PERFORMANCE OF MILK PRODUCERS' COOPERATIVE SOCIETIES AND ITS INFLUENCE IN RELATION TO ANIMAL HUSBANDRY PRACTICES ADOPTED BY TRIBALS OF SABARKANTHA DISTRICT

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BY

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DEDICATED

TO

MY BELOVED

MOTHER

AND

LATE FATHER

ABSTRACT

PERFORMANCE OF MILK PRODUCERS' COOPERATIVE SOCIETIES AND ITS INFLUENCE IN RELATION TO ANIMAL HUSBANDRY PRACTICES ADOPTED BY TRIBALS OF SABARKANTHA DISTRICT

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ABSTRACT

Dairy plays a crucial role in Indian economy and could significantly enhance the economy and living standard of the farmers in country. The nature has endowed the country with some of the best breeds of cattle and buffaloes. India occupies first position in milk production of the world, yet it has to establish itself in the global market. There is need to make dairy farming a sustainable and more competitive. The milk production per animal in India is far below than other developing countries. The probable reason for it would be the low level of knowledge and poor extent of adoption of improved animal husbandry practices. If dairy farmers are not educated enough in terms of improved animal husbandry practices and convinced to put these practices into use, no fruitful results will ensure.

Gujarat is a leading state in milk production with sound network of cooperatives for efficient marketing. Cooperatives, in the dairy sector have recognized to be an effective measure, to improve milk production potential. The role of Milk Producers' Cooperatives had been aimed not only at maximizing profits through technological modernization, but they also contributed in modernization of village communities through dairying that village people are capable of adopting themselves to change.

Despite of these, many dairy cooperatives are not successfully running their business particularly in undeveloped, hilly tribal areas may be due to various factors influencing the performance of village milk producers' cooperative societies.

Keeping this in view, the present study was undertaken with following specific objectives:

OBJECTIVES

[1] To assess the managerial and business performance of MPCs.

[2] To identify the organizational and non organizational factors influencing performance of MPCs.

[3] To identify the constraints as perceived by member respondents in effective functioning of MPCs.

[4] To study personal, socio-economic, communication and psychological characteristics of the members of MPCs.

[5] To assess the knowledge of MPCs members about improved animal husbandry practices.

[6] To measure the attitude of members towards MPCs and dairy farming technology.

[7] To study the adoption of improved animal husbandry practices by MPCs members.

[8] To determine the relationship between selected personal, socio-economic, psychological and communication characteristics of members and their adoption of improved animal husbandry practices.

METHODOLOGY

The present study was under taken in Sabarkantha district which have considerable tribal population in four talukas. Among four tribal talukas, Bhiloda and Khedbrahma talukas were purposively selected for the study having more number of MPCs running for since last five years. For selection of MPCs and respondents simple random sampling technique was used. Ten MPCs from Bhiloda talukas and five MPCs from Khedbrama talukas were selected and equal number of member dairy farmers i.e. 10 were selected from each MPC to make the sample size of 150 dairy farmers.

Most of the data pertaining to performance of MPCs were collected from secondary sources. For primary data, field survey by personal contanct using structured schedule was used. The data collected were coded, classified, tabulated and analyzed in order to get meaningful findings. The major findings are as follows:

MAJOR FINDINGS

[1] Majority of the MPCs (60.00 %) had average performance and 20.00 per cent each of them had poor and best performance.

[2] Relationship between performance of MPCs and extent of adoption of improved animal husbandry practices was positive and significant.

[3] The important factors which were highly affecting the performance of MPCs were; digital fat testing equipment and computer facilities for accounting, A. I. services and animal health services provided by MPCs.

[4] The important common constraints as reported by member dairy farmers in effective functioning of MPCs. Were; scarcity of green fodder for animals (90.66 %), non availability of A. I. services timely (84.66 %), low milk price to the producers (80.66 %). Lack of adequate knowledge of improved animal husbandry practices (78.00 %) and lack of subsidized credit facilities.

[5] Majority of the respondents were above 36 years of age and literate.

[6] It was recorded that about 56.67 per cent of the respondents were having more than five members and equally belongs to joint and nuclear family. Majority of them (71.34 %) were marginal to small farmers, most of them (80.67 %) had farming along with animal husbandry as their occupation and had low level of social participation (57.33 %). Most of the respondents (70.00 %) had medium herd size with medium milk production (68.00 %). Majority dairy farmers (57.34 %) had minimum draught power and medium material possession (62.00 %).

[7] It was recorded that slightly more than half (54.00 %) of the respondent had low mass media exposure and medium extension participation (60.00 %).

[8] Majority member dairy farmers (61.33 %) had medium level of overall modernity.

[9] Though about half of respondents (51.33 %) had medium level of knowledge about improved animal husbandry practices, the average knowledge score was very low (38.57).

[10] Majority of the respondents showed moderately favourable to highly favourable attitude (60.00 %) towards MPCs. The average attitude score was also high (60.85).

[11] Majority of the respondent possessed moderately favourable to highly favourable attitude (62.00 %) towards dairy farming technology. The average score was also higher (61.48).

[12] With regards to adoption of improved animal husbandry practices, majority of the dairy farmers (80.67%) had medium to low level of adoption.

[13] Relationship of extent of adoption was observed significant with the variables viz., age, education, land holding, occupation, social participation, material possession, mass media exposure, extension participation, overall modernity, knowledge, and attitude towards MPCs and dairy farming technology.

[14] Multiple regression analysis indicated that all the selected variables exerted as much as 88.49 per cent of total variation in adoption of improved animal husbandry practices. The results of step-wise regression analysis indicated that 87.31per cent of the total variation in adoption was accounted by a set of five variables viz., age, landholding , extension participation, attitude towards dairy farming technology and knowledge. Knowledge alone had accounted for 81.11 per cent variation.

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CERTIFICATE

This is to certify that thesis entitled **"Performance of milk producers' cooperative societies and its influence in relation to animal husbandry practices adopted by tribals of Sabarkantha district"** submitted by **PATEL VINODBHAI BAHECHARBHAI** in partial fulfillment of the requirements for the award of the degree **of "DOCTOR OF PHILOSOPHY"** in the subject of **EXTENSION EDUCATION** of the Sardarkrushinagar Dantiwada Agricultural University is a record of bonafide research work carried out by him under my guidance and supervision and the thesis has not previously formed the basis for the award of any degree, diploma or other similar title.

Place : Sardarkrushinagar
Date 6th June, 2007

(K. A. THAKKAR)
MAJOR ADVISOR

DECLARATION

This is to declare that the whole of the research work reported in the thesis for partial fulfillment of the requirements for the degree of **"DOCTOR OF PHILOSOPHY"** in **EXTENSION EDUCATION** by the undersigned is the result of investigations done by me under the direct guidance and supervision of **Dr. K. A. THAKKAR,** Professor, Directorate of Extension Education, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar and no part of the work has been submitted for any other degree so far.

Place : Sardarkrushinagar **(VINOD B. PATEL)**
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Place : Sardarkrushinagar
Date : 6th June, 2007

[V. B. PATEL]

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INTRODUCTION

I. INTRODUCTION

Livestock, particularly dairying is an integral part of agricultural system throughout the developing countries of the world. In India, keeping milch animals has been never a separate occupation from agriculture and is mashed with the cultural, social and religious ethos. Hence, dairy production occupies a key position in Indian rural economy.

Indian economy is agro-based and agrarian sector provides livelihood to majority of our rural population. More than 60 % of the workers engaged in agriculture are landless, marginal and small farmers having an average holding size is usually less than 1 ha. Small land is the most serious constraint to commercial agriculture. Besides this, crop farming in our country is faced with severe problems and vagaries of nature like flood, famine, cyclone, unseasonal heavy rain, insects and pest attack etc. which left the farmers in darkness of uncertainty. The majority of small and marginal farmers, specially in the remote rural areas have been less benefited from the modern agricultural innovations. However, dairy production technology is considered to have a little economic advantage over other land based enterprises. Owing to this fact, Government, donors and Non-Government Organizations (NGOs) involved in rural development and poverty alleviation programmes have been giving high priority to dairy development component. Evaluation of rural development projects in many developing countries of the world revealed that small,

marginal and even landless farmers had been benefited considerably from those programmes that had dairy component (Naimni, 1996).

Indian livestock resources constitute one of the largest renewable national resources and comprising many a species having great genetic variability and environmental adoption. It is the exclusive source of animal food and nutrition for country's population and substantial source of income and employment for rural population, specially the poor. Animal husbandry plays an important role in national economy and also in the socio-economic development of the rural people. The livestock sector contributes about 25 per cent to the Agricultural Gross Domestic Products (AGDP) and about 8 per cent of India's GDP. It provides regular employment to nearly 8 per cent labour force in India. (Kurian, 1999). The single largest contributor to the total GDP is milk, contributing 66 per cent of share from animal husbandry practices.

Dairy development has been given adequate place in the national agricultural development in India. As a result, both productivity and production of livestock including milk has increased significantly over the plan periods of 50 years. (Economic survey, 1999). The milk production in India has been increased since 1950 from 17 million tones to 84 million tones by 2005-06. Today more than Rs. 80,000 crores is flowing back into the rural economy every year through dairy industries directly benefiting the poorest of Indian farmers (Patel, 1999). The increase in milk production during the past few decades had been mainly due to increase in the number of milch animals,

particularly buffaloes and crossbred cows, improved veterinary services and adoption of animal husbandry practices.

