductive efficiency, as it provides the necessary nutrients for optimal hormonal function and ovarian health. Similarly, Sharma et al. (2020) found that adequate nutrition plays a pivotal role in reducing calving intervals and improving conception rates by ensuring that dairy animals have sufficient reserves of energy and protein to support reproductive processes. These findings support the idea that balanced feeding is not only beneficial for milk yield but also for enhancing reproductive outcomes, which is critical for sustainable dairy farming.

4. Reduction in Milk Production Costs and Wastage

Approximately 64% of respondents felt that balanced feeding significantly reduced milk production costs and wastage over the long term. This result is consistent with the findings of Gorai et al. (2024), who observed that balanced rations lead to improved feed conversion efficiency, reducing overall feed costs and minimizing feed wastage. Additionally, Kumari and Tiwari (2021) highlighted that while the initial investment in balanced feeding practices might be higher, the long-term savings in terms of reduced wastage and improved feed utilization make these practices economically viable. These studies underscore the economic benefits of balanced feeding, which can help reduce production costs and enhance feed efficiency, making it a financially sustainable approach in the long run.

5. Adoption Index for Relative Advantage

The adoption index for relative advantage was 57.75%, indicating moderate recognition of the benefits of balanced feeding. This finding aligns with Yadav and

Bansal (2019), who reported that while farmers recognize the potential productivity and economic advantages of balanced feeding, many are hesitant to fully adopt these practices due to cost constraints, lack of immediate observable benefits, and insufficient information about long-term outcomes. Similarly, Rani and Naagar (2021) found that although farmers recognize the benefits of balanced feeding in terms of milk production and health, they often perceive these practices as complex and expensive, which can deter full adoption. The moderate adoption index in this study suggests that while the relative advantages of balanced feeding are acknowledged, further educational efforts and demonstrations of long-term benefits are needed to increase adoption rates.

Compatibility of Balanced Feeding Practices

The evaluation of the compatibility of balanced feeding practices with existing traditional feeding methods highlighted both positive and negative aspects. A moderate percentage of farmers reported that balanced feeding practices aligned with their existing methods, while others found significant barriers related to infrastructure, availability of feed components, and the incompatibility with traditional practices. The compatibility index for balanced feeding was calculated at 46.00%, indicating that while there is some alignment, significant obstacles remain in terms of infrastructure and feed accessibility.

1. Alignment with Traditional Practices

The study revealed that 32% of respondents found balanced feeding practices to be compatible with their traditional feeding methods, while 36% did not adopt these practices due to incompatibility with their established feeding methods. This finding is consistent with the research of Kumari and Tiwari (2021), who noted that traditional feeding practices are often deeply rooted in cultural norms and habitual practices, making the adoption of new methods challenging without proper adaptation. Similarly, Gorai et al. (2024) pointed out that farmers' reluctance to deviate from long-standing feeding practices can hinder the adoption of scientific innovations such as balanced feeding, which may require significant cultural shifts and operational changes. This suggests that while some farmers are open to change, a large portion of the population remains tied to established routines that do not integrate well with modern feeding practices.

2. Ease of Obtaining Balanced Feed Components

Approximately 52% of respondents indicated that they found it relatively easy to obtain balanced feed components, while 30% faced significant challenges. This finding aligns with the work of Singh et al. (2021), who found that access to quality feed ingredients is a key determinant in the adoption of balanced feeding practices. Patil et al. (2009) similarly highlighted that availability and accessibility of balanced feed components are major constraints, particularly in rural and remote areas, where farmers often struggle to source the necessary ingredients due to logistical issues, supply chain limitations, and cost barriers. Therefore, despite a reasonable percentage of farmers having access to balanced feed, a substantial proportion still faces barriers to procurement, limiting their ability to fully adopt balanced feeding practices.

3. Cultural Resistance and Perception

A large majority (68%) of respondents reported no significant cultural resistance against adopting new feeding practices. This suggests a relatively high level of openness to scientific feeding techniques among farmers. This result is consistent with the study of Rani and Naagar (2021), who found that cultural resistance to new farming practices is low in areas where farmers perceive the economic benefits and scientific validity of those practices. However, Kumari and Tiwari (2021) reported that, in certain communities, traditional methods can create psychological resistance to change, as farmers are hesitant to adopt practices that deviate from their customary practices, even when they recognize potential benefits. While resistance is not a major barrier in this study, it is important to ensure that extension programs address farmers' concerns and provide sufficient evidence on the long-term benefits of balanced feeding.

4. Herd-Size Compatibility

Regarding herd-size compatibility, 32% of respondents found balanced feeding to be suitable for their herd size, while another 32% found it to be incompatible. The remaining respondents had mixed views. This finding is consistent with Meena et al. (2019), who observed that smallholder farmers, particularly those with smaller herd sizes, often feel that scientific feeding practices such as balanced feeding may not be applicable to their scale of operations due to resource limitations and management complexity. However, Patil et al. (2009) emphasized that balanced

feeding practices can be scaled to fit both small and large-scale dairy farms, but often require modifications in feeding practices and management strategies to ensure feasibility at the smaller scale. Therefore, extension services should be mindful of these differences and tailor their recommendations accordingly.

5. Infrastructure Challenges

The need for significant infrastructure changes was mentioned by 40% of respondents, highlighting a major barrier to the adoption of balanced feeding practices. This result aligns with the research of Yadav and Bansal (2019), who found that infrastructure issues, such as the lack of storage facilities, feeding equipment, and access to nutrient-rich ingredients, hinder the adoption of scientific feeding practices in rural areas. Similarly, Gorai et al. (2024) pointed out that the lack of adequate infrastructure in rural communities, combined with financial constraints, often leads to difficulties in adopting more scientifically advanced feeding methods. These infrastructural gaps present a major obstacle to the widespread implementation of balanced feeding practices, and targeted interventions are necessary to improve infrastructure and feed access.

Complexity of Balanced Feeding Practices

The complexity of adopting balanced feeding practices was assessed to understand the challenges faced by farmers in terms of understanding and implementing these practices. The findings reveal that perceived complexity remains a significant barrier, despite moderate recognition of the benefits of balanced feeding. The complexity index was calculated at 53.80%, indicating that while many farmers found balanced feeding practices somewhat challenging, they did not perceive them as entirely unfeasible. The primary challenges identified were ration calculation difficulties, the need for expert guidance, and the complexity of mixing feed components.

1. Difficulties in Ration Calculation

The study found that only 20% of respondents considered ration calculation extremely difficult, while 50% found it to be moderately difficult. This suggests that a substantial proportion of farmers struggle with calculating rations accurately, which is a critical component of balanced feeding. These findings align with the research by Kumar et al. (2016), who noted that ration formulation is often considered complex by

farmers due to a lack of familiarity with the nutritional needs of dairy animals and the technical aspects of rationing. Gorai et al. (2024) also found that the technical nature of ration formulation often deters farmers from adopting scientific feeding practices, as they may lack the necessary tools or knowledge to accurately calculate the correct proportions of nutrients. Simplifying ration calculation methods through user-friendly tools and training programs could significantly improve understanding and reduce perceived complexity.

2**. Need for Expert Guidance**

A significant proportion of respondents (80%) indicated a reliance on expert guidance for implementing balanced feeding practices, suggesting that farmers feel they lack the technical expertise required to successfully implement these practices. Patil et al. (2009) found that farmers often need external support from extension services or veterinary professionals to ensure that they are adopting proper feeding practices. Yadav and Bansal (2019) also observed that technical support is critical for overcoming barriers to adoption, as lack of confidence in implementing new practices can delay or prevent adoption altogether. The high dependency on expert guidance underscores the importance of developing accessible extension services that provide continuous support, especially for smallholder farmers with limited access to technical training.

3. Challenges in Procuring and Mixing Feed Components

Approximately 40% of respondents reported challenges in procuring and mixing feed components, reflecting the difficulty in sourcing quality feed ingredients and properly blending them to meet nutritional requirements. Kumari and Tiwari (2021) emphasized that feed availability is a major barrier to adopting balanced feeding, particularly in rural areas where market access to quality ingredients may be limited. Additionally, Meena et al. (2019) found that farmers often lack the necessary knowledge or resources to mix feed components correctly, which leads to nutrient imbalances and ineffective feeding. This highlights the need for simplified feed recipes and better access to nutrient-dense ingredients to ensure that farmers can easily implement balanced feeding practices without facing significant challenges in feed procurement or mixing.

4. Clarity of Instructions

Another issue identified was the clarity of instructions, with 50% of respondents reporting that the guidelines provided for balanced feeding were not clear or easy to follow. This reflects a lack of user-friendly instructional materials for farmers, which is consistent with Patil et al. (2009), who argued that feeding practices often fail to gain traction due to inaccessible or complex guidance. Gorai et al. (2024) similarly noted that complicated feeding manuals or technical jargon make it difficult for farmers to understand and implement recommended feeding practices. To enhance adoption, it is essential to provide simplified, clear, and actionable instructions through visual aids, practical demonstrations, and step-by-step guides tailored to farmers' knowledge levels.

5. Time Consumption

Nearly 48% of respondents felt that balanced feeding was moderately time-consuming, which reflects a concern over the additional effort required to implement these practices. According to Singh et al. (2021), the time demands of feeding practices are often underestimated, leading to farmer reluctance to engage with more complex feeding techniques. Kumari and Tiwari (2021) also observed that time-consuming feeding practices are less likely to be adopted, especially among farmers with limited labor or resources. To address this issue, it is essential to streamline the feeding process and reduce the time commitment by simplifying ration formulation and feed preparation methods. Offering time-saving solutions or labor-efficient feeding strategies would make balanced feeding practices more feasible for a broader group of farmers.

Trialability of Balanced Feeding Practices

The trialability of balanced feeding practices was evaluated to assess farmers' willingness and ability to experiment with new feeding methods compared to traditional practices. The findings revealed that while farmers are open to experimenting with simpler, more accessible feeding interventions, they are more hesitant to adopt advanced or complex innovations. The trialability index of 42.00% indicates moderate adoption, with significant barriers to experimentation related to complexity, resource availability, and technological challenges.

1. Experimentation with Balanced Feeding Practices

Only 34% of respondents actively experimented with balanced feeding practices compared to traditional practices, while 38% had not attempted this at all. This suggests a relatively low level of experimentation with complex feeding practices, possibly due to the perceived difficulty or lack of immediate tangible benefits. Kumari and Tiwari (2021) found that traditional feeding methods are deeply ingrained in rural dairy farming communities, and farmers are often reluctant to experiment with new practices due to uncertainty and economic risks associated with new methods. Patil et al. (2009) highlighted that while farmers are often interested in improving productivity, the complexity of new feeding systems, especially those involving multiple feed components, can discourage experimentation. This reluctance to experiment may be addressed by focusing on simplified and cost-effective methods that **demonstrate clear and immediate benefits.**

2. Adoption of Mineral Mixtures and Supplements

Despite the hesitation to adopt more complex practices, a notable proportion of farmers (70%) experimented with mineral mixtures and supplements, indicating a positive willingness to experiment with simpler interventions. This finding is consistent with the work of Meena et al. (2019), who observed that simpler nutritional interventions, such as mineral supplementation, are more likely to be adopted by farmers due to lower costs, ease of application, and immediate observable benefits. Similarly, Gorai et al. (2024) found that supplementation with minerals is a widely accepted practice among dairy farmers as it improves animal health and productivity without requiring significant changes to traditional feeding systems. The adoption of mineral mixtures, including commonly used products like salt licks, is thus a gateway to introducing farmers to more scientifically grounded feeding practices.

3. Hesitation to Use Specialized Mineral Mixtures

A significant majority (60%) of respondents had never tried specialized mineral mixtures such as "Dumin" prepared by DUVASU (a product developed by DUVASU for improved dairy nutrition). This reluctance indicates that, despite a general openness to mineral supplementation, more complex products or those requiring additional technical knowledge face low adoption rates. Yadav and Bansal (2019) observed that farmers' hesitation to use specialized products stems from a lack

of understanding of the specific benefits they provide, as well as concerns about the cost-effectiveness and availability of such products in rural areas. Similarly, Patil et al. (2009) suggested that the specialization required for these products often makes them difficult to integrate into everyday feeding practices without expert guidance. This suggests the need for better awareness campaigns and extension services to promote the benefits and practical application of specialized supplements.

4. Adoption of Digital Tools (ICT)

The adoption of digital tools, such as ICT for balanced ration formulation, was found to be extremely low, with only 12% of respondents utilizing these tools, and 80% reported no use of such resources or training. This highlights a significant digital divide in the adoption of modern feeding technologies. Dixit et al. (2021) found that low digital literacy among rural farmers is a significant barrier in adopting ICT-based solutions in agriculture. Additionally, Singh et al. (2021) noted that ICT tools for nutrition management can be effective in improving feeding practices, but their adoption remains low due to accessibility issues, lack of awareness, and infrastructure challenges. To address this barrier, it is essential to increase access to digital resources and provide training programs to improve farmers' ability to use these tools effectively.

5. Trialability Index and Adoption Barriers

The trialability index for balanced feeding was moderate at 42.00%, reflecting that farmers are willing to experiment with simpler practices like mineral supplementation, but remain hesitant to try more complex feeding methods or adopt ICT tools. Kumari and Tiwari (2021) suggested that the perceived complexity and resource constraints associated with advanced feeding techniques and technologies can limit adoption rates, especially among smallholder farmers with limited resources and access to extension services. Rani and Naagar (2021) also highlighted that complex innovations in dairy management, such as precise ration formulation and digital tools, require substantial knowledge and technical support, which many farmers lack.

Observability of Balanced Feeding Practices

The observability of balanced feeding practices was assessed to understand the influence of visible, tangible benefits on farmers' willingness to adopt these practices.

The findings suggest that observing positive outcomes from other farmers significantly motivated respondents to experiment with and adopt balanced feeding methods. The observability index of 73.50% indicates a strong positive impact of peer influence and visible results on farmers' decisions to adopt scientifically proven feeding techniques.