Cattle and buffaloes have been an integral part of Indian agricultural production system. The country is having about 185 million cattle and 98 million buffaloes, which accounts for 13 per cent and 57 per cent of world's cattle and buffalo population, respectively (Dept of A.H. and Dairying GOI, New Delhi, 2004).

India achieved very prestigious first position in milk production with an annual production of 84 million tones (FAO, 2004). This feels very pleasant to hear, but when we compare the per animal production in India with that of world average, it appears very disappointing, discouraging, it is below of half the average of world, and even less than $1/5^{th}$ of average production of leading nations like Isarel, U.S.A., U.K. etc. (sharma,1999).

The dairy producer farmers regardless of their herd sizes, have been organizing into Milk Producers' Cooperative Societies (MPCs) throughout the country. The first dairy cooperative society registered in Allahabad in Uttar Pradesh in 1913 and was called "Katra Cooperative Dairy Society." During the past 80 years, the Dairy Cooperative Movement has witnessed tremendous transformation both in shape and size in India. The review of literature reveal that it has passed through a distinctive phases of development in the past and there has always been a paradigm shift in the policy and program orientation of the government towards the cooperative development in the past.

Dairying plays a crucial role in Indian economy and Dairy Cooperative Societies have been playing a pivotal role in bringing about the "White Revolution" in India. The dairy cooperative movement in India has achieved a remarkable success in the past 50 years, particularly in the last 20 years. In the dairy development of India, Gujarat occupies a place of pride and proverbally known as "Milk bowl of India." This is possible through cooperative network of Gujarat Cooperative Milk Marketing Federation (GCMMF) presently comprising of 12 district cooperative unions and their affiliated village milk producers' cooperative societies. They have demonstrated their utility in the rural development. The formation of milk cooperatives is the best way for desired development of the dairy industry in general and rural empowerment in particular. Such milk cooperatives are organized with the object of providing effective marketing facilities for the surplus milk produced in the villages. A real successful experiment of Anand pattern of dairy industry has been followed in other districts also. Sabarkantha district is one of them to start dairy cooperative under the name "Sabar Dairy." in 1964, now comprising of 1670 MPCs with the 2,72,811 members. Total procurement of the milk is 322 thousand tones with an average of 8.82 lakh Kg /day (Annual Report, Sabar dairy, 2005-06)

Sabarkantha district is comprising of thirteen talukas of which four talukas are tribal dominating. Out of 1670 MPCs of the districts, 287 MPCs are working in the tribal packet of district. Further, there are few MPCs having both tribals as well as non tribals as their members.

The secondary data shows that the MPCs working in tribal area are far behind as compared to non-tribal area in terms of numbers, milk procurement, other services provided by MPCs etc.

1.1 STATEMENT OF THE PROBLEM :

Despite considerable interest in the dairy sectors and favourable macroclimatic conditions created by the government policies, specialized medium and large scale dairies seem to be non existent in India due to many reasons. The capacity utilization of the modern dairy processing plants has been less than 50 per cent of the potential capacities. The success of these modern dairies depends largely on the milk supplies by the village dairy cooperatives scattered throughout the country. Studies shows that the overall performance of village level cooperatives was not satisfactory in most of the states in India. It has been seen that the economic objectives has often subsidized the social goals of cooperation and equitable redistribution of incomes earned through economic activities set by the economic and social planners (Anonymous, 1992).

About 95 per cent of the total milk marketed by the organized sector (modem dairies) has been produced in rural areas by marginal and small farmers, while the profitable market for milk and milk products is largely urban. Unlike other agricultural produces, milk is highly perishable and requires sophisticated packaging, storage and transportation facilities. It is not possible for the majority of the small and marginal farmers unless they are organized and supported to do so. In spite of the introduction of modern

technologies in specialized discipline of dairy production, processing and successful implementation of dairy development projects under Operational Flood Programmes, specialized medium and large scale dairies seem to be non existent due to competition of other agricultural commodities for land and other prevailing socio-economic factors.

As dairy production is the main cash earning source for small farmers in India, the number of MPCs has been increasing in all states and it was reached above 1,31,000 with a members 1,23,26,000 (Annual report, NDDB, 2004-05). Out of these, about half of them are operating successfully and making reasonable profits. The remaining half is not performing well and they are either at par or at losses, mostly existing in rural remote or tribal areas due to many reasons.

India has the second largest tribal population in the world next to Africa. There are 67.76 million tribal population in the country. Gujarat has 74.81 lakh tribal population, out of 506.1 lakh of total, which is about 14.76 per cent of the total. Thus, Gujarat has larger concentration of the tribal population than national average. Gujarat rank fifth among the states with sizable tribal population. In Gujarat, 72.00 per cent of tribal population is concerned in eight districts viz., Panchmahal, Dangs, Valsad, Surat, Bharuch, Banaskantha and Sabarkantha. (Census, 2001).

Sabarkantha district ranks fifth among all the districts of the state with respect to tribal population. The district has 20.18 per cent tribal population to its total population (Census, 2001).

The tribal economy is pre-dominantly depending on agriculture and partially depends upon forest based produce. They practices old age system of agriculture. These tribal communities due to poor transport and communication in the hilly areas remain isolated. The productivity of crops is low per unit area, which can be attributed to number of factors such as low productivity of soil, lack of communication facilities, low adoption of recommended cultivation technology etc.

In the district, after establishment of MPCs dairy farming has become vital to the livehood, particularly for small and marginal farmers. It supplements the income of farmers. Tribal farmers have also started adopting dairy farming to increase their income. But, still they carried out milk production in a traditional way mostly due to lack of knowledge about improved dairy husbandry technology. There is a great scope for improvement of adoption of modern dairy farming technology. There is no dearth of technology in dairy farming but the important thing is the dissemination of this technology in its pure form and more over its adoption by dairy farmers. All the line departments, who work for dairy development have to motivate tribal dairy farmers and to make them adopt scientific dairy farming technology.

There had been lots of studies on technological and economic achievements of dairy development in India but there were few critical studies carried out on performance of milk cooperative societies in the tribal region. Therefore, it was imperative to conduct an indepth study on the

"Performance of milk producers' cooperative societies and its influence in relation to animal husbandry practices adopted by tribals of Sabarkantha district." The present study had conceived and designed to analyze the performance of MPCs, factors associated with the performance, personal, socio-economic, communication, psychological characteristics of the members of MPCs, their attitude towards MPCs and dairy farming and knowledge and adoption of improved animal husbandry practices.

1.2 OBJECTIVES OF THE STUDY:

The specific objectives of the study are as under:

(1) To assess the managerial and business performance of MPCs.

(2) To identify the organizational and non-organizational factors influencing performance of MPCs.

(3) To identify the constraints as perceived by member respondents in effective functioning of MPCs.

(4) To study personal, socio-economic, communication and psychological characteristics of the members of MPCs.

(5) To assess the knowledge of MPC members about improved animal husbandry practices.

(6) To measure the attitude of members towards MPCs and dairy farming technology.

(7) To study the adoption of improved animal husbandry practices by MPC members.

(8) To determine the relationship between selected personal, socio-economic, communication and psychological characteristics of members and their adoption of improved animal husbandry practices.

1.3 SIGNIFICANCE OF THE STUDY:

There is no alternative viable approach for the dairy cooperatives at present in India. Much has been talked about positive side of Anand Pattern of Cooperative extension in the past 50 years. There had been a little effort made to examine the issues of the present study. A very few studies carried out revealed that the replication of Anand Pattern of Cooperative has not been so successful as it has been proclaimed by the government agencies. Therefore, the findings of the present study would give a more balance views on the extent of adoptability of Anand Pattern and performance of MPCs in the district. MPCs may be working well in the district but in tribal area where the herd size is small adoption of animal husbandry practices is low and hence, the impact of MPCs may be poor.

The study will analyze the organizational process of the dairy cooperative societies at the village level, the expectations of dairy farmers of the area, overall functioning and the performance of the societies at greater length.

The study has also tried to highlight the various constraints that prevent the effective functioning of MPCs. The conclusions drawn on the basis of the findings of primary data truely reflect the concerns of the farmers and hence,

assumes a greater significance if the tribal people will be assisted by the programme.

The findings on knowledge and adoption of dairy farmers about improved animal husbandry practices, factors determing the adoption of improved animal husbandry practices, their attitude towards MPCs and dairy farming technology and its relationship with their attributes will help the specialists, scientists, research workers, planners, policy makers, administrator etc. to get information about the present status of dairy farmers in identifying the thrust area needing immediate attention to boost economy of rural poor in general and tribals in particular through dairy farming and thereby they can incorporate necessary modifications in the existing programmes.

1.4 LIMITATIONS OF THE STUDY:

Though the study has great significance to all concerned individuals and agencies involved in dairy and rural development, it may have some limitations and shortcoming as well. Some of these are summarized below.

(1) Being a student's research project, the present study had a limitation for time, money accessibility and other resources that have affected the study.

(2) As a social science research, the findings are primary based on the data collected from the respondents and the records made available to the researcher. The prejudices and biases of the respondents and the reliability of the data collected from the secondary sources are not ruled out.

(3) The study was conducted in a particular condition and system with limited samples and variables in a particular area. Hence, the results of the study may not be applicable to a wider geographical region.

In spite of these limitations, every effort was made to keep this study as objective as possible by following all the norms of scientific research study.

REVIEW OF LITERATURE

II. REVIEW OF LITERATURE

The main objective of the review of literature is to make the research worker acquaint with the past researches in the field of investigation. Review of previous studies helps in understanding the various techniques and procedures adopted by the past researchers. However, literature availability pertaining to the present study is limited and relevant research studies carried out in different states of India and abroad available to the researcher having a direct or indirect bearing on this study has been presented in sub-groups in this section under the following heads which help to formulate the present study in proper context.

2.1 Managerial and business performance of MPCs.

2.2 Factors influencing performance of MPCs.

2.3 Constraints as perceived by member respondents in effective functioning of MPCs.

2.4 Personal, socio-economic, psychological and communication characteristics of the dairy farmers.

2.5 Knowledge of dairy farmers about improved animal husbandry practices

2.6 Attitude of dairy farmers towards MPCs.

2.7 Attitude of dairy farmers towards dairy farming technology.

2.8 Adoption of improved animal husbandry practices by dairy farmers.

2.9 Relationship between selected characteristics of member farmers and their adoption of improved animal husbandry practices.

2.1 Managerial and business performance of MPCs

Mahipal and Rai (1978) reported that the role performance of the office bearers of the cooperative societies were one of the major factors governing the success of the cooperative societies.

Patel (1980) indicated that highly successful societies differed significantly form least successful societies in respect of (i) audit class (ii) ratio of Amuldan (animal feed) sold to milk purchased by the societies (iii) average price per litre of milk sold by the members and (iv) average price per kilogram of milk received from milk union.

Sasikumar (2000) indicated that organized milk sectors (cooperative and private) have been supplying about 15 per cent of fluid milk demand and less then 10 per cent of other milk products in the domestic markets.

Gopi Krishna (2001) observed that almost all the MPCs had been procuring milk from members and selling milk to union and some MPCs had been selling milk to the local market as well in the hilly area of Uttar Pradesh. Besides milk marketing, some of the MPCs were also selling milk products and cattle feed to the members and providing first aid and emergency veterinary service to the milch animals of dairy farmers.

2.2 Factors influencing performance of MPCs.

Gopi Krishna (2001) revealed that average distance of MPCs from milk union or nearest chilling center, operating years of MPCs, type of office building of MPCs and competition for purchasing milk from the milk producer

farmers between MPCs and different types of middleman in the village were not significantly correlated with overall performance of MPCs.

2.3 Constraints as perceived by member respondents in effective functioning of MPCs.

Baviskar (1988) stated that there were four major constraints related to the ability of households to engage in milk production business in Gujarat, viz., (i) Money to buy buffalos, (ii) Availability of fodder, (iii) Space to keep the buffalos and (iv) Someone to look after the buffalos. He further reported that most members did not take keen interest in the affairs of the cooperative and the secretary who is a permanent staff often tried to get members of his choice in committee. Considering this fact, it was surprising that the secretary and his staff got relatively a free hand in running the cooperative.

Dubey et al. (1989) in their study revealed that the low rate of milk and milk products, lack of veterinary hospital in villages, high cost of feeding concentrates and lack of land for growing green fodder were the main problems faced by dairy farmers.

Kulkarni et. al. (1990) indicated that the non-availability of loan facilities for purchase of milch animals, fodder, construction of animal shed, lack of preservation facilities for milk and lack of knowledge of scientific animal feeding, preservation practices, animal management etc. were the major constraints faced by the respondents.

Patel (1996) revealed that major constraints faced by the member dairy farmers were; high cost of animals and concentrate, non availability of medical aid, no supply of crossbreed cows, non-remunerative price of milk, irregular collection of milk, lack of knowledge about silage preparation and lack of training on dairy management & milk marketing facilities.

Gopi Krishna (2001) reported that the dairy farmers were of the opinion that high price of milking animals, milk holidays during flush season by milk union, no interest of the younger generation in dairying, lack of adequate knowledge of farmers about improved dairy technology and lack of coordination among the line agencies of the government, ineffective dairy extension activities of government, low milk price, unfavourable milk pricing policy etc. were the main constraints in effective functioning of MPCs.

Vyas (1996) observed that tribal milk producers in dairy villages reported lack of knowledge of scientific animal feeding and preservation practices as their main constraints in dairy farming.

2.4 Personal, socio-economic, psychological and communication characteristics of the dairy farmers

2.4.1 Personal characteristics

2.4.1.1 Age:

Lad (1991) found that 56.67 per cent of milk producers were in middle age group.

Vyas (1991) reported that 63.33 per cent of milk producers had medium age.

Singh (1992) found that in dairy farming, majority farmers were in middle age group.

Thakor (1992) found that majority (82.38 %) of the mixed farming business owners had medium age.

Faizudin (1995) observed that 44 per cent of milk producers had medium age.

Temkar (2000) pointed out that 72 per cent of dairy farmers were found in middle age groups followed by 16 per cent in young age group and 12 per cent in old age group.

Gour (2002) noted that 76.74 per cent of the dairy farmers were in medium age group and 12.21 per cent were in young age group.

Gopi Krishana (2001) observed that majority (54.71 %) milk producers were belonged to medium age group.

Ashwar (2005) found that more than 75 per cent of the respondents were in middle age group.

Toppo (2005) revealed that 71.67 per cent of the dairy farmers belonged to middle age group followed by 26.67 in young age group and 1.66% in old age group.

2.4.1.2 Education:

Lad (1991) found that 41.10 per cent of milk producers had primary level of education.

Singh (1992) indicated that average education of farmers was low i.e.up to primary level.

Temkar (2000) found that more than 94 per cent of the dairy farmers were literate and only about 6 per cent were illiterate. Among literate, more than 58 per cent had secondary, higher secondary and above level of education and nearly 36 per cent had primary level education. Gour (2002) also reported similar findings.

Gopi Krishana (2001) pointed out that 94 per cent of the milk producers were illiterate and among literate, 52 per cent of the respondents had been educated upto middle and above level.

Ashwar (2005) indicated that 47.00 per cent of dairy farmers had secondary to higher secondary school level education and 15.00 per cent had above school level education.

Toppo (2005) observed that 43.33 per cent of the dairy women were educated up to primary level followed by 38.33 per cent, while 15.84 per cent and 2.50% percent dairy women were educated up to higher secondary, and graduate level education, respectively.

2.4.2 Socio-economic characteristics

2.4.2.1 Family size:

Vyas (1991) stated that large number of dairy farmers had large family size.

Mudhwa (1995) revealed that 64.89 per cent of the respondents had medium size family.

Vyas (1995) revealed that majority of tribal milk producer had large family size.

Patel (1996) concluded that majority of the member (66.00 %) dairy farmers had large size family.

Gopi Krishna (2001) found out 48.3 per cent dairy farmers had 5 to 10 members in family.

Patel (2004) indicated that majority of the respondents (56.67 %) were belonged to medium sized family followed by large size family (24.16 %) and small size family (19.17 %).

Toppo (2005) observed that 71.67 per cent of the dairy women belonged to large family while 28.33 per cent from small size family.

Patel (2006) stated that 56.25 per cent of the respondents were from medium size family followed by 31.25 per cent and 12.50 per cent belonged to small size and large size family, respectively.

2.4.2.2 Family type:

Lad (1991) reveled that majority (72.22 %) of the respondents from dairy village were found in joint type of family.

Vyas(1991) indicated that large number of the milk producers possessed nuclear type of family.

Mudhwa (1995) concluded that about half of the respondents (52.00 %) were lived in joint family.

Vyas (1995) observed that a great majority of tribal milk producers were belonged to joint family.

Patel(1996) stated that majority of the dairy farmers had joint type of family.

Patel (2004) observed that 78.03 per cent respondents were the members of joint family while remaining respondents were belonged to nuclear family.

Patel (2006) reported that 57.92 per cent of the respondents were lived in joint family and remaining 42.08 per cent respondents were belonged to nuclear family.

2.4.2.3 Land holding:

Thakkar and Patel (1995) found that 76.67 per cent of the milk producers were belonged to small to medium category of the land holding.

Patel (1996) found that 67.00 per cent of the member dairy farmers were belonged to small to medium category of land holding.

Shinde et. al. (1998) revealed that 26.67 per cent of the dairy farmers were having more than 2 hectares of land followed by 25.83 per cent with no land and 25 per cent with up to 1 hectare of land. While 22.50 per cent were with 1 to 2 hectare of land.

Temkar (2000) revealed that 32.83 per cent of dairy farmers were marginal farmers followed by 32.50 per cent medium farmers and 21.67 per cent small farmers. Only 10.00 per cent of dairy farmers were large farmers.

Gour (2002) reported that 33.72 per cent of the dairy farmers were marginal farmers followed by 27.97 and 20.35 per cent who were large and medium farmers, respectively. While 10.00 per cent dairy farmers were small farmers.

Ashwar (2005) indicated that majority dairy farmers (46.67 %) were marginal farmers followed by small farmers (26.25 %).

Toppo (2005) observed that majority of dairy women (80.83 %) were marginal farmers followed by 15.82 per cent and 3.35 per cent who were small and marginal farmers, respectively.

2.4.2.4 Occupation:

Vyas (1991) observed that majority of the respondents had farming as main occupation and dairy farming as subsidiary occupation.

Lad (1991) found that majority of the milk producers had farming as their main occupation.