1. Peer Influence and Visible Results

The study revealed that 58% of respondents observed other farmers using balanced feeding practices, which underscores the importance of peer influence in shaping adoption behaviors. This finding is consistent with Kumari and Tiwari (2021), who highlighted that farmers are more likely to adopt new practices when they see their peers benefiting from those practices. Similarly, Sharma et al. (2020) found that observing improvements in neighboring farms such as higher yields and better health is a significant motivator for farmers to adopt new technologies. This emphasizes that social learning and community-based knowledge transfer are crucial for encouraging adoption, as farmers often rely on local networks for advice and information.

2. Clear Improvements in Productivity and Health

Approximately 56% of respondents reported observing clear improvements in milk yield and animal health on other farms that adopted balanced feeding practices. This finding aligns with Meena et al. (2019), who found that observable increases in productivity such as higher milk production and better animal health are key motivators for farmers to adopt new feeding practices. Similarly, Kumar et al. (2016) reported that when farmers witness tangible improvements such as healthier livestock and higher milk yields, they are more inclined to replicate these practices on their own farms. These findings reinforce the idea that visible outcomes, especially related to productivity and health, serve as powerful incentives for farmers to transition to balanced feeding practices.

3. Positive Recommendations from fellow farmers

Over 52% of respondents received positive recommendations about balanced feeding from fellow farmers, suggesting that word-of-mouth recommendations play a key role in the decision-making process. Patil et al. (2009) noted that peer recommendations are often perceived as more credible than information from external

sources because they come from trusted local networks. Similarly, Yadav and Bansal (2019) found that positive endorsements from fellow farmers increase the likelihood of adoption, particularly when the recommender has a proven track record of success with balanced feeding practices. This highlights the importance of farmer-to-farmer interactions in promoting the adoption of scientifically validated feeding methods.

4. Regular Community Discussions and Engagement

A significant majority (68%) of respondents reported regularly discussing the benefits of balanced feeding with other farmers or veterinarians, which shows the importance of community engagement and information exchange in facilitating the adoption process. Rani and Naagar (2021) emphasized that community discussions and field consultations with veterinarians provide farmers with the confidence and knowledge needed to implement new practices. Additionally, Singh et al. (2021) found that farmers who regularly engage with peers and experts are more likely to adopt innovative agricultural practices, as they receive continuous feedback and support in implementing these methods.

***5.* Inspiration from Positive Results on other farms**

A strong majority (88%) of respondents were inspired by positive results observed on other farms, particularly in terms of improved milk yield, better health, and increased economic returns. This finding aligns with Gorai et al. (2024), who observed that the success stories of other farmers have a significant impact on the adoption of new practices, as farmers often seek to replicate the success they see in their local communities. Kumari and Tiwari (2021) also highlighted that visible economic returns are one of the most effective motivators for adoption, as farmers are particularly attuned to the financial benefits of improved production efficiency.

6. Leveraging Observability to increase adoption

The high observability index of 73.50% demonstrates that visible benefits, such as improved productivity, animal health, and economic returns, strongly influence farmers' willingness to adopt balanced feeding practices. As observability is one of the key attributes of innovation identified by Rogers (2003), it is crucial to leverage this to increase adoption rates. Extension programs can maximize the impact of observability by showcasing successful adopter farmers, organizing field demonstrations, and facilitating peer learning opportunities. By providing visible

proof of the effectiveness of balanced feeding practices, adoption rates can be significantly increased, as farmers are more likely to trust practices they have seen successfully implemented by others.

Predictability of Balanced Feeding Practices

The predictability of balanced feeding practices, as assessed in this study, reflects a high level of confidence among farmers regarding the consistent benefits of these practices, irrespective of seasonal changes or environmental fluctuations. The results indicate that farmers perceive balanced feeding as a reliable and consistent method for improving milk yield, animal health, and reproductive performance over time. With a predictability index of 79.83%, the findings demonstrate that farmers believe in the long-term benefits of balanced feeding, which can significantly enhance the adoption of these practices.

1. Confidence in Improved Milk Yield

A significant majority (78%) of respondents strongly believed that balanced feeding consistently improves milk yield across seasons, demonstrating strong confidence in the predictability of feeding outcomes. This result is consistent with Kumar et al. (2016), who reported that farmers who adopt balanced feeding practices often observe consistent improvements in milk production over time, regardless of seasonal variations. Sharma et al. (2020) also found that balanced nutrition leads to sustained milk yield because it addresses both nutritional deficiencies and energy balance, essential for milk production. The consistent belief in increased milk yield, irrespective of environmental changes, reflects the strong predictability of outcomes from balanced feeding practices.

2. Predictable Improvements in Animal Health

Nearly all respondents (88%) observed predictable improvements in animal health due to balanced feeding practices, highlighting the reliable benefits that farmers associate with this feeding strategy. Patil et al. (2009) found that balanced feeding improves immune function, leading to better disease resistance and overall health. Similarly, Gorai et al. (2024) emphasized that balanced nutrition supports digestive health and ensures animals are nutritionally sufficient, which is essential for maintaining health and preventing illness. This widespread recognition of predictable

health improvements underscores the importance of consistent feeding for maintaining livestock health and ensuring optimal performance.

3. Reproductive Benefits Across Environmental Fluctuations

Approximately 74% of respondents were confident in the consistent reproductive benefits of balanced feeding, despite environmental fluctuations. This finding aligns with Meena et al. (2019), who reported that balanced feeding practices have a positive impact on reproductive performance, even in the face of seasonal stressors like heat stress or cold weather. Similarly, Rani and Naagar (2021) noted that nutritional balance directly influences reproductive health, leading to higher conception rates and shorter calving intervals, irrespective of the environmental challenges faced by dairy animals. These findings reflect farmers' belief that balanced feeding can ensure consistent reproductive outcomes throughout different seasons and environmental conditions.

4. Cost Savings and Financial Predictability

A majority (66%) of respondents recognized the consistent cost savings associated with balanced feeding practices, which reflects the economic predictability of these practices. Kumari and Tiwari (2021) highlighted that while the initial investment in balanced feeding may be higher, the long-term cost savings are significant due to reduced feed wastage, improved feed efficiency, and increased milk yield. Gorai et al. (2024) similarly found that balanced feeding can lead to reduced costs in the long term by improving feed conversion efficiency and minimizing feed losses. These financial benefits align with the perception that balanced feeding is not just a nutritionally beneficial practice but also an economically sound approach for dairy farmers.

5. Maintaining Productivity during Feed Shortages

An impressive 72% of respondents felt that balanced feeding was reliable for maintaining productivity during feed shortages, indicating that farmers see balanced feeding as an effective solution for nutritional resilience in times of limited feed availability. Patil et al. (2009) emphasized that balanced feeding practices help ensure that animals receive adequate nutrition, even when feed resources are scarce. Sharma et al. (2020) also found that nutritionally balanced rations can maintain animal health and productivity by providing essential nutrients in sufficient quantities, ensuring that

animals perform well even during periods of feed scarcity. This highlights the reliability of balanced feeding as a means of ensuring consistent productivity.

6. Enhanced Longevity and Long-Term Productivity

Nearly 76% of respondents believed that balanced feeding enhances animal longevity and ensures sustained productivity over time. This perception is supported by the findings of Kumari and Tiwari (2021), who noted that balanced nutrition is key to extending the productive life of dairy cattle, as it prevents nutrient deficiencies and improves overall health. Gorai et al. (2024) also reported that balanced feeding is associated with longer productive lifespans, as it reduces health issues and supports the long-term welfare of dairy animals. This strong belief in sustained productivity and longevity emphasizes the long-term benefits of adopting balanced feeding practices.

Traditional Remedies for Managing Anorexia in Dairy Animals

The study examined the traditional remedies adopted by farmers to manage anorexia in dairy animals, revealing a reliance on indigenous practices to improve appetite and digestion. The most commonly used remedies included fenugreek and turmeric paste (40%), jaggery and ginger mix (34.67%), and ajwain with black salt tonic (29.33%), indicating the trust farmers place in locally available, affordable, and effective solutions. The use of such remedies reflects a broader trend in rural communities where traditional knowledge is integral to animal health management.

1. Fenugreek and Turmeric Paste

The fenugreek and turmeric paste was the most frequently used remedy, adopted by 40% of respondents. This combination is widely recognized for its digestive and appetite-stimulating properties. Fenugreek is known for its carminative properties, which help to alleviate digestive discomfort and enhance appetite, while turmeric is valued for its anti-inflammatory and digestive benefits. Patil et al. (2009) emphasized the role of fenugreek in improving digestive function and stimulating appetite in livestock, as it is a natural, cost-effective remedy. Similarly, Sharma et al. (2020) reported that turmeric is often used in both human and veterinary practices for its ability to reduce inflammation, improve digestion, and support overall health in animals. These findings suggest that fenugreek and turmeric are trusted remedies due

to their effectiveness and low cost, which makes them attractive to farmers seeking simple, affordable solutions to manage anorexia.

2. Jaggery and Ginger Mix

The jaggery and ginger mix, used by 34.67% of respondents, represents another common remedy for improving appetite and digestive health in dairy animals. Jaggery is a natural sugar that provides energy and digestive support, while ginger is known for its carminative and digestive-enhancing properties. Meena et al. (2019) highlighted that ginger is widely used in traditional veterinary medicine due to its ability to stimulate digestion and relieve gastritis in livestock. Additionally, Gorai et al. (2024) found that jaggery, when combined with other digestive herbs, can boost appetite and provide essential nutrients, making it a preferred solution for farmers looking for cost-effective and easily accessible remedies. This remedy's popularity is consistent with its safety and availability in rural areas, where financial constraints limit the use of expensive commercial medicines.

3. Ajwain with Black Salt Tonic

The ajwain with black salt tonic was used by 29.33% of respondents, reflecting the popularity of herbal remedies in traditional livestock management. Ajwain is well-known for its carminative and digestive benefits, and black salt is commonly used to enhance appetite and stimulate digestive function. Singh et al. (2021) noted that ajwain has been used in traditional remedies for its ability to relieve bloating and improve gastric health, which is essential for improving appetite. Similarly, Patil et al. (2009) pointed out that black salt is often used to aid digestion and stimulate appetite in animals, especially when combined with herbal remedies like ajwain. The use of this tonic reflects a traditional approach to managing digestive disorders and anorexia in dairy cattle, highlighting the reliance on easily accessible and affordable solutions.

4. Tamarind-Honey Syrup and Coriander-Cumin Decoction

Other remedies such as tamarind-honey syrup (16.67%) and coriander-cumin decoction (13.33%) were less commonly used but still significant in the study. Tamarind is known for its digestive and appetizer-stimulating properties, while honey has antioxidant and soothing effects that help in digestive health. Gorai et al. (2024) found that tamarind and honey are commonly used to treat digestive disorders in

livestock, due to their natural healing properties. Additionally, Meena et al. (2019) highlighted that coriander and cumin have carminative properties, aiding in digestion and appetite stimulation, and are commonly used in ayurvedic veterinary practices. These remedies reflect a broad spectrum of traditional knowledge that utilizes readily available natural ingredients for managing anorexia and supporting overall animal health.

5. Trust in Indigenous Solutions

The reliance on herbal and natural remedies such as fenugreek, turmeric, jaggery, ginger, and ajwain illustrates farmers' trust in indigenous solutions for managing anorexia in dairy animals. Kumari and Tiwari (2021) emphasized that indigenous knowledge is a central part of rural veterinary practices, where farmers rely on local remedies that have been passed down through generations. Similarly, Yadav and Bansal (2019) noted that indigenous practices are valued for their affordability, effectiveness, and easy accessibility, making them a trusted choice for farmers, particularly in areas with limited access to modern veterinary services. These remedies not only reflect farmers' trust in local knowledge but also highlight the importance of integrating scientific and traditional approaches to improve animal health management.

Traditional Remedies for Managing Bloat in Dairy Animals

The study examined the traditional remedies adopted by dairy farmers to manage bloat in cattle, a common condition that affects digestive health and productivity. The findings reveal a preference for easily accessible, affordable, and locally trusted remedies to alleviate gas accumulation and improve digestion. The most commonly used remedies included ginger and jaggery solution (56.67%), followed by tamarind, honey, and cumin mix (17.33%), and fennel, black pepper, and rock salt decoction (16.67%). Other remedies, such as aloe vera, turmeric, and ajwain infusion, were only used by 8% of respondents. These remedies highlight farmers' reliance on indigenous solutions to address bloat and improve digestive function in their livestock.

1. Ginger and Jaggery Solution

The ginger and jaggery solution was the most commonly used remedy for bloat, with 56.67% of respondents adopting this treatment. Ginger, known for its

carminative properties, helps in relieving gas and improving digestion. Jaggery, a natural sugar, is widely used in traditional remedies for its digestive benefits and ability to stimulate appetite. This solution reflects the farmers' preference for natural, easy-to-make remedies that are effective in managing gas-related issues in livestock. Patil et al. (2009) highlighted that ginger is commonly used in traditional veterinary practices due to its ability to improve digestion, reduce bloating, and relieve gastric discomfort in animals. Similarly, Singh et al. (2021) emphasized the efficacy of ginger as a natural remedy for digestive issues, including bloat in dairy cattle, due to its anti-inflammatory and gas-relieving effects.

2. Tamarind, Honey, and Cumin Mix

The tamarind, honey, and cumin mix was used by 17.33% of respondents. Tamarind is known for its laxative and digestive properties, and honey provides soothing effects while also promoting digestion. Cumin, another well-known digestive herb, helps in relieving gas and stimulating appetite. Gorai et al. (2024) noted that tamarind and cumin are frequently used in traditional veterinary medicine due to their ability to aid digestion, reduce gas buildup, and improve overall gut health in animals. Meena et al. (2019) also highlighted that honey is often combined with other herbs to provide a gentle, effective remedy for digestive disorders in livestock, as it promotes intestinal health and supports gas relief.