Vaidehi and Joshi (1995) stated that main occupation of the majority (94.30 per cent) respondents was agriculture with subsidiary occupation as animal husbandry.

Patel (1996) revealed that majority of the member (79.00 %) dairy farmers were having dairy and farming as their main occupation.

Gopi Krisha (2001) reported that about 92 per cent of dairy farmers had farming with dairying as their main occupation.

2.4.2.5 Social participation

Patel (1996) reported that 56.00 per cent of member dairy farmers and 38.00 per cent of the non-member dairy farmers had membership only in one organization.

Bariya (1997) revealed that great majority of the dairy farmers (93.34 %) had no participation in any organization.

Shinde et. al. (1998) indicated that 48.34 per cent of the dairy farmers were having low level of organizational participation followed by 35.83 per

cent and 15.83 per cent with medium and high level of organizational participation, respectively.

Gour (2002) noted that 57.56-57.00 per cent of dairy farmers had low level of organizational participation, while 42.44 per cent had high level of organizational participation.

Ashwar (2005) reported that 58.33 per cent dairy farmers had low level of social participation followed by 40.42 per cent had medium level of social participation.

Toppo (2005) observed that 71.67 per cent of dairy women had medium level of social participation followed by 18.33 per cent and 10.00 per cent had low and high level of social participation respectively.

2.4.2.6 Herd size:

Singh (1992) found that in dairy farming system average size of herd was 3.45.

Vyas (1995) concluded that 67.33 per cent of tribal milk producers had small size herd.

Temkar (2000) reported that 43.33 per cent of dairy farmers had 5 to 8 animals followed by 40.00 per cent with up to 5 animals and 16.67 per cent with more than 8 animals.

Gour (2002) revealed that 40.76 per cent of dairy farmers had up to 5 animals followed by 32.50 per cent with more than 8 animals.

Ashwar (2005) observed that majority of dairy farmers (43.33 %) had medium size herd, followed by 32.92 per cent dairy farmers with small herd

size and 23.75 per cent dairy farmers with large size herd. The average herd size was 4.55 animals.

2.4.2.7 Milk production:

Singh (1992) revealed that average lactational milk yield from all milch animals was 1404.94 liters.

Thakor (1992) observed that 49.17 per cent of the mixed farming owners had animals producing up to 5 to 10 liters milk per day.

Dwivedi et. al. (1996) reported that under traditional feeding system, the average milk yield of cows and buffaloes in Bundelkhand region was 2.1 and 2.7 liter / day / animal, respectively.

Patel (1996) stated that 44 per cent of milk producers had animals producing up to 5 liters milk per day followed by 33 per cent who had milch animals producing 5.1 to 10 liters milk per day.

Ashwar (2005) noted that majority of farm families were in large producer group (45.42 per cent) followed by 31.25 per cent and 23.33 per cent were considered as medium producer group and small producer group, respectively.

2.4.2.8 Farm power possession:

Nayak (1993) revealed that 50.00 per cent respondents had 3 to 4 animals followed by 38.33 per cent who had 5 and above animals.

Patel (1995) observed that a great majority (81.11 %) of the respondents possessed minimum farm power i.e. up to two bullocks followed by 11.46 per cent of the respondents with no bullocks, while rest possessed 3 to 4 bullocks.

Gopi Krishna (2001) reported that 51.00 per cent of the member dairy farmers had no bullocks and about 44.00 per cent had one pair of bullock and 5 per cent had only one bullock.

Jadhao (2001) stated that 64.17 per cent of the respondents were found in medium farm power category. Whereas 24.17 per cent and 11.66 per cent of the respondents were found in high and low farm power category, respectively.

2.4.2.9 Material possession:

Jagdeshwara (1994) reported that 39.35 per cent of the respondents had low material possession followed by 37.50 per cent with medium and 23.14 % with high material possession.

Patel (1995) stated that majority (92.96 per cent) of the respondents possessed improved implements. While 6.67 per cent of the respondents reported that they had no implements.

Sarkar and Bandyopadhyay (1996) concluded that quite a large number of respondents (70.00 %) had low material possession.

Desai (1997) observed that majority (72.58 %) of the respondents had high material possession.

Kawale (2000) reported that slightly more than half (52.50 %) of the respondents were found possessing materials at medium level. Remaining 25.84 per cent and 21.66 per cent of the respondents were found with low and high material possession, respectively.

2.4.3 Communication characteristics:

2.4.3.1 Mass media exposure:

Thakor (1992) pointed out that majority of the dairy farm women (48.77 %) belonged to low category of mass media exposure.

Vyas (1995) observed that 64.00 per cent of tribal milk producers had medium exposure to mass media.

Bariya (1997) revealed that nearly equal per cent (44.54 % each) of milk producers had medium and low level of mass media exposure.

Temkar (2000) found that 44.16 per cent of the respondents had medium level of mass media exposure followed by 35.00 per cent with high level and 20.84 per cent with low level of mass media exposure.

Sawarkar et. al. (2001) stated that mass media viz. poster, radio, T.V. and meetings, individual media viz. friends, relatives and progressive farmers were the different sources of technical information about animal husbandry practices for tribal dairy farmers.

2.4.3.2 Extension participation:

Thakor (1992) found that 82.79 per cent of the mixed farming business owners had no participation in any extension activity.

Shinde (1994) indicated that nearly one-half (48.50 %) of the dairy farmers had medium extension contact.

Vyas (1991) reported that majority of the progressive dairy farmers (88.00%) had higher extension participation.

Vyas (1995) reported that 62.67 per cent of tribal milk producers were found to have medium extension participation.

Chand (1997) observed that two-third of the tribal farmers had low level of extension participation.

Ashwar (2005) indicated that majority of the respondents (67.50 %) had medium level of extension participation followed by high extension participation (19.17 %). Where as remaining 13.33 per cent dairy farmers had low extension participation.

2.4.4 Psychological characteristic:

2.4.4.1 Overall modernity

Prajapati (1993) reported that majority (82.50 %) of the respondents were having medium level of overall modernity.

Chauhan (1994) concluded that nearly half (49.53 %) of the general peasants were having low level of overall modernization followed by 44.76 per cent with medium level and 5.72 per cent with high level of overall modernization.

Trivedi (1994) observed that 72.89 per cent of the respondents had medium overall modernity followed by 15.55 per cent of the respondents had high overall modernity.

Patel (1997) reported 62.96 per cent of the respondents with unfavorable mass media exposure and had low level of overall modernization, whereas 62.57 per cent of the respondents with favourable mass media exposure were with high level of overall modernization.

Vankar (2000) concluded that respondents of unirrigated villages had comparatively low level of overall modernization.

Solanki (2002) stated that about two-third (67.17 %) of the respondents had medium level of overall modernity followed by 17.04 per cent of the respondents with low overall modernity.

2.5 Knowledge of dairy farmers about animal husbandry practices.

Patel (1994) found that 63 per cent of the crossbred cow owners had medium level of knowledge regarding improved animal husbandry practices.

Verma and Jain (1995) found that majority of dairy farmers had medium level of knowledge about modern animal husbandry practices. Sharma et. al. (1996) also observed similar findings.

Vyas (1995) revealed that knowledge of improved animal husbandry practices was higher among non-tribal milk producers as compared to tribal milk producers.

Dana and Kanabi (1998) observed that more than fifty per cent livestock oweners had medium level of knowledge regarding artificial insemination.

Shinde et.al. (1998) pointed out that 48.33 per cent of the respondents were having medium level of knowledge followed by 39.17 per cent with high level of knowledge and 12.50 per cent with low level of knowledge of artificial insemination.

Kadian (1999) reported that majority of the dairy farmers had medium level of knowledge.

Meena and Chauhan (1999) revealed that 62.50 per cent of the respondents had medium level of knowledge followed by 19.16 per cent with low level of knowledge and 18.34 per cent with high level of knowledge regarding breeding practices.

Temkar (2000) observed that 39 per cent of the dairy farmers had medium level of knowledge, followed by 35 per cent with low level of knowledge and 26 per cent with high level of knowledge.

Ganeshan and seethalaxmi (2002) found that 43.33 per cent of the tribal respondents had high knowledge followed by 30.33 per cent and 25.84 per cent who had medium and low knowledge on integrate pest management in Rice.

Ashwar (2005) pointed out that majority of the respondents (61.67 %) had medium level of knowledge of scientific dairy farming. The respondents with high and low level of knowledge were to the extent of 19.58 per cent and 18.75 per cent respectively.

2.6 Attitude of dairy farmers towards Milk Producer's Cooperative Society:

Patel (1981) stated that most of the milk producers in dairy villages (96.76 %) have favourable attitude towards cooperative milk producers' union.

Vekaria (1984) stated that the majority of the sugarcane growers (57.90 %) were found to possess favourable attitude. While 42.21 per cent were found to have unfavorable attitude towards cooperative sugar factory.

Patel (1985) pointed out that most of the milk producers (93.33 %) have favourable attitude towards cooperative milk producers' union.

2.7 Attitude of dairy farmers towards improved dairy farming technology.

Dixit et. al. (1991) reported that farmers of adopted villages had favourable attitude towards buffalo management practices than that of non-adopted villages.

Lad (1991) observed that majority of milk producers (88.89 %) had favourable attitude towards dairy farming.

Patel and Patel (1994) found that 53.33 per cent of the respondents were having favourable attitude towards dairy farming practices.

Vyas (1995) reported that majority of milk producers (97.78 %) had favourable attitude towards dairy farming.

Temkar (2000) reported that 49 per cent of the dairy farmers had medium level of attitude followed by 28 per cent with high level of attitude and 23 per cent with low level of attitude.

Thakkar (2001) observed that majority farmers had favourable attitude towards dairy farming.

Ashwar (2005) revealed that nearly 70 per cent dairy farmers demonstrated moderately favourable attitude towards dairy farming. The dairy farmers with highly favourable and less favourable attitude were 16.25 per cent and 14.58 per cent, respectively.

Awasthi et.al. (2000) reported that maximum no. of dairy farmers had favourable attitude toward improved dairy practices.

2.8 Adoption of improved animal husbandry practices by dairy farmers.

Rao et. al. (1992) reported that majority of farmers practiced cleaning the mucus from mouth and nostrils of calf and allowed dam to lick its calf. However, it was rare to see a farmer adopting sealing of naval and feeding colostrums within two hours of birth.

Yadav and Yadav (1995) found that average adoption index in various buffalo management practices viz. housing, feeding, breeding and milking were 57.05, 68.05, 71.05 and 67.85 per cent respectively. Whereas, for calf rearing, disease prevention, sale, purchase and care management practices, the adoption indexes were 72.00, 75.30, 75.65 and 76.35 per cent respectively, in home tract of Murrah.

Kulkarni et. al. (1990) stated that majority of dairy farmers (68.25 %) had medium level of adoption followed by 18.24 per cent with low level of adoption. Only 13.51 per cent of the dairy farmers were appeared in high level of adoption.

Patel (1998) observed that among animal husbandry related practices, 60.00 per cent of adoption was reported in management practices, whereas 57.00 per cent, 55.00 per cent, 51.00 per cent and 40.00 per cent of adoption was observed in housing, breeding, milking and feeding practices, respectively.

Rakshe et. al. (1998) revealed that 54.20 per cent respondents had medium level of adoption, while 25.00 per cent had high level of adoption and 20.80 per cent had low level of adoption of improved animal husbandry practices.

Shinde et. al. (1998) observed that 37.50 per cent of the dairy farmers had low level of adoption followed by 33.33 per cent with medium level of adoption.Rremaining 29.16 per cent of the dairy farmers were appeared in high level of adoption.

Sahu (2001) reported that farmers of Karnal and Kurukshetra district reasonably followed milking managemental practices but they have poor awareness about hygienic milk production.

Gour (2002) noticed that 64.00 per cent of the dairy farmers had medium level of adoption of improved animal husbandry practices, while 17.50 per cent and 18.50 per cent had high and low level of adoption, respectively.

Verma and Sharma (2003) reported that 53.34 per cent of the total respondents were in medium adoption group and 25.83 per cent respondents in the high adoption group, while 20.83 per cent were observed to be in low adoption group.

Ashwar (2005) concluded that 63.33 per cent of dairy farmers had medium level of adoption. While equal (18.33 %) numbers of the dairy farmers were with low level and high level of adoption.

Rahman et. al. (2005) observed that 51.00 per cent of the respondents adopted the improved dairy practices partially. Where as, 39 per cent and 10 per cent were found under no adoption and full adoption categories, respectively.

2.9 Relationship between selected characteristics of dairy farmers and their adoption of improved animal husbandry practices.

In the present study, the selected characteristics viz. personal, socio-economic, communication and psychological characteristics were considered to be the independent variables whereas adoption was considered as dependent variable.

2.9.1 Personal characteristics

2.9.1.1 Age and extent of adoption

Kulkarni et.al. (1990) observed non-significant relationship between age and adoption of animal husbandry practices by the farmers.

Shinde et. al. (1999) reported that age had significant correlation with adoption of improved animal husbandry practices by dairy farmers.

Temkar (2000) revealed that age had positive and significant correlation with attitude of the dairy farmers towards Artificial Insemination.

Gour (2002) observed non significant relationship between age and adoption of innovations by dairy farmers.

Varma and Sharma (2003) could found no significant association between age and adoption of improved animal husbandry practices by the dairy farmers.

Ashwar (2005) noticed that age of dairy farmers did not find to have significant correlation with adoption of improved animal husbandry practices.

2.9.1.2 Education and extent of adoption

Yadav (1993) observed that education of respondents had positive and significant influence on the adoption of various buffalo management practices.

Narwal et. al. (1996) reported that education of the farmers was positively correlated with their adoption of animal husbandry practices. The adoption index was higher among respondents of matriculate and above education level while lowest in illiterate.

Lal (1997) revealed that education of respondents had positive and significant influence on the adoption of various buffalo management practices.

Kulkarni et. al. (1990) observed non-significant correlation between education of dairy farmers and their extent of adoption of innovations.

Rajendra and Narendra (1999)stated that education has significantly affected the adoption of milking methods.

Gour (2002) found non-significant relationship between education and adoption of innovations by dairy farmers.

Verma and Sharma (2003) found non-significant relationship between education and adoption of improved animal husbandry practices by the dairy farmers.

Ashwar (2005) indicated that education of dairy farmers was positively and significantly correlated with adoption of improved animal husbandry practices.

2.9.2 Socio-economic characteristics

2.9.2.1 Family size and extent of adoption:

Gouda (1995) found non-significant relationship between family type of farmers and their extent of adoption of improved practice.

Patel (1996) revealed that extent of adoption of dairy innovations had no significant relationship with family size of dairy farmers.

Kalbhore (1998) observed non-significant correlation between family size of respondents and their level of adoption.

Dongardive (2002) revealed that family size of the respondents had non-significant relationship with their extent of adoption.

Non significant association between family size of the farmers and their extent of adoption was reported by Kawale (2000), Jadav (2001) and Patel (2006).

2.9.2.2 Family type and extent adoption:

Lad (1991) found that family type of the tribal milk producers had no significant relationship with their adoption of improved animal husbandry practices.

Vyas (1991) observed significant relationship between family type and extent of adoption of improved animal husbandry practices.

Patel (1996 a) found that family type had non-significant correlation with the farmers' adoption level of improved dairy practices.

Patel (1996 b) found significant relationship between family type of the respondents and their extent of adoption of improved practices.

Kawale (2000), Dongardive (2002) and Patel (2006) observed no significant relationship between family types of respondents with their extent of adoption of improved practices.

Pandya (2004) reported that family type of the farmers had non significant influence on their extent of adoption of innovations.

2.9.2.3 Land holding and extent of adoption:

Singh et al (1985) found that operational land holding size had no significant relationship with the adoption of improved dairy practices in non progressive villages. They further stated that in the progressive villages adoption of improved dairy innovations was positively and significantly correlated with size of land holding.

Patel (1994) found that land holding had significant correlation with the farmers' adoption level of improved dairy practices.

Shinde et. al. (1999) observed positive and significant correlation between land holding and adoption of improved animal husbandry practices by the dairy farmers.

Gour (2002) reported negative but significant correlation between land holding and adoption of improved animal husbandry practices.

Verma and Sharma (2003) found no significant association between land holding of the farmers and their adoption of improved animal husbandry practices.

Ashwar (2005) stated that higher the land holding of a dairy farmer, the better was his adoption of improved animal husbandry practices.

2.9.2.4 Occupation and extent of adoption:

Lad (1991) found no significant relationship between occupation of the milk producers and their extent of adoption of improved animal husbandry practices.

Patel (1996) revealed that there was positive and significant association between the occupation and adoption of improved animal husbandry practices by dairy farmers.

Shinde et. al. (1998) observed significant relationship between occupation of dairy farmers and their extent of adoption of dairy practices.

Dongardive (2002) found non significant correlation between occupation of the respondents and their extent of adoption.

Patel (2004a) and Patel (2004b) observed positive and significant correlation between occupation of farmers and their adoption.

Patel (2006) revealed that there was positive and significant association between occupation and extent of adoption of improved practices by the farmers.

2.9.2.5 Social participation and extent of adoption:

Patel (1994) observed non-significant correlation between organizational participation and adoption of improved animal husbandry practices by the dairy farmers.

Shinde et. al. (1998) stated negative but significant relationship between social participation and adoption of improved animal husbandry practices by the farmers.

Gour (2002) reported non-significant relationship between social participation and adoption of innovations by dairy farmers.

Ashwar (2005) concluded that social participation had positive and significant association with adoption of improved animal husbandry practices.

2.9.2.6 Herd size and extent of adoption

Patel (1993) observed positive and significant relationship between herd size of dairy farmers and their extent of adoption of improved animal husbandry practices.

Chaudhary and Singh (1997) revealed that there was significant relationship between herd size and adoption of artificial insemination practice for breeding the animals by the dairy farmers.

Kulkarni et. al. (1990) observed positive and significant relationship between herd size of dairy farmers and their extent of adoption of dairy innovations.

Shinde et. al. (1998) observed negative and significant correlation between herd size and adoption of improved animal husbandry practices by the farmers.

Shinde et al (1999) found positive and significant correlation between herd size possessed by the farmers and their adoption of improved animal husbandry practices.

Temkar (2000) found negative but non-significant relationship between herd size and adoption of dairy technology by the farmers.

Gour (2002) concluded that more the number of dairy animals dairy farmers had, higher was the adoption of improved animal husbandry practices by them.