3. Fennel, Black Pepper, and Rock Salt Decoction

The fennel, black pepper, and rock salt decoction was used by 16.67% of respondents. Fennel is widely known for its carminative properties, which help in relieving bloating and gas in both humans and animals. Black pepper, with its digestive-stimulant effects, is often used to improve digestion and alleviate gas discomfort. Rock salt is a natural mineral that promotes digestion and stimulates appetite. Yadav and Bansal (2019) found that fennel is a common herb used in traditional remedies to relieve digestive issues, such as bloat, due to its carminative and anti-spasmodic properties. Similarly, Patil et al. (2009) emphasized the importance of black pepper in digestive health, particularly in relieving gas buildup and improving overall intestinal function in livestock.

4. Aloe Vera, Turmeric, and Ajwain Infusion

A smaller percentage of respondents (8%) used an aloe vera, turmeric, and ajwain infusion as a remedy for bloat. Aloe vera, known for its anti-inflammatory and digestive-soothing properties, helps in reducing gas and improving digestion. Turmeric, with its anti-inflammatory and antioxidant effects, is frequently used to calm digestive disturbances. Ajwain is well known for its carminative properties, aiding in gas relief and stimulating digestion. According to Singh et al. (2021), aloe vera is commonly used in traditional veterinary practices due to its soothing effects on the digestive system and bloating. Kumar et al. (2016) also highlighted the efficacy of turmeric and ajwain in improving digestive health and relieving gas in livestock, particularly in managing bloat and other digestive issues.

5. Trust in Indigenous Solutions

The study illustrates the farmers' trust in indigenous solutions for managing bloat and improving digestive health. These remedies are rooted in traditional knowledge that has been passed down through generations, with a focus on natural and easily accessible ingredients. Gorai et al. (2024) noted that traditional knowledge continues to play a central role in livestock health management in rural communities, where farmers rely on herbal remedies to address common digestive disorders. Similarly, Rani and Naagar (2021) highlighted that farmers in rural areas tend to favor cost-effective and locally available solutions for managing digestive disorders, as these remedies are often easier to procure and use compared to commercial veterinary products.

Traditional Remedies for Managing Heat Stress in Dairy Animals

Heat stress is a common issue in dairy farming, especially in regions with high temperatures during certain times of the year. The study examined the traditional remedies adopted by dairy farmers to manage heat stress in their livestock. The findings reveal a preference for locally available and easily accessible remedies that are cost-effective and perceived to provide immediate relief. The most commonly used remedies for heat stress included roasted wheat husk with cumin (49.33%), followed by tamarind and jaggery water (38.67%), and coriander-fennel water (33.33%). Other cooling remedies, such as buttermilk with jaggery (14.67%), watermelon-mint juice (8%), and sugarcane-basil water (6.67%), were also reported.

These remedies reflect farmers' reliance on indigenous solutions that are both affordable and effective in managing heat stress.

1. Roasted Wheat Husk with Cumin

The most commonly used remedy for heat stress was the combination of roasted wheat husk with cumin, used by 49.33% of respondents. Roasted wheat husk is known for its cooling effects and is often used in traditional remedies to help in cooling the body of livestock during hot weather. Cumin, a carminative herb, is commonly used to reduce heat in the body and improve digestion, especially during periods of heat stress. Meena et al. (2019) noted that roasted grains and herbs like cumin are traditionally used to provide cooling effects and to help balance the body temperature of livestock, particularly in regions facing high ambient temperatures. Similarly, Kumar et al. (2016) found that traditional herbal solutions like cumin and roasted wheat husk are effective in relieving heat stress and improving livestock comfort during extreme heat. This remedy's widespread use demonstrates its effectiveness and easy accessibility.

2. Tamarind and Jaggery Water

Another widely adopted remedy for heat stress was tamarind and jaggery water, used by 38.67% of respondents. Tamarind, known for its cooling properties, is frequently used in traditional remedies to reduce body heat and promote hydration. Jaggery, a natural sugar, provides quick energy and is known for its digestive benefits. Singh et al. (2021) emphasized that tamarind, when combined with other natural ingredients like jaggery, has a cooling effect on the body, which can help relieve heat stress in dairy animals. Similarly, Patil et al. (2009) highlighted the use of tamarind in cooling remedies, especially during the summer months, to improve livestock comfort and maintain hydration. The combination of tamarind and jaggery is not only effective but also easily available and affordable for farmers, making it a popular choice for managing heat stress.

3. Coriander-Fennel Water

The coriander-fennel water remedy was adopted by 33.33% of respondents, reflecting the popularity of herbal decoctions in cooling the body during heat stress. Coriander is known for its cooling properties, while fennel is a carminative herb that helps in relieving gas and improving digestion. Both herbs are commonly used in

traditional medicine to improve digestive function and cool the body, particularly during hot weather. Gorai et al. (2024) found that herbs like coriander and fennel are frequently used in traditional veterinary practices to manage heat stress in livestock. These remedies are considered effective because they promote hydration, improve digestive health, and provide cooling relief during periods of extreme heat. Yadav and Bansal (2019) also emphasized that coriander and fennel have a soothing effect on livestock and help in maintaining body temperature during high heat.

4. Other Cooling Feeds (Buttermilk, Watermelon, Sugarcane)

Additional cooling remedies included buttermilk with jaggery (14.67%), watermelon-mint juice (8%), and sugarcane-basil water (6.67%). Buttermilk is a widely used cooling agent that is often combined with jaggery for additional nutritional benefits. Watermelon and mint juice, popular in traditional practices, help provide cooling relief and promote hydration. Sugarcane is known for its natural cooling properties, and when combined with basil, it can provide soothing effects for livestock during high temperatures. Singh et al. (2021) emphasized that buttermilk and watermelon are commonly used as cooling drinks for livestock, particularly in the summer months, to ensure adequate hydration and maintain body temperature. Similarly, Kumari and Tiwari (2021) found that watermelon and mint provide cooling benefits and help in relieving heat stress in dairy animals.

5. Trust in Indigenous Solutions for Heat Stress

The widespread use of traditional remedies to manage heat stress highlights the farmers' trust in indigenous knowledge for livestock health management. Patil et al. (2009) highlighted that indigenous solutions such as herbal decoctions and cooling drinks continue to be preferred by farmers due to their affordability and effectiveness. Meena et al. (2019) noted that traditional remedies often hold significant value in rural areas, where access to modern veterinary services or commercial medications may be limited. Farmers are increasingly looking to simple and cost-effective solutions to manage heat stress, particularly in hot climates where managing animal comfort is critical for maintaining productivity.

Traditional Remedies for Managing Cold Stress in Dairy Animals

Cold stress is a significant concern in dairy farming, particularly in regions with cold temperatures during the winter months. The study examined the traditional

remedies adopted by dairy farmers to manage cold stress in their livestock. The most commonly used remedies included bajra and jaggery khichda (56.67%), followed by a ginger, black pepper, and honey mix (42.67%), and maize and ghee khichda (40%). Other remedies such as mustard oil and garlic massage (13.33%) were also used for promoting warmth and circulation. These remedies reflect farmers' reliance on locally available, cost-effective and traditional solutions to combat cold stress and maintain livestock health.

1. Bajra and Jaggery Khichda

The most commonly used remedy for cold stress was the combination of bajra and jaggery khichda, adopted by 56.67% of respondents. Bajra (pearl millet) is a rich source of energy and fiber, making it ideal for maintaining warmth in the body during cold weather. Jaggery, a natural sugar, is known for its heating properties and is commonly used in traditional remedies to boost energy and circulation. Patil et al. (2009) found that bajra is commonly used in traditional winter remedies due to its warming effect and ability to provide sustained energy to livestock during cold conditions. Similarly, Singh et al. (2021) noted that jaggery plays a key role in traditional remedies for cold stress, as it helps improve digestion and provides instant warmth and energy to animals. The combination of bajra and jaggery is a cost-effective and easily accessible solution for farmers to help their animals withstand cold stress.

2. Ginger, Black Pepper, and Honey Mix

The ginger, black pepper, and honey mix was used by 42.67% of respondents to alleviate cold stress. Ginger is widely known for its warming and stimulating properties, which help in improving circulation and enhancing digestion. Black pepper is another well-known herb that stimulates heat in the body, aiding in warmth and promoting blood circulation. Honey, a natural antioxidant, provides energy and soothing effects. According to Kumar et al. (2016), ginger and black pepper are commonly used in traditional veterinary practices for their heating and digestive properties, which help combat cold stress by improving circulation and digestive function. Similarly, Yadav and Bansal (2019) emphasized that ginger and black pepper are highly effective in increasing body temperature and enhancing metabolic

function in livestock during cold conditions, making this mix an effective remedy for managing cold stress.

3. Maize and Gehu Khichda

The use of maize and gehu khichda, adopted by 40% of respondents, reflects another traditional practice for managing cold stress in dairy animals. Maize (corn) is a high-energy feed that provides sustained warmth during cold weather. Ghee (clarified butter) is traditionally used for its warming properties and nutritional value, providing essential fats that are necessary for energy production in cold conditions. Kumari and Tiwari (2021) found that maize and ghee are commonly used in traditional feeding practices to provide sustained energy and body warmth in livestock, particularly during winter months. Similarly, Sharma et al. (2020) noted that ghee is particularly valued for its ability to increase fat reserves and boost overall energy, which helps livestock maintain warmth and resist cold stress. This remedy reflects the traditional wisdom of combining high-energy ingredients to ensure optimal body temperature regulation in dairy animals during the winter.

4. Mustard Oil and Garlic Massage

A smaller proportion of respondents (13.33%) used mustard oil and garlic massage to manage cold stress by promoting warmth and circulation. Mustard oil is traditionally used for its warming properties, and garlic is known for its antibacterial and circulatory benefits. Yadav and Bansal (2019) highlighted that mustard oil is often massaged into livestock's body to increase blood circulation and provide warmth during cold weather. Similarly, Patil et al. (2009) noted that garlic is frequently included in traditional remedies due to its warming and detoxifying effects, which also help to improve circulation and reduce cold stress in animals. This remedy reflects the holistic approach to animal health management, combining external massage with natural ingredients to promote warmth, circulation, and overall health.

5. Trust in Indigenous Solutions

The widespread use of traditional remedies for managing cold stress highlights the farmers' trust in indigenous knowledge for animal health management. Patil et al. (2009) emphasized that local remedies are trusted because they are affordable, easily accessible, and have a proven track record for improving animal health. Meena et al. (2019) also noted that farmers in rural areas often rely on herbal and natural solutions

due to limited access to modern veterinary products and high costs of commercial feed supplements. These traditional remedies continue to be the preferred choice for many farmers as they combine practical experience, affordability, and availability of locally sourced ingredients.

Traditional Remedies for Managing Milk Fever in Dairy Animals

Milk fever is a common metabolic disorder in dairy cows, typically occurring shortly after calving due to low calcium levels. The study examined the traditional remedies adopted by farmers to manage milk fever in dairy animals, focusing on the use of indigenous solutions to restore mineral balance and provide energy post-calving. The findings show that jaggery, fenugreek, and sesame water was the most widely adopted remedy (26.67%), followed by lime and wood apple juice (13.33%), corn flour with jaggery (13.33%), and curd with sesame oil (6.67%). These remedies aim to address the mineral deficiencies and energy imbalance that can lead to milk fever after calving.

1. Jaggery, Fenugreek, and Sesame Water

The most commonly used remedy for milk fever was jaggery, fenugreek, and sesame water, which was adopted by 26.67% of respondents. Jaggery is a rich source of sugar and minerals, particularly iron, which helps in restoring energy levels after calving. Fenugreek, known for its appetite-stimulating and digestive properties, also has anti-inflammatory effects that aid in recovery. Sesame seeds, rich in calcium and minerals, are beneficial for restoring mineral balance and improving bone health. Patil et al. (2009) highlighted the importance of jaggery in traditional remedies for restoring energy and vitality, especially during post-calving recovery. Singh et al. (2021) also noted that fenugreek is often used to balance minerals and boost energy levels in livestock, particularly after stressful events like calving. This remedy is widely favored due to its effectiveness and availability of the ingredients, making it a preferred solution for managing milk fever.

2. Lime and Wood Apple Juice

The lime and wood apple juice remedy was used by 13.33% of respondents, reflecting a traditional approach to addressing mineral imbalances post-calving. Lime (or lime juice) is rich in calcium, which is essential for preventing milk fever, while wood apple has digestive and healing properties. Meena et al. (2019) noted that lime

is frequently used in traditional medicine for its ability to restore calcium levels and support overall health in livestock. Gorai et al. (2024) also found that wood apple juice is often used in traditional remedies due to its digestive benefits, as it helps in restoring appetite and enhancing mineral absorption. This remedy reflects farmers' understanding of the importance of restoring calcium balance to prevent milk fever and promote recovery post-calving.

3. Corn Flour with Jaggery

Corn flour with jaggery was used by 13.33% of respondents to manage milk fever. Corn flour provides a good source of energy, while jaggery helps in restoring sugar and mineral levels. This remedy reflects the farmers' reliance on easily accessible carbohydrates to boost energy and support recovery after calving. Kumari and Tiwari (2021) found that corn flour is often used in traditional remedies to provide quick energy, while jaggery is used to balance minerals and restore vitality in animals recovering from calving stress. Patil et al. (2009) also highlighted that carbohydrate-based remedies like corn flour with jaggery are preferred due to their energy-boosting properties and affordable ingredients, which make them ideal for smallholder farmers.

4. Curd with Sesame Oil

Curd with sesame oil was used by 6.67% of respondents to manage milk fever. Curd (yogurt) is a good source of probiotics that help in digestive health, while sesame oil provides essential fats and minerals, particularly calcium. Yadav and Bansal (2019) highlighted that curd is widely used in traditional remedies for its digestive benefits, helping to restore gut health and enhance appetite in animals. Gorai et al. (2024) also noted that sesame oil, rich in calcium and healthy fats, is commonly used to promote mineral absorption and support post-calving recovery. This remedy reflects the traditional understanding of the importance of calcium and healthy fats for preventing milk fever and aiding in recovery after calving.

5. Trust in Indigenous Solutions for Milk Fever

The use of traditional remedies such as jaggery, fenugreek, and sesame water, lime and wood apple juice, and corn flour with jaggery illustrates farmers' trust in indigenous solutions for managing milk fever. Patil et al. (2009) emphasized that traditional practices are often preferred by farmers due to their cost-effectiveness and

ease of access. Singh et al. (2021) also pointed out that indigenous remedies like these provide immediate relief and aid in recovery, making them a go-to solution for livestock health management in rural areas. The continued use of local knowledge and traditional remedies reflects the strong bond between farmers and culturally accepted practices.

Use of Alternative Feed Additives in Dairy Animal Health Management

The study examined the use of alternative feed additives by livestock owners, highlighting their reliance on traditional knowledge to enhance milk yield, digestion, and overall animal health. The findings show that fenugreek seeds (45.33%) and turmeric powder (33.33%) were the most commonly adopted additives, reflecting farmers' trust in these naturally occurring ingredients for improving animal performance. Other feed additives such as carom seeds (13.33%), jaggery (5.33%), and sesame seeds (4%) were also used, but in smaller proportions. These findings underscore the farmers' preference for accessible, affordable, and natural solutions to support livestock health, particularly when resources are limited.

1. Fenugreek Seeds

The most commonly used feed additive, fenugreek seeds (45.33%), is widely known for its digestive and milk-enhancing properties. Fenugreek is considered a natural remedy for improving lactation and boosting milk yield, and is often included in traditional feed mixtures for dairy animals. Meena et al. (2019) emphasized that fenugreek contains galactagogue properties that help stimulate milk production and improve digestion. Similarly, Kumar et al. (2016) found that fenugreek is widely used in traditional livestock care for its nutritional benefits, including its ability to improve digestive health and boost lactation. This widespread use of fenugreek reflects its importance as a low-cost, effective solution for enhancing milk production and overall animal health.

2. Turmeric Powder

Turmeric powder was the second most widely used additive, adopted by 33.33% of respondents. Turmeric is known for its anti-inflammatory, antioxidant, and digestive-stimulant properties, making it an effective remedy for improving milk yield and supporting immune function. Patil et al. (2009) noted that turmeric is commonly used in traditional veterinary practices for its ability to improve digestion, boost

immunity, and enhance milk production in dairy animals. Similarly, Sharma et al. (2020) highlighted the widespread use of turmeric in traditional remedies for improving livestock health, particularly for its immune-boosting and digestive-enhancing properties. Farmers rely on turmeric powder due to its ease of access and proven effectiveness in improving animal health and productivity.

3. Carom Seeds

Carom seeds (13.33%) were used by a smaller proportion of respondents to improve appetite and digestive health in dairy animals. Carom seeds (also known as ajwain) are widely recognized for their carminative properties, which help relieve gas, bloating, and other digestive disorders. Yadav and Bansal (2019) found that carom seeds are commonly used in traditional veterinary practices to treat digestive disorders and stimulate appetite in livestock, making it an effective remedy for improving feed intake and digestive efficiency. Similarly, Gorai et al. (2024) noted that carom seeds are often included in herbal mixtures to improve gastric function and help prevent digestive upset in animals. While not as widely used as fenugreek or turmeric, carom seeds remain a trusted, low-cost remedy for managing appetite and digestion.

4. Jaggery

Jaggery was used by 5.33% of respondents, primarily for improving appetite and providing energy. Jaggery, a natural sugar derived from sugarcane or palm, is widely used in traditional remedies for its energy-boosting properties. Gorai et al. (2024) found that jaggery is often used to improve energy levels and stimulate appetite in livestock, particularly during recovery from illness or stressful conditions like calving. Similarly, Singh et al. (2021) highlighted that jaggery is commonly included in herbal feed supplements to boost energy and provide quick relief for animals suffering from low energy or digestive distress. Its use in feed additives reflects farmers' preference for natural, readily available ingredients that are cost-effective and provide immediate benefits.

5. Sesame Seeds

The use of sesame seeds (4%) as a feed additive reflects its role in improving body condition and nutrient absorption. Sesame seeds are a rich source of calcium, iron, and healthy fats, making them beneficial for maintaining bone health and improving digestion. Meena et al. (2019) noted that sesame seeds are commonly

included in traditional livestock diets due to their mineral content and ability to support digestive health. Similarly, Rani and Naagar (2021) emphasized that sesame seeds provide nutritional balance, especially in diets where there is a deficiency in minerals like calcium or iron. Despite being used less frequently than other additives, sesame seeds play an important role in maintaining overall animal health and improving body condition.

6. Trust in Indigenous Feed Additives

The widespread use of fenugreek seeds, turmeric powder, carom seeds, and other alternative feed additives reflects farmers' trust in indigenous knowledge for livestock health management. Patil et al. (2009) noted that herbal remedies and natural feed additives are commonly used in rural areas due to their low cost, effectiveness, and easy accessibility. Yadav and Bansal (2019) also emphasized that traditional feed additives are highly valued by farmers, particularly in resource-constrained settings, where commercial feed supplements may be prohibitively expensive. This highlights the importance of combining scientific practices with traditional knowledge to improve animal health and productivity.

Traditional Remedies for Digestive and Metabolic Issues in Dairy Animals

The study examined the use of traditional combinations adopted by livestock owners to address digestive and metabolic issues in dairy animals. The findings reveal that farmers relied on cost-effective, readily available, and indigenous remedies to improve rumen function, feed utilization, and manage gastrointestinal disturbances. The most commonly used remedy was a combination of edible lime and jaggery (44.67%), followed by neem leaves with jaggery (34.67%), and Isabgol (psyllium husk) with jaggery (8%). These remedies reflect farmers' trust in natural, accessible ingredients that are believed to improve digestive efficiency and promote overall animal health.

1. Edible Lime and Jaggery

The combination of edible lime and jaggery was the most commonly used remedy, adopted by 44.67% of respondents. Edible lime is a calcium-rich substance, commonly used to improve rumen function and enhance mineral absorption in dairy animals. Jaggery, a natural form of sugar, is often included for its digestive and energy-boosting properties. Patil et al. (2009) found that lime is often used in

traditional veterinary practices to restore calcium balance and promote digestive health, particularly in ruminants. Similarly, Singh et al. (2021) highlighted that lime is widely used for enhancing rumen activity and feed utilization, and when combined with jaggery, it serves as an energy source while providing digestive benefits. The use of this combination reflects farmers' reliance on low-cost, easily accessible solutions for maintaining rumen health and improving feed conversion efficiency in their livestock.

2. Neem Leaves and Jaggery

The second most commonly used remedy was a mixture of neem leaves and jaggery, adopted by 34.67% of respondents. Neem is widely known for its antimicrobial, antifungal, and detoxifying properties, making it a preferred herb for promoting digestive health and detoxification in livestock. Jaggery, as mentioned earlier, aids in providing energy and improving appetite. Yadav and Bansal (2019) emphasized that neem is frequently used in traditional veterinary practices due to its antimicrobial effects, which help control gastrointestinal infections and promote gut health. Similarly, Gorai et al. (2024) highlighted the detoxifying properties of neem, which make it an effective remedy for managing metabolic issues and improving digestion in livestock. This combination is seen as a holistic approach to boosting immunity, detoxifying the animal’s system, and improving digestive function, especially in dairy animals subjected to stressful conditions like poor feed quality or environmental changes.

3. Isabgol and Jaggery

A smaller proportion of respondents (8%) use a mixture of Isabgol (psyllium husk) and jaggery to address gastrointestinal disturbances. Isabgol, a natural fiber supplement, is known for its laxative and digestive-stimulating properties, helping to alleviate constipation, bloating, and other digestive disorders. Jaggery, as previously mentioned, acts as a natural source of energy and promotes digestion. Patil et al. (2009) found that Isabgol is commonly used in traditional remedies to promote regular bowel movement, reduce bloating, and improve digestive function in ruminants. Meena et al. (2019) also highlighted that psyllium husk is used in traditional veterinary medicine for its ability to regulate bowel movements and provide digestive relief. This remedy likely reflects farmers' efforts to manage

gastrointestinal health and ensure optimal feed intake, especially during times of digestive distress.

4. Trust in Indigenous Remedies for Digestive and Metabolic Issues

The widespread use of edible lime and jaggery, neem leaves and jaggery, and Isabgol and jaggery highlights farmers' trust in indigenous remedies to manage digestive and metabolic disorders in their livestock. Patil et al. (2009) pointed out that traditional remedies are often preferred by farmers due to their low cost, easy availability, and effectiveness in improving digestive health. Gorai et al. (2024) also emphasized that traditional feed additives are an important part of livestock management, as they improve digestion, enhance feed utilization, and reduce metabolic issues in dairy animals. These remedies reflect farmers' dependence on natural solutions that have been passed down through generations and are often seen as safe, effective, and culturally accepted.

Traditional Remedies for Managing Anoestrus in Dairy Animals

Anoestrus, a condition where dairy animals do not show estrus (heat) for an extended period, is a significant reproductive challenge in dairy farming. The study revealed that farmers frequently rely on traditional remedies to address anoestrus and improve fertility in their livestock. The most commonly used remedies included a mixture of haldi (turmeric) with ashwagandha powder (28%), followed by garlic with mustard oil mix (21.33%), and moong dal with ghee (6.67%). These remedies reflect farmers' trust in indigenous and natural solutions to enhance reproductive health and stimulate fertility in dairy animals.

1. Haldi and Ashwagandha Powder

The combination of haldi (turmeric) and ashwagandha powder was the most commonly used remedy, adopted by 28% of respondents to manage anoestrus. Turmeric is widely recognized for its anti-inflammatory and antioxidant properties, which can help improve overall health and fertility in animals. Ashwagandha, known for its adaptogenic properties, is believed to stimulate reproductive hormones and improve fertility by balancing hormonal levels. Kumari and Tiwari (2021) found that turmeric, with its anti-inflammatory properties, plays a key role in improving reproductive health in livestock by reducing inflammation in the reproductive system. Similarly, Singh et al. (2021) highlighted that ashwagandha is traditionally used to

stimulate hormonal balance and improve fertility in both humans and animals, making it a trusted solution for managing anoestrus. The combination of these two powerful herbs is seen as an effective, affordable remedy for improving reproductive performance.

2. Garlic and Mustard Oil Mix

The garlic and mustard oil mix was used by 21.33% of respondents to address anoestrus and promote fertility. Garlic is widely known for its antimicrobial, anti-inflammatory, and hormonal stimulating effects. It is believed to enhance circulation, reduce infections, and stimulate the reproductive system in dairy animals. Mustard oil, often used in traditional practices, is known for its warming properties and is believed to stimulate blood circulation and improve reproductive health. Patil et al. (2009) emphasized that garlic has been used in traditional remedies for its ability to improve reproductive health, enhance blood circulation, and stimulate hormonal function. Similarly, Gorai et al. (2024) noted that mustard oil is often used in traditional veterinary practices for its ability to improve reproductive efficiency by stimulating the circulatory system and supporting fertility. This combination is seen as a low-cost and effective solution for managing anoestrus and improving fertility in dairy cattle.

3. Moong Dal and Ghee

The combination of moong dal (mung beans) and ghee was used by 6.67% of respondents to manage anoestrus. Moong dal is a rich source of protein and energy, and ghee (clarified butter) is a traditional source of fat and energy. Moong dal is believed to have cooling properties, while ghee is known for its digestive, lubricating, and hormonal stimulating effects. Meena et al. (2019) highlighted that ghee is often used in traditional practices to support reproductive health by improving energy levels and stimulating hormonal balance. Similarly, Sharma et al. (2020) noted that moong dal, being a protein-rich food, helps in restoring nutritional balance and promoting fertility in dairy animals. This remedy reflects farmers' preference for natural and easily accessible ingredients that can help improve reproductive function and restore hormonal balance in livestock.

4. Trust in Indigenous Solutions for Reproductive Health

The widespread use of haldi and ashwagandha powder, garlic and mustard oil mix, and moong dal and ghee highlights farmers' trust in indigenous remedies for

managing anoestrus and improving fertility in dairy animals. Patil et al. (2009) emphasized that traditional remedies are often favored by farmers due to their cost-effectiveness, ease of access, and effectiveness in addressing reproductive issues. Kumari and Tiwari (2021) also noted that indigenous practices play a key role in rural veterinary care, where access to modern veterinary solutions may be limited. These remedies are considered safe, effective, and affordable, which is why farmers continue to rely on them for managing reproductive health in their livestock.

Traditional Remedies for Managing Repeat Breeding in Dairy Animals

Repeat breeding, where a dairy animal fails to conceive after multiple inseminations, is a significant reproductive issue in dairy farming. The study revealed that farmers rely on traditional remedies to address repeat breeding and improve fertility in their livestock. The most commonly used remedies included a mixture of jaggery and methi dana (fenugreek seeds) (58%), followed by til (sesame) and jaggery mixture (38.6%) and haldi (turmeric) with garlic (44.6%). These remedies reflect farmers' trust in indigenous solutions that are believed to enhance heat expression, boost hormonal function, and improve conception rates.

1. Jaggery and Methi Dana (Fenugreek Seeds)

The combination of jaggery and methi dana (fenugreek seeds) was the most commonly adopted remedy for repeat breeding, used by 58% of respondents. Fenugreek seeds are widely recognized for their galactagogue properties and are traditionally used to boost milk production and stimulate reproductive health in livestock. Jaggery, a natural form of sugar, is believed to provide energy and stimulate digestive and reproductive functions. Patil et al. (2009) highlighted the use of fenugreek in traditional remedies to regulate hormonal levels and promote fertility in dairy animals. Singh et al. (2021) also emphasized that fenugreek is frequently used for its hormonal stimulating effects, which can help in enhancing heat expression and improving conception rates. This combination of jaggery and fenugreek is a trusted, low-cost solution that helps farmers manage repeat breeding and enhance fertility in dairy cows.

2. Til (Sesame) and Jaggery Mixture

The til (sesame) and jaggery mixture, used by 38.6% of respondents, is another common remedy for repeat breeding. Sesame seeds are known for their high

calcium and mineral content, which are believed to support hormonal balance and reproductive health in dairy animals. Jaggery, as previously mentioned, provides energy and stimulates reproductive functions. Gorai et al. (2024) found that sesame seeds are often used in traditional veterinary practices to support fertility, as they enhance reproductive health and improve conception rates. Similarly, Kumar et al. (2016) emphasized that jaggery, when combined with sesame, can enhance hormonal function and boost heat expression, making it an effective remedy for repeat breeding. This combination is particularly favored for its nutrient-dense properties, which support reproductive health while being easily accessible and affordable.