Verma and Sharma (2003) found non-significant association between herd size and adoption of improved animal husbandry practices by the dairy farmers.

Ashwar (2005) noticed that the unit size of dairy animal maintained by a dairy farmer had positive and significant correlation with the extent of adoption of improved animal husbandry practices.

2.9.2.7 Milk production and extent adoption

Lad (1991) concluded that more the milk production of dairy farmers had, more was the adoption of improved animal husbandry practices.

Shirsat et. al. (1993) reported that milk production of animals of the dairy owners was positively and significantly correlated with extent of adoption of improved dairy management practices by milk producers.

Patel (1994) reported positive and significant correlation between milk production of dairy farmers and the extent of adoption of improved animal husbandry practices by dairy farmers.

Patel (1996 a) observed that there was non-significant relationship between the daily average milk production by the members and adoption of innovations of dairy farming by them.

Ashwar (2005) revealed that milk production of respondents was positively and significantly associated with adoption of improved animal husbandry practices.

2.9.2.8 Farm power possession and extent of adoption

Pandit (1981) reported that among the tribal farmers having more farm power, adoption rate was higher.

Gopi Krishana (2001) stated that higher the animal power possessed by the dairy farmers, higher was their adoption rate.

2.9.2.9 Material possession and extent of adoption:

Kawale (2000) revealed that material possession of respondents was significantly associated with extent of adoption of improved practices.

Patel (2004) stated that higher the material possessed by the farmers, the better was his adoption of innovations.

2.9.3 Communication characteristics

2.9.3.1 Mass media exposure and adoption

Chaunan et al (1994) observed positive and significant correlation between mass media exposure and attitude towards modern agricultural practices of small peasants.

Patel (1997) reported that mass media exposure was found significantly and positively correlated with extent of adoption of recommended technology by the farmers.

More et. al. (1998) found that mass media exposure had significant correlation with the farmers' level of adoption.

Patel (2004) observed positive and significant association between mass media exposure and the extent of adoption of improved technology by the farmers.

Patel (2006) revealed that higher the mass media exposure by farmers the better was his level of adoption of improved practices.

Temkar and Chandhary (2002) stated that mass media exposure had positive and significant correlation with attitude of dairy farmers toward A. I. service.

2.9.3.2 Extension participation and adoption

Patel (1994) found that extension participation had significant correlation with the farmers' level of adoption of dairy practices.

Kulkarni et al (1998) reported positive and significant relationship between extension contact of dairy farmers and their extent of adoption of innovations.

Shinde et al (1999) observed positive and significant relationship between extension participation of dairy farmers and their extent of adoption of improved animal husbandry practices.

Gour (2002) reported that extension participation of dairy farmers had positive and significant effect on adoption of improved animal husbandry practices.

Ashwar (2005) indicated that extension participation was positively and significantly associated with adoption of improved animal husbandry practices.

2.9.4 Psychological characteristic

2.9.4.1 Overall modernity and adoption:

Joshi and Shinde (1984) concluded that state of modernization was significantly associated with adoption.

Patel (1997) revealed that overall modernity was positively and significantly correlated with extent of adoption.

Vankar (2000) reported that the level of overall modernization of the respondents of unirrigated and irrigated villages was found to be positively and significantly related to their extent of adoption of modern technology.

Solanki (2002) found that the overall modernity was positively and significantly related with entrepreneurial behaviour of potato growers.

THEORETICAL ORIENTATION

III. THEORETICAL ORIENTATION

This chapter is highlighting the development of theoretical frame work for the study. The review of literature related to the research has already been given in the proceeding chapter. Based on review, the conceptual frame work was framed under following five sections.

3.1 Conceptual frame work of the study

3.2 Theoretical setting

3.3 Identification of the variables

3.4 Conceptual model

3.5 Operationalization of concepts

3.6 Derivation of hypotheses

3.1 CONCEPTUAL FRAME WORK OF THE STUDY

Indian farming is an economic symbiosis between crop and animal husbandry. It is said that India lives in villages since a large majority (74 per cent) of the families are dependent on agriculture with live stock constituting integral role, particularly for the rural poor.

Live stock provides cheap nutritious food rich in animal protein to millions of people. It offers a good employment generation opportunity. A large number of rural women find good opportunities to work in several operations of livestock production. It provides supplementary income to the economically weaker section of the society, like schedule tribe, schedule caste, small farmers, marginal farmers and agricultural labourers. Bullocks are the

main source of draught power in agricultural operations and transport of agricultural product to nearby market. Moreover, livestock enrich the soils of 70 millions of farm families by adding huge amount of organic manure in the soil across the country. Above all, our animals convert vast quantities of crop residues of little value into valuable milk and other byproducts for human use. The animals have thus rightly been called to act as food factories, the powerhouses, the fertilizer plants and mobile banks for vast majority of poor and landless dairy farmers of the country. Income from livestock has a redistribute effect in national economy. Owing to this, dairying has received considerable attention of planners of the country.

Dairy animal production depends on the extent to which dairy farmers adopt scientific husbandry practices. The successful adoption of scientific animal husbandry practices can be considered as means to achieve increased productivity and there by socio-economic upliftment of farming community. In dairy farming, improved animal husbandry practices are considered worth useful to enhance milk production, productivity and profitability and ensure sustainability which improves the standard of living of rural poor masses including small farmers, marginal farmers and landless labourers. Enhancing the knowledge of dairy farmers would be the important step towards attaining high level of adoption of the recommended dairy practices.

The success, progress and development or failure of any enterprise would mainly depend upon people's attitude towards it. Many research workers have noticed that only availabilities of technology and help provided by

development agencies are not enough to divert the dairy farmers towards adoption process but very basic thing required in this process is positive attitude of dairy farmers.

They should be motivated and convinced to adopt recommended scientific practices for achieving desired results and making dairy farming a more profitable and sustainable business.

Dairy cooperative has emerged as a boon for resource poor milk producers and played an important and vital role in success story of our dairy development. In Gujarat, dairy cooperative development programme has resulted into a remarkable success and state has emerged as a fifth largest producer of milk in the country. Dairy cooperatives at village level have been organized with the idea of bringing millions of milk producers under the umbrella of cooperatives. Milk producers with small scale production constitute an important component of dairy. The dairy development organizations in the country are thriving hard to increase the income of dairy farmers spread throughout the country. The overall performance of village dairy cooperatives was not satisfactory in most of the state of India particularly in tribal area. Therefore, the overall functioning and the performance of the dairy cooperatives and the expectation of farmers from dairy are important to study at greater length.

The major concepts which are aimed at to study are; (1) Attitude, (2) Adoption and (3) Constraints. The detail of all these concepts is discussed here after.

3.1.1 Attitude

Attitude is a mental and natural state of readiness organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which is related (Allport, 1935).

It may be defined as relatively stable affective response to an object (Rosenberg) and also a tendency or disposition to evaluate an object or the symbol of the object in certain ways Nanda (1998). According to Thruston (1946) defined an attitude as the degree of positive and negative affect associated with some psychological object. The components of attitude are, (i) Cognitive (Knowledge), (ii) Affective (feeling) and (iii) Behavioural (the act of responses). Regarding psychological objects, these may be symbol, phrases, slogan, person, institution or idea towards which people can differ with respect to positive or negative affect.

An individual who has associated a positive effect or feeling with some psychological object is said to like that object to have a favourable attitude towards it. An individual who has associated a negative affect with some psychological object would be said to dislike that object or to have an unfavourable attitude towards it. In this study, the attitude has been conceptualized as dairy farmers' degree of favourable or unfavourable feeling towards the objects, the milk producers' cooperative society and the dairy farming.

Several studies have established favourable attitude of dairy farmers towards dairy farming viz; Dixit et. al. (1991), Lad (1991), Vyas (1996), Temkar (2000) and Thakkar (2001).

Attitude was also found to have positive and significant association with adoption of improved animal husbandry practices. This was supported by Shirsat et. al. (1991), Patel (1994) and Gour (2002). An attitude would positively and negatively affect the course of action to be selected. It was therefore, assumed that attitude of the farmers might be associated with extent of adoption of improved animal husbandry practices.

3.1.2 Adoption

Adoption has generally been defined as a decision to make full use of a new idea or innovation as the best course of action available. Whereas, the adoption process is the mental process through which an individual passes, first from hearing about an innovation to its final adoption. Adoption of innovation requires a decision by an individual. He must be using be new idea and in most cases decide to cease using an idea that the innovation replaces. Adoption implies continued use of the innovation in the future. Ramsey et. al. (1959) conceived adoption as cognitive adoption and behavioural adoption. Cognitive adoption involves complex decisions and changes including situation. Behavioural adoption consist of actual uses of the practices. In the present investigation, behavioural adoption is defined as the use of improved animal husbandry practices on a continuing basis.

Adoption is a kind of social action and it is conceptualized as behavioural predisposition manifests in the acceptance of improved animal husbandry practices known to increase productivity of dairy animals. In the present investigation it is attempted to understand the extent to which farmers adopted the improved animal husbandry practices and to spell out the factors which influence adoption behaviour of dairy farmers, so as to able to predict the behaviour of the farmers and control the known factors in a desired manner and chanalized the course of farmers' action in desired direction.

Since adoption is an action, it involves the use of means for attainment of certain goals or objectives. In this case, both the means and the ends are concretely identifiable objects or states and are also clearly distinguishable. For example, the scientific dairy farming consist of breeding, feeding, management, health coverage, clean milk production, mastitis control etc. to increase the production per animal and thereby improve socio-economic condition of village dairy farmers.

3.1.3 Constraints

Constraints imply forcible restriction and confinement of action. Constraints play a vital role in the adoption process of any technology. the advantages of any technology can actually be derived only when the farmers in their local situation efficiently use it. The farmers are very eager to get maximum benefits from the newer technology.

As far as the constraints confronting the dairy farmers in effective functioning of milk producers' cooperatives are concerned, they are many,

which restrict the development of dairy farming. These constraints not only stand in a way of acceptance of new way of dairying but also check the adoption process. However, it is well known fact that the constraints in adoption of technology can never be removed but they may be minimized.

In the present study, it is assumed that the dairy farmers may experienced some difficulties which restrict the functioning of Milk Producer's Cooperative Societies. Hence, it is conceptualized to identify the constraints experienced or perceived by the dairy farmers in effective functioning of MPCs.

3.2 THEORETICAL SETTING

Cooperative dairying in India has turned out to be a major instrument of large scale modernization of dairy sector in the country. In this process, it offers a number of economic changes through its institutional structure. What started as movement against exploitative price in one district (Kheda) of central Gujarat in the fourties, has now become one of the major development instruments for large number of small & marginal farmers and landless labourers who constitute the majority of rural India.

Dairy cooperatives had been aimed not only at maximizing profits through technological modernization, but they looked at modernization from a wider perspective i.e. modernization of village communities through the instrument of dairying that village people are capable of adopting themselves to change. It may be argued that institutional structure provided by the

cooperative dairying becomes the fountain head of other social and cultural change.

The role of milk producers' co-operative societies assumes significant dimension in context of present status of dairying in India.

As dairy production is the main cash earning source of small farmers in India the number of MPCs has been increasing in all the states but all are not operating successfully and making reasonable profit. The cooperatives working in far remote and tribal area are performing not well and they are either at par or at losses may be due to many reasons.

Patel (1980) indicated that audit class of the society, percentage of A. I. buffaloes, ratio of concentrate feed sold to milk purchased by society, average milk collection per unit of breedable buffalo, average price per litre of milk paid to the members and average price per kilogram of milk received from union were significant common indicator for the success of MPCs.

Franco and Shery Chand (1991) studied the impact of animal health programme on economic viability of tribal dairy cooperative. They selected various types of indicators viz. goal indicators, objective indicators, purpose indicators and target indicators. They concluded that the milk cooperatives were considered as valuable workable instruments for the development of tribal areas, but equally other inputs not being provided by the milk union were required if the cooperatives were to function on viable commercial enterprises.

Hence, it was conceptualized to study the performance of MPCs with respect to managerial and business ability and other affiliated factors.

3.3 IDENTIFICATION OF VARIABLES

Situation or environment role is very crucial in anticipating the human action. Behaviour takes place in a situation and it has therefore profound influence on the individual's action, sometime situation presents the actor with certain goal to pursue. Rogers (1962) therefore, confirmed the decisive role of situation. The social system in which individual is a member had dominant effect on his behaviour. An individual's action is depending upon many factors. As conceptualized by parsons (1954), the action takes place in a situation consisting of social, physical and cultural factors. To be precise, any action or decision is influenced not only by economic factors but also by those related to socio-personal, economic, psychological and situational factors. As we know respondents differ in their characteristics and this may have association with attitude and adoption.

A brief discussion on selection of variables having bearing on member's attitude towards MPCs and dairy farming technology and adoption of improved animal husbandry practices is given below.

3.3.1 Independent variables

3.3.1.1 Age

It is generally believed that younger the farmer, the more favorable will be his attitudes resulting in to higher adoption, beccuse generally youngsters are more innovative, change prone and progressive than older generation. Hence, it is conceptualized that farmers with higher age are expected to have less favourable attitude towards milk cooperative societies and improved dairy

farming and thereby have low rate of adoption of improved animal husbandry practices.

3.3.1.2 Education

It is will known that education is the essence of any development process. Beal and Sibyl (1967) rightly pointed out that individual's ability to read and the level of formal education he possesses will leads towards broadening his vision and creating better ability to cope up with the situation. It is therefore, expected that the greater the education, more favourable will be the attitude and better will be the adoption.

3.3.2 Socio-economic characteristic

3.3.2.1 Family size

Livestock enterprise is a labour intensive enterprise. The family size is a factor which determines man's power. This characteristic plays vital role in Indian agriculture where household labour's involvement in farming and animal husbandry is very high. Family workers are the assets of family as these workers earn money from different sources or get themselves engaged in agricultural operations, thereby reducing current expenditure to be incurred on hiring of labour. This will add with more net income. Thus, person will be in a good position to adopt improved practices. In this study, it is postulated that family size may exert influence on attitude and adoption of improved animal husbandry practices.

3.3.2.2 Family type

Family is the chief economic unit in the society. There is a clear work distribution in the family and it is dependent of family size. If a family is joint, then pressure of work on individual member might be less and if a family is nuclear then pressure of work is higher due to less number of family members. Hence, large family may prefer to adopt dairy farming enterprise readily than nuclear family, as it involves higher degree of labour. In this respect the variable, family type was selected for the study.

3.3.2.3 Land holding

It is assumed that farmers with large size of land holding have substantial investible capital which is beyond the investment potential and credit resources of small farmers. Therefore, it is postulated that the farmers having large land holding might have more favourable attitude and would be in a better position to adopt improved animal husbandry practices.

3.3.2.4 Occupation

Occupation is an economic activity in which a farmer engages himself for earning purpose. Along with farming, other occupations make the farmer economically sound. The economic well being obliviously affect the risk taking ability of a farmer and give courage to be innovative and accept new way of farming or dairying. Thus, it is assumed that the farmers with other occupation would have opportunity to earn higher which in turn help him to purchase costly inputs to adopt the improved technology.

3.3.2.5 Social participation

It refers to voluntary sharing of an individual in person-to-person and group-to-group relationship, beyond the immediate household benefit (Hay, 1951). It shows the degree to which the respondents are involved in formal organizations as a member or office bearer. It plays an important role in increasing one's contact with the outside world and in widening of one's horizon of experience by exposing him to the secondary group atmosphere.

An association is considered to exist between social participation and adoption behaviour of dairy farmers.

3.3.2.6 Herd size

Herd size refers to the number of productive animals a dairy farmer is having. In general, more the number of milk producing animals more will be his income and better will be his economic condition, which results in higher adoption of improved animal husbandry practices. In this study, it is postulated that herd size, may exert influence on adoption of improved animal husbandry practices.

3.3.2.7 Milk production

Milk production at farmer's home may also have influence on the adoption of improved animal husbandry practices by dairy farmers. More will be milk produced at farmers' home, more will be his income through its sale and better will be his living. This will add to more favourable attitude. With more income, he will be in a better position to adopt improved animal husbandry practices to a greater extent. Hence, it is conceptualized that the

farmer having more milk produced at his home would be in a better position to adopt improved animal husbandry practices and will have more favourable attitude toward dairy farming as well as towards milk producers' cooperative society.

3.3.2.8 Farm power possession

Dairy farming is age old occupation followed by the Indian farmers for a long time with agriculture. Bullock is the main source of farm draft power. With the advancement of agriculture now a days, farmers also keep tractor, thresher, chaff cutter, seed drill etc. to avoid labour shortage and to do work speedily. Hence, farmer's power possession has its influence on adoption of dairy farming. Looking to the tribal area, farmers might have kept bullock as farm power. Therefore, the variable farm power possession was taken for the study.

3.3.2.9 Material possession

The well being of a farmer can be judged by many factors. Material possession is one of them. Material possession with respect to household and physical facility and transportation facility is the indication of prosperity of the farmer. A prosperous farmer may divert his money more to agriculture and animal husbandry as he possesses more purchasing power and entrepreneurship. Scientific dairy farming is also enterprise which require considerable amount of money to purchase milch animals, recurring cost of feed and aftercare etc. Hence, it was taken for the study.

3.3.3 Communication characteristics

3.3.3.1 Mass media exposure

This refers to the degree to which a respondent is exposed to mass media like radio, newspaper, television for getting information. In the present era, agricultural information become an important input just like seed, fertilizer and irrigation. Hence, a farmer who is exposed to media sources would have latest information on the enterprise of his interest. He obviously possesses and uses the information and knowledge in his enterprise. The co-operative milk marketing unions, government departments, agricultural universities and farm magazines, radio, television and newspaper are providing information on dairy farming.

To know the influence of such media exposure, it is selected as a variable for the study.

3.3.3.2 Extension participation

It refers to the participation or involvement of dairy farmers in animal husbandry extension activities, like clinical camp, dairy farmers meet, calf really, vaccination camp, infertility camp, farmers' fair, exhibition etc. being organized from time to time by agencies of animal husbandry extension. Having participated in such extension activities, they may come to know about beneficial effect of various improved animal husbandry practices and may change their mind to adopt such practices. Various studies in the past also established a relationship between extension participation and dairy farmer's adoption of improved practices. In the present study, it is expected to have

relationship between extension participation and the dependent variable adoption.

3.3.4 Psychological characteristic

3.3.4.1 Overall modernity

"Modernization is the process by which individual change from traditional way of life to a more complex technologically advanced and rapid changing style of life "(Rogers and Sevening, 1969).