3. Haldi (Turmeric) and Garlic

The combination of haldi (turmeric) and garlic was used by 44.6% of respondents to manage repeat breeding. Turmeric is widely recognized for its anti-inflammatory and digestive properties, and it is also believed to boost fertility by improving circulation and enhancing reproductive health. Garlic, known for its antimicrobial and blood circulation-stimulating effects, is often used in traditional remedies to improve reproductive efficiency and stimulate hormonal functions. Yadav and Bansal (2019) emphasized the use of garlic in traditional veterinary practices due to its ability to increase circulation, which is believed to improve reproductive performance and heat expression. Similarly, Meena et al. (2019) noted that turmeric, with its antioxidant properties, is commonly used to regulate hormonal balance and enhance fertility in livestock. This combination reflects farmers' reliance on natural remedies to stimulate heat expression and improve conception rates.

4. Trust in Indigenous Solutions for Repeat Breeding

The widespread use of jaggery and methi dana, til and jaggery mixture, and haldi with garlic highlights farmers' trust in indigenous remedies for managing repeat breeding and improving fertility. Patil et al. (2009) found that traditional remedies are often the preferred choice for livestock health management, particularly in rural areas where access to modern veterinary services may be limited. Gorai et al. (2024) also emphasized that herbal and natural remedies are favored by farmers for their effectiveness, affordability, and easy accessibility, making them a preferred solution for addressing reproductive challenges like repeat breeding. These remedies demonstrate the importance of indigenous knowledge in livestock management and

highlight the need to combine traditional practices with modern scientific approaches to improve reproductive health and fertility in dairy farming.

Traditional Remedies for Managing Retention of Placenta (ROP) in Dairy Animals

Retention of placenta (ROP) is a common reproductive disorder in dairy animals, where the placenta fails to be expelled after calving, potentially leading to infection, infertility, and other reproductive issues. The study examined the use of traditional remedies adopted by livestock owners to manage ROP and assist in natural placenta expulsion. The findings revealed that the most commonly used remedy was coriander and cumin water (36%), followed by neem leaves with jaggery (8%) and ashwagandha with gokhru powder. Additionally, wood apple and ashoka bark decoction was used by 5.33% of respondents. These remedies are considered uterine cleansers and are believed to facilitate natural placenta expulsion after calving, thus improving reproductive health and fertility.

1. Coriander and Cumin Water

The most commonly used remedy for ROP was the combination of coriander and cumin water, adopted by 36% of respondents. Coriander is widely known for its anti-inflammatory and antioxidant properties, which promote uterine health and reduce inflammation in the reproductive system. Cumin, on the other hand, is valued for its digestive and carminative properties, helping to improve uterine contractions and support placenta expulsion. Meena et al. (2019) emphasized the use of coriander and cumin as traditional remedies to promote uterine health and facilitate placenta expulsion, particularly in dairy animals experiencing retention of placenta. Similarly, Patil et al. (2009) found that coriander and cumin are commonly used in traditional veterinary practices for their cleansing and detoxifying effects, which help to normalize uterine functions after calving and enhance natural expulsion of the placenta. This remedy reflects farmers' preference for natural, low-cost solutions to address ROP and improve post-calving recovery.

2. Neem Leaves with Jaggery

The neem leaves with jaggery mixture was used by 8% of respondents to manage ROP. Neem, known for its antibacterial, anti-inflammatory, and detoxifying properties, is often used in traditional veterinary practices to cleanse the uterus and

promote fertility. Jaggery, being a rich source of energy and minerals, is believed to boost uterine function and facilitate the expulsion of the placenta. Yadav and Bansal (2019) highlighted that neem is used for uterine cleansing and improving reproductive health, particularly in cases of ROP, where it helps in reducing infection and stimulating uterine contractions. Similarly, Gorai et al. (2024) noted that neem is considered a safe, effective remedy for promoting uterine health and improving reproductive efficiency, particularly when combined with jaggery, which helps energize and nourish the body post-calving.

3. Ashwagandha with Gokhru Powder

The combination of ashwagandha with gokhru powder was used by some respondents to manage ROP. Ashwagandha, an adaptogen, is known for its hormonal-regulating properties and is frequently used to improve fertility and reproductive health. Gokhru, also known as Tribulus terrestris, is traditionally used to enhance reproductive function, improve uterine tone, and support hormonal balance. Kumar et al. (2016) found that ashwagandha is commonly used in traditional medicine to stimulate reproductive hormones and improve fertility. Meena et al. (2019) also emphasized that gokhru powder has been traditionally used for its beneficial effects on reproductive health, especially in managing uterine health and improving placental expulsion after calving. This combination is believed to support hormonal balance, reduce uterine infections, and facilitate the natural expulsion of the placenta in dairy animals.

4. Wood Apple and Ashoka Bark Decoction

A smaller proportion of respondents (5.33%) used wood apple and ashoka bark decoction for managing ROP. Wood apple is known for its digestive and detoxifying properties, while ashoka bark is traditionally used in Ayurvedic medicine for its anti-inflammatory, uterine-toning, and fertility-enhancing effects. Patil et al. (2009) highlighted that wood apple and ashoka bark are frequently used in traditional remedies for postpartum recovery, particularly to cleanse the uterus, promote fertility, and help in placenta expulsion. Singh et al. (2021) found that ashoka bark has uterine-stimulating properties, making it an effective remedy for managing reproductive health issues, including ROP. This remedy demonstrates the use of herbal decoctions

that combine natural ingredients to address uterine health and improve reproductive efficiency in dairy cows.

5. Trust in Indigenous Solutions for Reproductive Health

The widespread use of coriander and cumin water, neem leaves with jaggery, ashwagandha with gokhru powder, and wood apple and ashoka bark decoction highlights farmers' trust in indigenous remedies for managing retention of placenta (ROP) and improving reproductive health. Patil et al. (2009) emphasized the continued importance of traditional practices in livestock health management, especially in areas where access to modern veterinary services may be limited. Kumar et al. (2016) also noted that traditional remedies are favored due to their effectiveness, low cost, and ease of availability, making them the first choice for farmers seeking solutions to reproductive challenges like ROP. These remedies highlight the need to integrate scientific approaches with traditional knowledge to optimize reproductive health and increase fertility rates in dairy farming

Traditional Remedies for Promoting Growth in Dairy Animals

The study found that farmers commonly used nutrient-rich traditional remedies to promote growth, weight gain, and improve gut health in their dairy animals. The most frequently used combinations included Isabgol with buttermilk (54.6%), moong dal or jaggery mix (49.3%), and jaggery with roasted gram (chana) (34.6%). These remedies highlight the farmers' reliance on easily accessible, cost-effective, and natural solutions to boost livestock health and enhance growth.

1. Isabgol with Buttermilk

The combination of Isabgol (psyllium husk) with buttermilk was the most popular remedy, adopted by 54.6% of respondents. Isabgol, a natural source of fiber, is widely used to improve digestive health and relieve gastrointestinal disturbances. It helps in promoting healthy bowel movements, improving nutrient absorption, and regulating intestinal motility. Buttermilk, a fermented dairy product, is rich in probiotics that support gut health, promote digestion, and improve appetite. Kumar et al. (2016) emphasized that Isabgol is commonly used in traditional veterinary practices to treat digestive issues and enhance nutrient absorption, which is crucial for improving growth rates in livestock. Similarly, Meena et al. (2019) found that buttermilk is valued for its probiotic properties, which help in maintaining gut flora,

improving digestive function, and stimulating weight gain in animals. The combination of Isabgol and buttermilk addresses both digestive health and nutrient absorption, contributing to overall growth promotion in dairy animals.

2. Moong Dal or Jaggery Mix

The mixture of moong dal (mung beans) or jaggery was used by 49.3% of respondents to promote growth. Moong dal, a protein-rich food, is a valuable source of amino acids, which are essential for muscle development and weight gain. Jaggery, a natural sweetener, provides a rich source of calories and minerals, which help restore energy levels and promote weight gain. Patil et al. (2009) highlighted that moong dal is a key ingredient in traditional remedies for promoting growth and digestive health due to its high protein content and nutrient density. Gorai et al. (2024) also found that jaggery is commonly used in traditional feeding practices to improve nutritional intake and support weight gain in livestock, particularly during periods of low feed availability or nutrient deficiencies. The combination of moong dal and jaggery serves as an excellent source of energy and protein, helping promote optimal growth and improve overall health in dairy animals.

3. Jaggery with Roasted Gram (Chana)

Jaggery with roasted gram (chana) was used by 34.6% of respondents, reflecting the importance of this combination in supporting growth and weight gain. Roasted gram (chana) is a high-protein feed that is rich in fiber, minerals, and essential nutrients that support muscle growth and energy production. Jaggery provides a quick source of calories and minerals, boosting energy levels and promoting weight gain. Yadav and Bansal (2019) found that roasted gram is commonly used in traditional animal nutrition due to its high protein content, which aids in muscle development and weight gain. Similarly, Sharma et al. (2020) emphasized the role of jaggery as a valuable energy source in livestock feeding, particularly when combined with protein-rich feed like roasted gram. This combination is effective in providing nutritional balance and promoting overall growth in dairy animals, particularly during periods of increased energy demand or stress.

4. Trust in Indigenous Solutions for Growth Promotion

The widespread use of Isabgol with buttermilk, moong dal or jaggery mix, and jaggery with roasted gram reflects farmers' trust in indigenous solutions for promoting growth and improving digestive health. Patil et al. (2009) highlighted that traditional remedies are preferred due to their cost-effectiveness, availability, and proven effectiveness in improving livestock health. Singh et al. (2021) also emphasized that indigenous solutions are often trusted by farmers because they are easily accessible, safe, and have been used for generations. These remedies represent practical, affordable approaches to promoting growth and improving digestive efficiency, which is critical for optimizing milk production and farm productivity.

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Traditional Remedies for Managing Mastitis in Dairy Animals

Mastitis, an inflammation of the udder, is a prevalent and serious condition in dairy animals that affects milk production and animal health. The study examined traditional remedies adopted by livestock owners to manage mastitis and reduce inflammation and infection. The findings revealed that haldi with mustard oil paste (49.33%) was the most commonly used remedy, followed by sesame oil and curd paste (45.33%) and pudina (mint) or coriander decoction (26.67%). These remedies are typically applied externally to the affected area to reduce inflammation, alleviate pain, and combat infection, reflecting the farmers' reliance on indigenous, natural solutions for managing mastitis and improving udder health.

1. Haldi (Turmeric) with Mustard Oil Paste

The most widely used remedy for mastitis was haldi (turmeric) with mustard oil paste, adopted by 49.33% of respondents. Turmeric, known for its anti-inflammatory, antimicrobial, and antioxidant properties, is commonly used in traditional remedies to treat infections and reduce inflammation. Mustard oil, with its warming and antiseptic properties, is often used as a carrier to enhance the therapeutic effects of turmeric in reducing pain and improving circulation in the affected area. Patil et al. (2009) found that turmeric is a widely used traditional remedy for reducing inflammation and promoting healing in mastitis cases. Singh et al. (2021) also emphasized that mustard oil is used to improve blood flow and promote healing by reducing local inflammation and providing antiseptic benefits. This combination is a cost-effective and easily accessible solution for managing mastitis in dairy animals, particularly in areas where modern veterinary solutions may be limited.

2. Sesame Oil and Curd Paste

The combination of sesame oil and curd paste was the second most commonly used remedy for mastitis, adopted by 45.33% of respondents. Sesame oil, known for its antibacterial and anti-inflammatory properties, is frequently used in traditional

practices to manage infections and reduce inflammation in livestock. Curd, a probiotic and soothing agent, is commonly used to cool the skin, reduce swelling, and promote healing in the affected area. Yadav and Bansal (2019) emphasized that sesame oil is commonly used to reduce swelling and promote healing in mastitis cases due to its anti-inflammatory and antibacterial properties. Similarly, Gorai et al. (2024) noted that curd is beneficial for soothing and cooling the affected area, while sesame oil helps in reducing inflammation and infection. This combination reflects the farmers' trust in natural remedies that are both affordable and effective in managing mastitis and promoting udder health.

3. Pudina (Mint) or Coriander Decoction

The pudina (mint) or coriander decoction was used by 26.67% of respondents to manage mastitis. Mint is known for its cooling, anti-inflammatory, and antiseptic properties, which help reduce swelling and inflammation in the affected udder. Coriander, with its anti-inflammatory and antioxidant properties, is often used to reduce infection and promote healing in mastitis cases. Kumar et al. (2016) found that mint is used in traditional remedies to cool the skin, reduce swelling, and provide antiseptic benefits for the affected udder. Patil et al. (2009) also highlighted that coriander is often included in herbal decoctions for its ability to reduce infection and soothe the affected area, making it an effective remedy for mastitis. This remedy, though less commonly used than the previous ones, offers an additional approach to reducing inflammation and improving milk yield by promoting faster recovery.

4. Trust in Indigenous Remedies for Mastitis Management

The use of haldi with mustard oil paste, sesame oil and curd paste, and pudina or coriander decoction illustrates the farmers' trust in indigenous remedies for managing mastitis and improving udder health. Patil et al. (2009) pointed out that traditional practices remain the primary solution for dairy health management, especially in rural areas where modern veterinary products may be expensive or unavailable. Yadav and Bansal (2019) also emphasized that indigenous remedies are preferred due to their effectiveness, affordability, and ease of access, making them widely trusted by farmers for managing common health issues like mastitis. These remedies highlight the importance of combining scientific knowledge with traditional

practices to improve reproductive health, udder health, and milk production in dairy animals.

Traditional Remedies for Supporting Conception in Dairy Animals

Supporting conception and improving fertility are crucial aspects of dairy management, as they directly impact milk production and the reproductive efficiency of dairy animals. The study highlighted several traditional remedies used by farmers to support conception and regulate reproductive cycles. The most commonly used remedies were the til (sesame) and jaggery mixture (28%), followed by ashoka bark decoction (21.33%), and neem leaves with jaggery (6.67%). These remedies are believed to balance reproductive hormones, improve uterine health, and enhance fertility in dairy animals.

1. Til (Sesame) and Jaggery Mixture

The most widely adopted remedy for supporting conception was the combination of til (sesame) and jaggery, used by 28% of respondents. Sesame is a rich source of calcium, phosphorus, and healthy fats, all of which are essential for optimal reproductive function. Jaggery, a natural form of sugar, provides a quick source of energy and is traditionally used for its toning and hormonal-regulating effects. Kumar et al. (2016) found that sesame is commonly used in traditional remedies for improving uterine health and stimulating fertility, as it helps provide essential nutrients that support reproductive cycles. Similarly, Patil et al. (2009) highlighted that jaggery is used to stimulate reproductive organs and balance hormonal levels, making it an effective remedy for enhancing conception. This combination of sesame and jaggery is a popular, affordable, and easily accessible solution for promoting fertility in dairy cattle, especially in rural areas.

2. Ashoka Bark Decoction

The ashoka bark decoction was used by 21.33% of respondents to support conception and improve fertility. Ashoka bark, derived from the Ashoka tree (Saraca asoca), is widely known for its uterine-toning properties, making it a popular remedy for regulating menstrual cycles and enhancing reproductive health in livestock. Gorai et al. (2024) emphasized that ashoka bark is traditionally used to regulate reproductive cycles, promote uterine health, and improve fertility in female animals. Similarly, Meena et al. (2019) found that ashoka bark is included in traditional remedies for its

fertility-enhancing properties, particularly to help regulate irregular cycles and improve conception rates. The use of ashoka bark decoction highlights the value of herbal remedies in supporting fertility and improving reproductive health in dairy animals.

3. Neem Leaves with Jaggery

Neem leaves with jaggery were used by 6.67% of respondents to support conception and improve fertility. Neem is known for its antimicrobial, anti-inflammatory, and hormonal-regulating properties, making it a popular choice for improving uterine health and fertility. Jaggery, as mentioned earlier, provides energy and helps regulate hormonal levels. Yadav and Bansal (2019) noted that neem is often used in traditional veterinary practices to detoxify the uterus, improve reproductive health, and stimulate hormonal balance. Similarly, Gorai et al. (2024) highlighted that neem has fertility-enhancing properties, especially when combined with jaggery, which energizes and nourishes the body post-calving. This remedy is widely trusted due to its dual action of improving both uterine health and hormonal balance, making it effective for managing conception-related issues.

4. Trust in Indigenous Solutions for Fertility Management

The widespread use of til and jaggery mixture, ashoka bark decoction, and neem leaves with jaggery reflects farmers' trust in indigenous remedies for managing fertility and supporting conception. Patil et al. (2009) highlighted the significant role of traditional practices in livestock management, particularly in areas where access to modern veterinary services may be limited or expensive. Singh et al. (2021) emphasized that indigenous remedies are highly valued due to their affordability, effectiveness, and ease of accessibility. These remedies continue to be preferred solutions for managing fertility-related issues in dairy animals, particularly when modern reproductive technologies may not be accessible to all farmers.

Technical Constraints in the Adoption of Balanced Feeding Practices

Balanced feeding plays a pivotal role in enhancing livestock productivity and health. However, the adoption of balanced ration practices among dairy farmers is hindered by a range of technical constraints. The study identified key barriers, with the most prominent ones being related to infrastructure, awareness, and knowledge gaps. These constraints directly impact the quality, availability, and implementation of

balanced feeding practices, making it challenging for farmers to optimize livestock health and productivity.

1. Improper Housing Facilities for Feed and Fodder Storage (Rank I)

The most significant constraint identified was improper housing facilities for the storage of feed and fodder, with 38% of respondents rating it as very severe and 58% as severe. This suggests that infrastructural limitations in rural areas have a direct impact on the quality and availability of feed. Storage facilities are essential for maintaining feed quality and preventing spoilage. As Patil et al. (2009) noted, poor storage conditions can lead to feed contamination, reducing nutritional value and efficiency. Similarly, Gorai et al. (2024) emphasized that inadequate storage infrastructure not only reduces feed shelf life but also affects animal health due to the poor quality of feed. This finding highlights the urgent need for improved storage facilities to ensure that feed quality is maintained, directly affecting the successful adoption of balanced feeding practices.

2. Lack of Awareness about Alternative or Low-Cost Feed Options (Rank II)

The second most prominent constraint was the lack of awareness about alternative or low-cost feed options, with 40% of respondents rating it as very severe and 54% as severe. This underscores the knowledge gap regarding locally adaptable, affordable, and sustainable feeding resources. Sharma et al. (2020) found that farmers' knowledge about alternative feeds, such as local grasses or non-conventional feed sources, is often limited, leading to reliance on expensive commercial feeds. Kumar et al. (2016) also noted that alternative feed resources have the potential to reduce feed costs and improve sustainability, but the lack of awareness prevents farmers from fully utilizing these options. To bridge this gap, extension services and training programs should focus on educating farmers about the availability and economic benefits of alternative feeds.

3. Challenges in Mixing Feed Ingredients (Rank III)

The third major constraint was the difficulty in mixing feed ingredients, with 48% of respondents rating it as very severe. This highlights the practical challenges farmers face in formulating balanced rations, even when feed ingredients are available. Patil et al. (2009) observed that improper mixing of feed ingredients can lead to imbalanced rations, resulting in poor nutrient utilization and suboptimal

animal performance. Similarly, Singh et al. (2021) emphasized that effective feed formulation requires technical knowledge and precision, which may be lacking in rural settings, thereby hindering balanced feeding adoption. Providing training on mixing techniques and ration formulation would help farmers improve the effectiveness of their feeding practices and enhance livestock productivity.

4. Difficulty in Measuring and Monitoring Animal Nutrition (Rank IV)

The difficulty in measuring and monitoring animal nutrition was rated as very severe by 36% and severe by 54% of respondents. This indicates the lack of tools or knowledge for evaluating the nutritional status of livestock and adjusting rations accordingly. Kumar et al. (2016) noted that the ability to assess nutrition is crucial for formulating effective feeding strategies. Without access to proper tools or knowledge, farmers struggle to ensure nutritional balance in their livestock's diet, which hinders the adoption of balanced feeding practices. Providing accessible tools for monitoring animal nutrition and offering practical training on ration evaluation could help overcome this barrier.

5. Lack of Access to Extension Services and Nutritional Advice (Rank V)

The lack of access to extension services and nutritional advice was another major concern, with 35% of respondents rating it as very severe and 55% as severe. This constraint indicates the limited field-level guidance available to farmers regarding balanced feeding practices. Singh et al. (2021) highlighted the importance of extension services in providing technical support and practical knowledge about feed formulation and livestock nutrition. Yadav and Bansal (2019) also emphasized that trained extension agents can significantly enhance the adoption of scientific feeding practices by providing farmers with guidance and support. Strengthening extension services and expanding their reach to remote areas could significantly improve knowledge dissemination and promote the adoption of balanced feeding practices.

6. Other Notable Constraints

Additional constraints included:

- Lack of knowledge on balanced ration formulation (Rank VI)
- Lack of standardized feed formulation guidelines (Rank VII)
- Insufficient knowledge of feed nutrient composition (Rank VIII)

- Lack of nutrient-specific supplements (Rank IX)

These constraints reflect the knowledge gaps and technical limitations that hinder the adoption of balanced feeding practices. Gorai et al. (2024) noted that the lack of standardized guidelines and clear nutrient specifications make it difficult for farmers to formulate balanced rations that meet the specific nutritional needs of their livestock.

Financial Constraints in the Adoption of Balanced Feeding Practices

Financial limitations are one of the most prominent barriers to the adoption of balanced feeding practices among dairy farmers. The study identified several key financial constraints that hinder the implementation of balanced rations, with the high cost of feed and fluctuating feed prices emerging as the most critical challenges. The results indicate that financial accessibility and the affordability of feed are significant concerns for farmers, especially smallholders who have limited access to credit facilities and market returns.

1. High Cost of Feed and Fodder (Rank I)

The high cost of feed and fodder was ranked as the most severe financial constraint, with 28% of respondents rating it as very severe and 70% as severe. This reflects the economic burden of feed costs on farmers and its direct impact on their ability to implement balanced feeding practices. As Gorai et al. (2024) pointed out, the cost of feed is one of the major expenses in dairy farming, and high feed costs can significantly reduce profit margins for farmers. Similarly, Patil et al. (2009) noted that the high cost of quality feed is a key factor limiting the adoption of scientific feeding practices, as farmers often prioritize basic nutritional needs over optimal feeding. The findings of this study clearly highlight that without affordable feed options, farmers struggle to adopt and sustain balanced feeding for their livestock. Addressing the high cost of feed through subsidies or price regulation could help alleviate this constraint and promote the widespread adoption of balanced feeding.

2. Fluctuating Prices of Feed Ingredients (Rank II)

The second major financial constraint identified was the fluctuating prices of feed ingredients, with 22% of respondents rating it as very severe and 76% as severe. Price volatility creates significant uncertainty for farmers in planning and procuring feed ingredients, especially for smallholder farmers who lack the financial flexibility

to absorb cost changes. Sharma et al. (2020) emphasized that price volatility in the feed market can create challenges for farmers in maintaining a consistent supply of nutritionally balanced feed. Kumar et al. (2016) also found that price fluctuations affect farmers' ability to budget for feed expenses, which in turn impacts their ability to invest in balanced rations. The uncertainty in feed costs makes it difficult for farmers to plan for long-term feed requirements, thus limiting their ability to sustain balanced feeding practices. To address this issue, implementing price stabilization mechanisms and providing predictable pricing structures for feed ingredients would help farmers plan and implement balanced feeding more effectively.

3. Lack of Availability of Credit Facilities (Rank III)

Limited access to credit facilities was identified as the third major constraint, with 11% of respondents rating it as very severe and 88% as severe. Limited access to institutional finance reduces farmers' capacity to invest in quality feed or formulate balanced rations for their livestock. Yadav and Bansal (2019) noted that smallholder farmers often face financial exclusion from formal credit sources, which significantly impacts their ability to purchase quality feed or invest in improved feeding practices. Similarly, Gorai et al. (2024) highlighted that lack of credit facilities limits farmers' ability to adopt scientific practices, including balanced feeding, as they are unable to make the necessary upfront investments. Access to affordable credit is essential for enabling farmers to purchase high-quality feed and implement balanced feeding practices. Providing easy access to loans, subsidized credit, or government-backed loan schemes would help ease the financial burden on farmers and encourage the adoption of balanced feeding practices.

4. Low Price for Milk (Rank IV)

Although low milk prices were considered the least severe among the financial constraints, they still posed a significant challenge, with 10% of respondents rating it as very severe and 82% as severe. Dissatisfaction with milk prices reflects the indirect effect on farmers' ability to invest in feed and balanced rations. Singh et al. (2021) found that low milk prices often lead farmers to cut back on feed quality to reduce costs, which in turn affects milk yield and animal health. Kumar et al. (2016) also emphasized that low milk prices reduce the profit margin for farmers, making it difficult for them to invest in balanced feeding practices. While milk prices are often

influenced by market dynamics, price regulation or minimum support prices for milk could improve farmers' financial stability and enable them to make the necessary investments in balanced feeding.

5. Financial Constraints and Adoption of Balanced Feeding

The findings of this study underscore that financial constraints, particularly the high cost of feed, fluctuating feed prices, and lack of access to credit, are major barriers to the adoption of balanced feeding practices. These financial challenges limit farmers' ability to invest in high-quality feed, resulting in suboptimal feeding practices that hinder livestock health and productivity. Sharma et al. (2023) found that financial support through subsidies and easy access to credit can significantly enhance the adoption of balanced feeding practices, as it provides farmers with the necessary resources to invest in scientific feeding techniques. Additionally, providing price regulation mechanisms and support for milk prices can reduce financial pressure on farmers and help promote sustainable feeding practices.

Social Constraints in the Adoption of Balanced Feeding Practices

Social factors significantly influence the adoption of balanced feeding practices among dairy farmers. The study identified key social constraints that hinder the widespread adoption of scientific feeding practices. The most notable constraints included misinformation about the benefits of balanced feeding, lack of organized markets, and limited collaboration among farmers. These constraints indicate that incorrect perceptions, market disorganization, and poor knowledge exchange continue to act as barriers to improving feeding practices and livestock productivity.

1. Misinformation about the Benefits of Balanced Feeding (Rank I)

The most prominent social constraint identified was misinformation about the benefits of balanced feeding, with 20% of respondents rating it as very severe and 78% as severe. This suggests that incorrect perceptions and a lack of awareness continue to hinder the adoption of balanced feeding practices. Kumar et al. (2016) highlighted that misinformation can lead to poor feeding practices, as farmers may not recognize the importance of balanced nutrition for livestock productivity and health. Sharma et al. (2023) also emphasized that incorrect beliefs about the cost or complexity of balanced feeding prevent farmers from adopting these practices. The findings underline the need for targeted awareness campaigns to educate farmers

about the scientific benefits of balanced feeding and correct misconceptions. Community-level education can significantly reduce misinformation and encourage farmers to implement scientifically-based feeding practices.

2. Lack of Organized Market for Feed (Rank II)

The second major social constraint was the lack of an organized market for feed, with 88% of respondents rating it as severe and 10% as very severe. Inadequate market infrastructure limits farmers' access to quality feed and makes it difficult for them to procure balanced feed ingredients. Gorai et al. (2024) noted that the absence of organized markets for feed can result in unpredictable feed prices, which directly affects farmers' ability to purchase high-quality ingredients. Similarly, Patil et al. (2009) emphasized that market disorganization reduces feed availability and limits farmers' willingness to invest in balanced feeding practices. This constraint reflects the need for improved market infrastructure and organized feed distribution systems to ensure that farmers have easy access to affordable, high-quality feed for their livestock. Government support in establishing organized feed markets would help address this barrier and enhance adoption rates for balanced feeding practices.

3. Limited Collaboration and Knowledge Sharing Among Farmers (Rank III)

The third significant social constraint was limited collaboration and knowledge sharing among farmers, with 12% rating it as very severe and 82% as severe. This highlights the low level of peer learning and collective awareness generation in rural dairy systems. Yadav and Bansal (2019) pointed out that collaboration and knowledge exchange among farmers are critical for promoting best practices and encouraging the adoption of new technologies, including balanced feeding. Meena et al. (2019) found that peer learning and farmer-to-farmer extension models play an essential role in the adoption of innovative agricultural practices. However, limited collaboration restricts farmers' exposure to new information and best practices, leading to a slower rate of adoption of scientific feeding techniques. Establishing farmer groups, cooperatives, and community-based learning platforms can help overcome this constraint by fostering a culture of knowledge sharing and improving collective awareness of balanced feeding practices.

4. Social Constraints and Their Impact on Adoption

The findings indicate that social constraints such as misinformation, market disorganization, and poor knowledge exchange significantly limit the adoption of balanced feeding practices in dairy farming. Patil et al. (2009) found that social factors such as access to information, peer influence, and community support play a crucial role in the adoption of new agricultural technologies. In rural settings, where access to formal extension services may be limited, community-based extension models and farmer-to-farmer communication can be highly effective in overcoming social barriers and promoting balanced feeding practices. Kumar et al. (2016) emphasized the importance of community engagement in promoting scientific feeding practices through knowledge sharing and collective action.

5. Recommendations for Addressing Social Constraints

To address these social constraints, it is essential to increase awareness about the benefits of balanced feeding through targeted education programs and community outreach initiatives. Additionally, promoting collaborative platforms such as farmer groups and cooperatives can encourage peer learning and knowledge exchange. Strengthening extension services and implementing farmer-to-farmer extension models will also foster greater collaboration and enhance the adoption of balanced feeding practices. Furthermore, improving market infrastructure for feed supply will enable farmers to access quality ingredients and make informed decisions regarding balanced feeding.

The study identified several environmental and resource-related constraints that hinder the adoption of balanced feeding practices in dairy farming. These constraints, which are often beyond the control of the farmers, significantly affect the availability of feed, the quality of fodder, and the overall livestock health. The findings highlighted that the most significant environmental constraint was the non-availability of green fodder throughout the year, followed by lack of water availability, and adverse climatic conditions. These constraints, along with other resource limitations, such as land availability and lack of diverse feed ingredients, affect the sustainability of balanced feeding practices.

1. Non-Availability of Green Fodder Throughout the Year (Rank I)

The most critical constraint identified was the non-availability of green fodder throughout the year, with 38% of respondents marking it as very severe and 54% as severe. This reflects the seasonal nature of fodder production and its direct impact on the continuous supply of fresh, green fodder for livestock. Gorai et al. (2024) noted that green fodder is essential for providing the necessary nutrients such as proteins, minerals, and fiber for optimal livestock health and milk production. However, seasonal fluctuations in fodder availability make it difficult for farmers to maintain a consistent and nutritious feed supply. Patil et al. (2009) emphasized that irregular green fodder availability leads to the reliance on dry fodder and supplements, which may not fully meet the nutritional needs of the animals. This constraint highlights the importance of improving fodder cultivation practices, including irrigation systems and improved fodder varieties to ensure a steady supply of green fodder year-round.

2. Lack of Water Availability (Rank II)

Water availability was the second most significant environmental constraint, with 32% of respondents rating it as very severe and 62% as severe. Water scarcity affects both animal health and the cultivation of fodder, making it challenging for farmers to provide adequate hydration for livestock and irrigation for fodder crops. Singh et al. (2021) emphasized that water is a critical resource for livestock and fodder production, and a shortage of water directly impacts the growth and quality of feed. Yadav and Bansal (2019) also pointed out that water scarcity affects feed production, as irrigated crops such as alfalfa and lucerne are essential for maintaining green fodder supplies. Water scarcity can further exacerbate feed shortages, leading to nutritional deficiencies in dairy animals. To mitigate this constraint, it is essential to focus on water conservation techniques, such as rainwater harvesting and efficient irrigation methods, to ensure adequate water supply for both livestock and fodder cultivation.

3. Adverse Climatic Conditions (Rank III)

Adverse climatic conditions were ranked as the third major constraint, with 34% of respondents rating it as very severe and 58% as severe. Irregular rainfall, droughts, and extreme weather events such as heatwaves and flooding were reported as significant challenges affecting feed and fodder production. Kumar et al. (2016)

found that climatic variability significantly impacts the growth of fodder crops, especially during periods of drought or excessive rainfall, leading to feed shortages and low-quality feed. Similarly, Sharma et al. (2023) emphasized that extreme weather events limit fodder availability, which negatively affects livestock nutrition and overall farm productivity. Farmers are increasingly faced with unpredictable climatic conditions, which further complicate their ability to plan for feed and fodder supplies. Addressing this constraint requires climate-resilient farming practices, such as the adoption of drought-tolerant fodder varieties, water-efficient irrigation systems, and sustainable land management practices to enhance fodder production under changing climatic conditions.

4. Non-Availability of Land for Fodder Cultivation (Rank IV)

The non-availability of land for fodder cultivation was ranked as the fourth constraint, as reported by farmers who faced limited land availability for growing fodder crops. Patil et al. (2009) found that limited land availability is a common issue in intensive dairy farming systems, especially in regions with high population densities and land fragmentation. This constraint prevents farmers from cultivating sufficient fodder to meet their livestock's nutritional needs, forcing them to rely on external feed suppliers or dry fodder, which may not provide a complete nutritional profile. To address this issue, land use policies should encourage the allocation of land for fodder production and promote sustainable intensification practices to make the best use of available resources.

5. Lack of Availability of Dry Fodder Year-Round (Rank V)

The lack of availability of dry fodder year-round was another significant constraint, ranking fifth. Singh et al. (2021) emphasized that dry fodder plays a critical role in maintaining a balanced diet for dairy animals, especially during periods when green fodder is unavailable. Kumar et al. (2016) found that dry fodder such as hay, straw, and silage is often used as a supplementary feed in off-season months, but its availability and quality are limited in many areas. The availability of high-quality dry fodder throughout the year is essential for maintaining balanced nutrition for dairy animals and ensuring consistent milk production.

6. Lack of Diverse Feed Ingredients for Ration Formulation (Rank VI*)*

The final constraint identified was the lack of diverse feed ingredients for ration formulation. Farmers reported challenges in sourcing a wide variety of feed ingredients that are essential for balanced ration formulation, limiting their ability to meet nutritional needs effectively. Patil et al. (2009) noted that limited access to diverse feed resources restricts farmers' ability to create nutritionally complete rations, leading to imbalanced feeding and suboptimal livestock productivity. Gorai et al. (2024) highlighted that diverse feed resources, such as protein-rich oil cakes, minerals, and vitamins, are essential for optimizing livestock health and milk production. Farmers must have better access to a variety of feed ingredients to create well-balanced and nutritionally adequate rations.

Summary and Conclusions

CHAPTER -6

SUMMARY AND CONCLUSIONS

Objective 1: To study the socio-economic and socio-personal profile of respondents

The socio-economic analysis revealed that the majority (49%) of the respondents were middle-aged (35–50 years), indicating an active and productive age group in livestock farming. Most families were nuclear (75%), and 59% had small-sized families (≤5 members). The education level was mostly low to moderate, with primary (26%) and middle-level (22%) education being predominant, while 12% of respondents were illiterate.

A large portion of respondents (68%) maintained medium-sized herds (2–4 animals), and 57.33% had medium milk production (5.5–16.5 L/day). Regarding landholding, most were marginal (29%) or small (21%) farmers, highlighting constraints in fodder cultivation.

Television (68%) and WhatsApp (55%) were the most utilized information sources. Participation in formal institutions like KVKs was low (41%), with limited use of cooperatives, SHGs, and FPOs. Overall, the socio-economic profile reflected semi-commercial dairy activity operated primarily at the household level.

Objective 2: To study the awareness and knowledge level of respondents pertaining to balanced ration feeding in dairy animals

Awareness and knowledge levels regarding balanced feeding were found to be moderate across the study area. Out of 150 respondents, 50% had low, 44% medium, and only 6% high levels of knowledge about balanced feeding practices. While respondents demonstrated awareness of basic feeding concepts (e.g., the importance of green and dry fodder, protein sources, and mineral mixtures), scientific understanding like exact feed ratios, use of urea-treated straw, and government-developed tools such as the "Pashu Poshan App" was comparatively poor. Statistical analysis revealed that family size had a positive and significant correlation with awareness ($r = 0.252$, $p < 0.01$), and younger farmers showed relatively better

knowledge ($r = -0.162$, $p < 0.05$). Regression analysis confirmed family size as a significant predictor of knowledge scores ($\beta = 0.252$, $p = 0.002$).

Objective 3: To study the adoption level of respondents in relation to feeding of scientific balanced ration in dairy animals

The overall adoption index of balanced feeding practices was calculated as 58.81%, signifying a moderate level of adoption among dairy farmers. Under Relative Advantage, many farmers acknowledged improvements in milk yield, reproductive performance, and reduction in long-term feed costs.

Compatibility revealed that 52% found balanced feed components accessible, but 68% reported cultural resistance to change. Under Complexity, 80% stated they needed expert guidance, and many found the process time-consuming. Trialability was low, with only 34% trying balanced feeding in place of traditional methods, and only 12% had access to ICT or training tools. Observability and Predictability showed high scores: 88% noticed benefits like improved health and yield in others' animals, and a majority believed balanced feeding was effective across seasons.

Objective 4: To study the alternate indigenous feeding practices adopted by respondents to improve productivity of dairy animals

Farmers in the study area reported widespread use of indigenous feeding practices to address common health and productivity issues in livestock. Popular remedies included fenugreek-turmeric paste, jaggery-ginger mix, and ajwain-black salt tonic for anorexia, and ginger-jaggery solution for bloat. In heat and cold stress conditions, natural coolants (like watermelon juice, coriander water) and warming agents (like bajra-gud khichda, ginger-honey decoction) were preferred.

Herbal preparations were also adopted during milk fever, anoestrus, mastitis, and to improve fertility, mineral supplementation, and growth stages. These practices reflect strong local ethno-veterinary knowledge and offer low-cost, readily available alternatives, especially in the absence of modern veterinary access.

Objective 5: To study various constraints faced by dairy farmers in feeding balanced ration in dairy animals

The constraint analysis indicated multiple technical, financial, social, and environmental barriers. Technical constraints ranked highest especially lack of feed storage facilities, difficulty in mixing rations, and insufficient knowledge of feed composition.

Financial constraints included the high cost of feed, fluctuating prices, and lack of accessible credit facilities. Social barriers included misinformation, low awareness, and poor collaboration among farmers. Environmental constraints such as non-availability of green fodder year-round, water scarcity, and land shortage for fodder cultivation were frequently reported. These multi-dimensional constraints severely affect the scientific adoption of balanced feeding and need immediate redressal through targeted intervention.

Conclusion

Objective 1: Socio-Economic Profile

It is concluded that dairy farming in Mathura district is primarily practiced by middle-aged, nuclear family households with moderate education and herd size. The dependency on traditional media and limited institutional interaction reflects the need for increased extension services and ICT-based outreach to improve feeding practices.

Objective 2: Awareness and Knowledge

The moderate awareness level and low scientific knowledge among farmers suggest an urgent requirement for need-based training programs. Younger and larger families are more receptive, indicating that future interventions should be youth-centric and family-inclusive for greater impact.

Objective 3: Adoption of Balanced Feeding

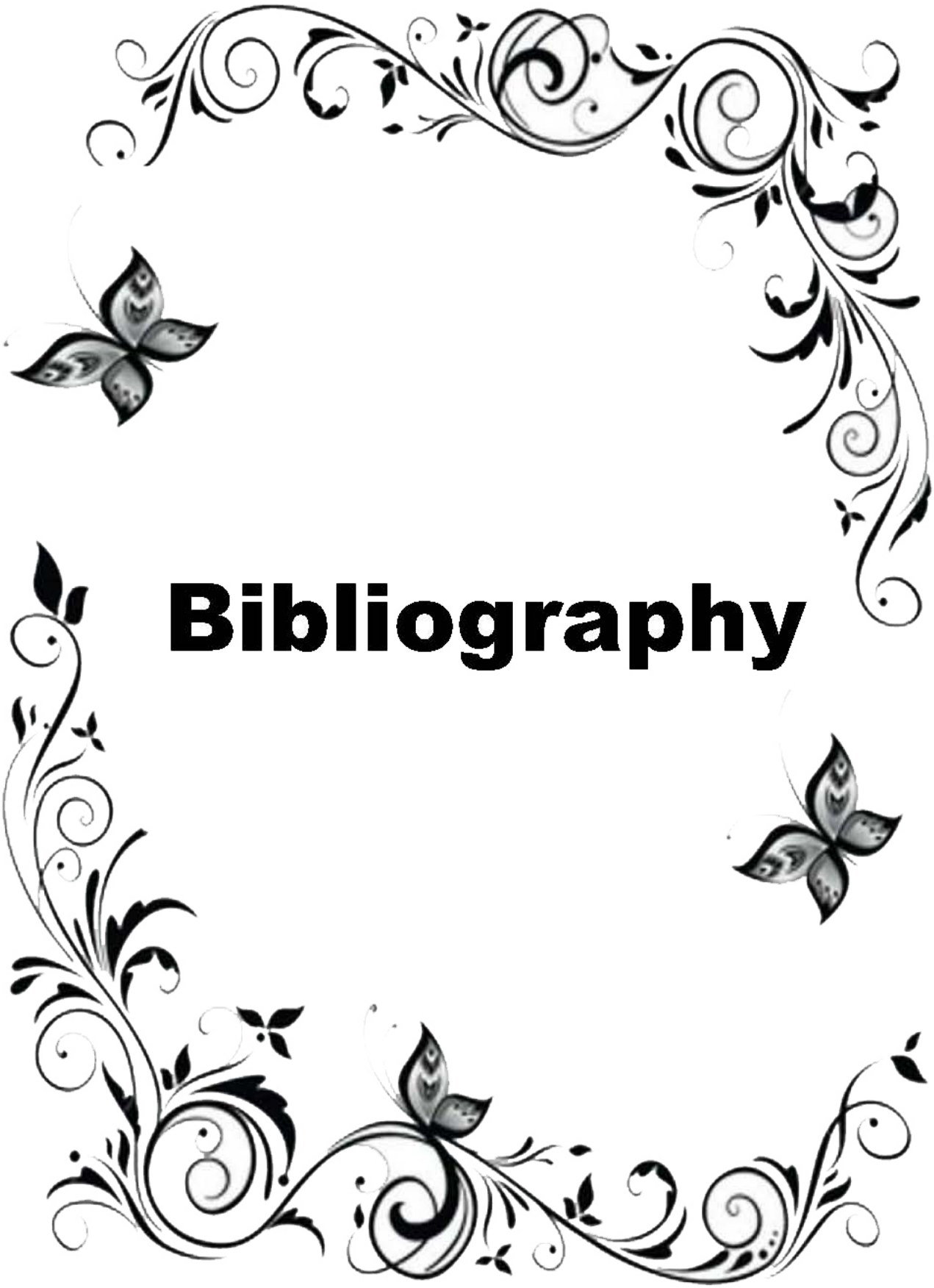
Although farmers recognized the benefits of balanced feeding, actual adoption remained moderate due to lack of trialability, guidance, and infrastructural support. Despite the predictability and observability of benefits, implementation complexity continues to act as a major deterrent. Adoption can be improved by simplifying feeding protocols and providing localized training and demonstrations.

Objective 4: Indigenous Feeding Practices

The widespread use of indigenous feeding practices underscores the community's reliance on traditional knowledge, especially in remote areas with poor veterinary access. These practices should be scientifically validated and integrated into training modules to promote safe and effective usage.

Objective 5: Constraints in Balanced Feeding

Farmers face critical technical and financial constraints that obstruct balanced feeding adoption. Lack of infrastructure, storage, high input cost, and misinformation are key bottlenecks. Addressing these constraints through multi-stakeholder collaborations, subsidies, and strategic policy support is essential for improving animal nutrition and farmer income.



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A study on balanced feeding practices in dairy animals of Mathura district

Interview Schedule

Part 1 : To study the socio-economic and socio-personal profile of the respondent :

1) Name of the respondent:
2) Village :-
3) Block & Tehsil :-
4) Contact Number :-
5) Age (in years) :-
6) Experience in livestock farming (in years):
7) Family Background :-
8) Family size :-

S. No	Items		Response
1)	Family size	Small (up to 5 members)	
		Medium (4-8 members)	
		Large (more than 8 members)	
2)	Family type	Nuclear family	
		Joint family	

9) Education : (please √) :-

S. No	Item	Response
a)	Illiterate (0)	
b)	Functionally literate (can read and write) (1)	
c)	Primary (2)	
d)	Middle (3)	
e)	Secondary (4)	
f)	Higher Secondary up to 12 (5)	
g)	Graduate and above (6)	

10) Total annual income: Rs

S. No	Item	Amount
a)	Livestock	
b)	Agriculture	
c)	Horticulture	
d)	Food processing	
e)	Service	
f)	Any other	

11) Land holdings as per Govt of India, 2001 (please) :-

S. No.	Items	Response
a)	Landless (0 ha)	
b)	Marginal(< 1 ha) (1)	
c.)	Small (1-2 ha) (2)	
d.)	Semi- medium (2-4 ha) (3)	
e.)	Medium (4-10 ha) (4)	
f.)	Large (>10 ha) (5)	

12) Herd size: (Total number of animals)

S. No.	Type of animal	Milch	Dry	Heifer	Bull	Bullock	Female calves	Male calves	Total
a.	Indigenous cow								
b.	Crossbred cow								
c.	Buffalo								
d.	Sheep								
e.	Goat								
f.	Any other								

13). Milk Production:-

S. No.	**Livestock**	Total Amount of milk (in lit.)
1.	Cattle	
2.	Buffalo	
3.	Goat	
4.	Sheep	
5.	Total	

14) Milk Consumption /Sale:-

S. No.	**Amount of milk (in liter) /day (Household)**	**Amount of milk (in Liter /day) sold**

15) Social participation of the livestock owner :

S. No.	**Category**	**Response**
1.	KVK	
2.	Cooperatives Societies (PCDF / Other)	
3.	Self-help groups	
4.	Government departments	

16) Occupation:

S.No.	**Category**	**Response**
1.	Dairy (1)	
2.	Dairy + Agriculture (2)	
3.	Dairy + Business + Agriculture (3)	
4.	Dairy + Labour (4)	
5.	Dairy + Service + Agriculture (5)	
6.	Dairy+Hortriculture(6)	

17). Mass Media Exposure:

S. No.	Item	Responses		
		Always	**Some-times**	**Never**
1.	Radio			
2.	Television			
3.	Magazines			
4.	Newspaper			

18). Social media exposure:

1	Mobile apps			
2	Whatsaap			
3	Telegram			
4	Facebook			
5	Any other			

18). Source of Information (Extension Agency Contact):-

S. No.	Items	Category	Responses	
			Yes	**No**
1.)	Extension agencies	Krishi Vigyan Kendra		
		Government Departments		
		Farmer producer organization's		
		SAU's		
2.)	ICT Tools	Mobile phones		
		Websites /web portals		

Part 2: To study the Awareness & Knowledge level of respondents pertaining to balanced ration feeding in dairy animals

Q1)	What do you meant by a balanced ration in dairy animals ?	a) Feed that includes all nutrients in the right proportion	b) Only concentrates	c) Only roughage	d) Feed that has only energy-rich ingredients	e) Feed only minerals
Q2)	What is the importance of providing a balanced ration to dairy animals ?	a) Improves milk production Improves breed characteristics	b) enhances milk flavour	c) causes weight loss	d) no milk or decreased milk production	e)No significant importance
Q3)	Which nutrient is primarily required for growth in dairy animals?	a) carbohydrates	b) fat	c) salt	d) minerals	e) Water
Q4)	How do you decide the quantity of feed for your dairy animals?	a) Based on animal weight, production stage,	b) based on weather	c) Based on availability of feed	d) Do not follow any specific method	e) Any other method
Q5)	Which feed component provides the most energy to animals?	a) Roughage	b) Concentrates	c) Minerals & Vitamines	d) Water	e)Salt
Q6)	What type of protein-rich feeds do you use for your animal's balanced diet ?	a) Oil cakes	b) straw	c) wheat bhussa	d) Do not use protein-rich feeds	e) Paddy straw
Q7)	What do you give to your animals to prevent mineral deficiency?	a) Salt licks	b) Mineral mixture	c) Do not use any supplements	d) Both a and b	e)Molasses
Q8)	Why is it important to provide sufficient water along with feed?	a) Helps digestion Maintains water balance in the body	b) increases weight loss	c) Improves overall health	d) decreases milk production	e)Only maintain body temperature
Q9)	How do you store feed to ensure its quality?	a) Store in a dry place	b) store in a open place	c)store in a air-tight containers	d) all of the above	e) Store in humid place
Q10)	Do you modify the feeding practices based on the seasons (summer, winter, etc)?	a) Yes, I modify the feed in various seasons		b) I don't modify the feed in various seasons		

Q11)	Do you feed young animals differently compared to adult animals?	a) Yes		b) No		
Q12)	Have you noticed any changes in milk production, growth, or health when you change the animal's diet?	a) only significant improvement is visible	b)significant improvement, but no noticeable change is visible	c) No / visible changes were observes	d) unable to detect	e) Least change observed
Q13)	What is the effect of feeding un-balanced diet to a dairy animals?	a) Decreased milk production, Poor growth and weight loss	b) Decreased resistance to diseases	c) Rapid weight gain with no health issues.	d) Improved health and productivity	e) Increase BCS condition
Q14)	How we can determine that the animals is not taking sufficient diet or balanced ration ?	a) Shiny coat and active behavior	b) Increased milk yield	c) Healthy weight gain	d) Reduced milk production &Weight loss	e) good reproductive health
Q15)	Which of the following is the application of balanced ration formulation issued by the GOI. INDIA ?	a) Pashu Poshan app by nddb	b) eNAM (National Agriculture Market)	c) Kisan Rath	d) Plantix	e) M.P kissan aap
Q16)	How a farmer can understand that he/she is giving a balanced diet to dairy animals ?	a) Healthy appearance of the animal	b) decreased milk yield	c) Random feeding without observation	d) Sudden weight loss	e) Decreased resistance to infectious diseases
Q17)	What is the importance of urea treated straw in balanced diet of an dairy animals ?	a)It increases the protein content of straw	b) decreases quality	c) Destroys the nutritional quality of straw	d) don't know	e)Decreased palatablity
Q18)	How much amount of concentrate is given to dairy animal in balanced diet ?	a) 3kg milk / 1 kg concentrate	b) 3kg milk /2 kg concentrate	c) 4kg milk / 1 kg of concentrate	d) 4 kg milk /2 kg concentrate	5 kg Milk/1 kg concentrate
Q19)	Do you know the balanced diet of cattle in different stage life ?	Yes		No		

Q20)	In which of the following is the (example) good source of dry fodder in balanced diet of animals?	a) Hay, straw,	b)Fresh grass	c) Silage	d) Green maize	e)sorghum
Q21)	Which of the following is the good source of concentrate in balanced diet of an animal ?	a) Cereals grains and oil cakes	b) barseem	c) hay	d) Green fodder	e) rice barn
Q22)	Which of the following is green fodder is used in balanced diet of an dairy animal?	a) cereals, legumes, hybrid Napier	b) hay straw	c) wheat bhussa	d) paddy	e) whet straw
Q23)	Do you know how much amount of fodder (green , dry) should be provided to the dairy animals for production	a) Green 30-40 kg per day Dry 10-15 kg per day	b) Green 50 kg dry 10 kg per day	c) Green 5 kg Dry 5 kg per day	d) Green 10 kg Dry 10 kg per day	e)Green 15 kg dry 15 kg per day

Part 3: To study the adoption level of respondents in relation to feeding of scientific balanced ration in dairy animals

	S.N.	Questions	A	PA	NA
Relative Advantage	1.	Does feeding a scientifically balanced ration lead to an increase in the milk yield of your dairy animals compared to traditional feeding practices?			
	2.	Have you observed improvements in animal health, such as reduced illnesses or better immunity, due to balanced feeding?			
	3.	Do you think feeding a balanced ration has a positive impact on the reproductive performance of dairy animals, such as better conception rates and shorter calving intervals ?			
	4.	Does using a scientifically balanced ration reduce the overall cost of milk production in the long run by improving feed efficiency and reducing wastage?			
Compatibility	5.	Do balanced feeding practices align with the feeding methods traditionally followed on your farm?			
	6.	Are balanced feed components (e.g., concentrates, fodder, mineral mixtures) easily available?			
	7.	Is there cultural or traditional resistance against new feeding methods in your community?			
	8.	Is the balanced feeding process suitable for the size of your herd?			
	9.	Would adopting balanced feeding require significant infrastructure changes (e.g., storage)?			
Complexity	10.	Do you think calculating a balanced ration for dairy animals is difficult?			
	11.	Do you require expert guidance to understand balanced feeding practices?			
	12.	Is it difficult to procure and mix all components of a balanced ration?			

	13.	Are instructions for balanced feeding practices clear and easy to follow?			
	14.	Is the feeding process (e.g., measuring feed) time-consuming?			
Trialability	15.	Have you ever tried balanced feeding practices instead of traditional feeding practices			
	16.	Have you tried mineral mixture feed + supplementation			
	17.	Have you ever tried mineral mixture Dumin prepared by DUVASU			
	18.	Have you find any ICT tools or training to formulate balanced feeding practices			
Observability	19.	Have you observed other farmers using balanced feeding practices?			
	20.	Did you notice improvements on their farms (e.g., higher yield, healthier animals)?			
	21.	Have you received recommendations from fellow farmers about balanced feeding?			
	22.	Do you discuss the benefits of balanced feeding with your community or veterinary advisors?			
	23.	Are you inspired to adopt balanced feeding after seeing positive results on other farms?			
Predictability	24.	Do you believe that balanced feeding consistently improves milk yield across different seasons?			
	25.	Have you observed a predictable improvement in the health of your animals after following balanced feeding practices?			
	26.	Do you think balanced feeding ensures consistent reproductive performance of dairy animals regardless of environmental changes?			
	27.	Is the impact of balanced feeding on cost reduction consistent and predictable on your farm?			
	28.	Do you find balanced feeding practices reliable for maintaining overall productivity during feed shortages or seasonal variations?			
	29.	Can balanced feeding be predicted to improve the longevity and productivity of dairy animals over time?			

Part 4: To study the alternate indigenous feeding practices adopted by respondents to improve productivity of dairy animals

S. No.	Alternate feeding practices	Alternate feeding practices adopted by respondents
1)	Annorexia	
2)	Bloat	
3)	Heat stress	
4)	Cold stress	
5)	Milk fever	
6)	Mastitis	
7)	Natural feed additive	
8)	Growth inducer	
9)	Alternative natural sources of minerals	
10)	Fertility	
11)	Conception	
12)	Treat anoestrus	
13)	Repeat breeding	
14)	Retention of placentae	

CV OF STUDENT

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Date: 02/07/2025
Place: Mathura

Abhijeet Purohit
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Undertaking of Copy Right

I, **Abhijeet Purohit, Enrolment No V-2573/22** undertake that I give copy right to the U.P. Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan Sansthan, Mathura of my thesis entitled **"A study on balanced feeding practices in dairy animals of Mathura district"**

I also undertake that patent, if any, arising out of research work conducted during the programme shall be filed by me only with due permission of the competent authority of **U.P. Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan, Mathura (UP).**

Abhijeet Purohit

Signature of the Student