Inkles and Smith (1966) also reported that modern man is quicker to adopt technical innovation Shing (1970) pointed out that the successful agricultural adoption had a positive attitude towards modernization and scientific farming for the growth of agriculture.

The above discussion provides a base to believe that modernity of dairy farmers may play important role in adoption of improved dairy farming. Keeping this in mind, it is conceptualized that the overall modernity of dairy farmers affect their adoption of modern agricultural techniques.

3.4 CONCEPTUAL MODEL

The conceptual frame work given in preceding section may be presented paradigmatically which has been developed during the course of study based on discussion and assumptions made earlier from the review of literature. The model depicted in figure 1 is tentatively generalized and shows the postulated relationship between variables. The final format of such model has been suggested at the end of this dissertation in the chapter of "Result and

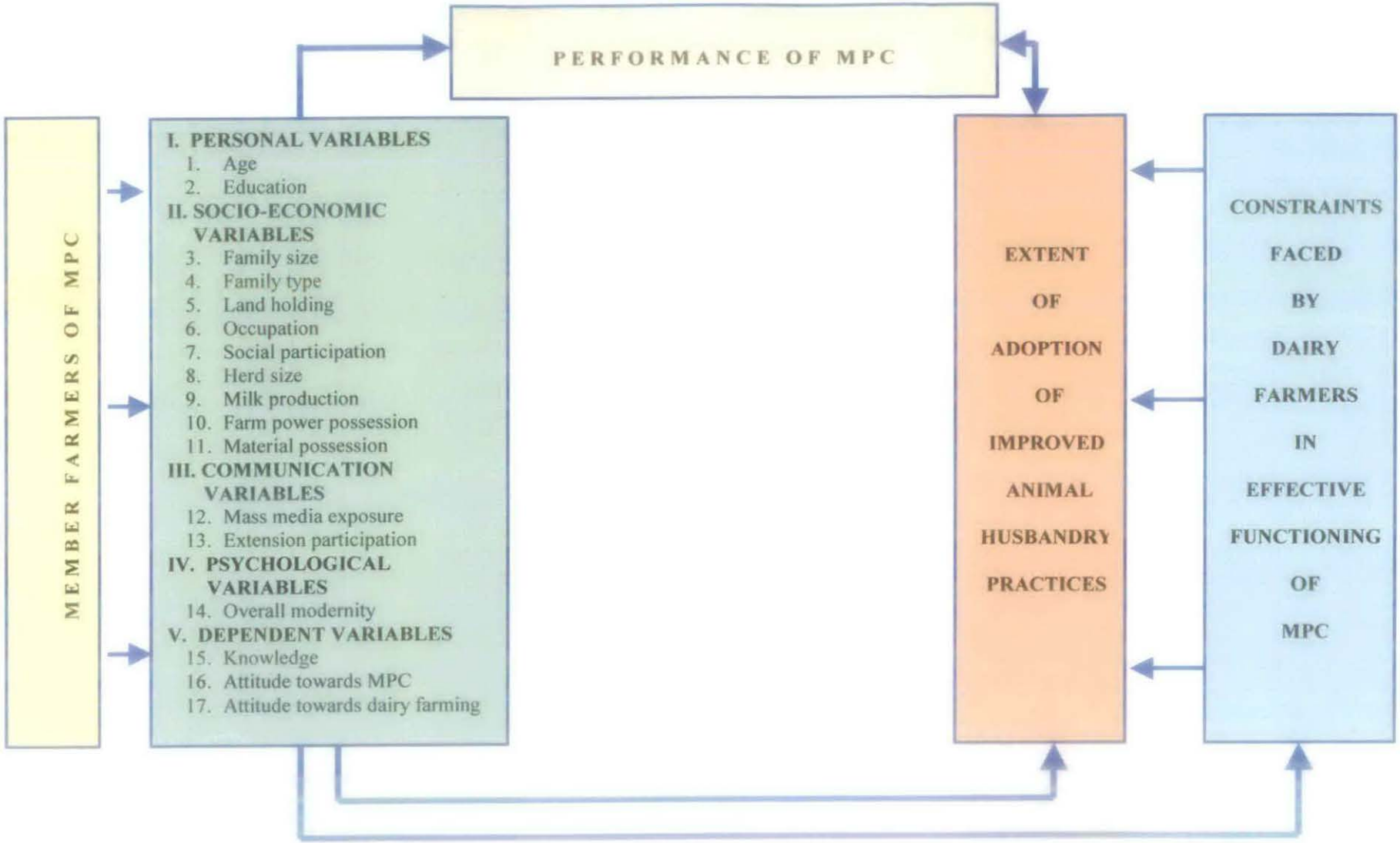


FIG. 1 CONCEPTUAL MODEL

Discussion." The model generalize that the selected characteristics of member dairy farmers influenced their attitude and adoption behaviour.

3.5 OPERATIONALIZATION OF CONCEPTS

[1] Cooperative

Cooperatives are autonomous democratic institution for the welfare of public. They are governed by principle of cooperation, justice and equality whether a primary, secondary or an apex society, they have to work under specific frame work i.e. act, rules and by laws framed by respective society for the management.

[2] Milk Producers' Cooperative society

It is an organisation in which individual milk producer join together voluntarily on the basis of equality, to work for secured milk marketing and for essential technical inputs coupled with extension services which are made available to them at the optimum level.

[3] Attitude

Attitude refers in the present study as the favourableness or unfavourableness affection towards milk producers' cooperative society and improved dairy farming technology.

[4] Adoption

Adoption in the present study was operationalized as the number of dairy farming practices followed by the member farmers in their dairy business.

[5] Constraints

This refers to the item of difficulties faced or perceived by the member farmers in effective functioning of the milk producers' cooperative society.

3.6 DERIVATION OF HYPOTHESES

Based on the objectives and theoretical frame work of the study, the following hypotheses were formulated as per the procedure given by Kerlinger (1976).

3.6.1 General hypotheses

H.1 : There is no relationship between performance of MPCs and extent of adoption of improved animal husbandry practices by member farmers.

H.2 : There is no relationship between selected independent variables and extent of adoption of improved animal husbandry practices by member farmers.

3.6.2 Specific hypotheses

From the above general hypotheses, following specific hypotheses were drawn.

H.2.1 : There is no relationship between age of the member farmers and their extent of adoption of improved animal husbandry practices.

H.2.2 : There is no relationship between education of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.3 : There is no relationship between family size of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.4 : There is no relationship between family type of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.5 : There is no relationship between land holding of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.6 : There is no relationship between occupation of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.7 : There is no relationship between social participation of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.8 : There is no relationship between hard size of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.9 : There is no relationship between milk production of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.10 : There is no relationship between farm power possession of the member farmer and their extent of adoption of improved animal

husbandry practices.

H.2.11 : There is no relationship between material possession of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.12 : There is no relationship between mass media exposure of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.13 : There is no relationship between extension participation of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.14 : There is no relationship between overall modernity of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.15 : There is no relationship between knowledge of the member farmer and their extent of adoption of improved animal husbandry practices.

H.2.16 : There is no relationship between attitude of member farmers towards MPC and their extent of adoption of improved animal husbandry practices.

H.2.17 : There is no relationship between attitude of member farmers towards dairy farming technology and their extent of adoption of improved animal husbandry practices.

RESEARCH METHODOLOGY

IV. RESEARCH METHODOLOGY

This chapter deals with the methods and procedures adopted by the researcher to conduct the research study successfully. It contains the research design, the tools and the techniques employed for data collection. The major focus of the study is to critically analyze the overall performance of Milk Producer's Cooperative Societies (MPCs) in tribal region. The relevant information was collected from both primary and secondary sources and a composite performance index was developed for making a comparative study of the high and low performing MPCS operating in study area. The details of the methods followed for selection of universe and sampling techniques for investigation as well as devices used for analysis are also summarized in the following sub-heads.

4.1 Plan of the study

4.2 Area of the study

4.3 Research methods

4.4 Sampling techniques

4.5 Selection of variables and their measurement

4.6 Constraints in effective functioning of MPCs

4.7 Characteristics of the respondents and their measurement

4.8 Knowledge of MPC members about improved animal husbandry practices

4.9 Attitude of members towards MPCs and dairy farming technology

4.10 Adoption of improved animal husbandry practices by MPC members

4.11 Tools of the study

4.12 Pre-testing of the interview schedule

4.13 Collection of the data

4.14 Statistical analysis

4.1 PLAN OF THE STUDY

The future status of white revolution could be predicted more convincingly if adequate evidence based on the important aspects of dairy farming enterprises could be known. The Milk Producer's Cooperative Societies (MPCs) have been established in all most of the districts of Gujarat state for economic development of the villages in general and dairy farmers in particular.

Milk cooperative society act as a source of information, centre for spreading knowledge and technical know how for achieving higher milk production, maintaining animal health & hygiene and providing milk inputs. Thus, milk cooperative society is playing a vital role in all round development of animal husbandry. Hence, it is prime need to know the performance of MPCs working in the villages and their influence in relation to the member's knowledge and adoption of dairy innovations, and also their attitude towards dairy farming as well as MPCs. This information will be useful to the policy makers, administrators, researchers, scientists, extension workers and development agencies engaged in dairy development. The information will be

also useful in development of milk marking business. With these objectives, the research problem was undertaken and carried out.

4.2 AREA OF THE STUDY

In Sabarkantha district, dairy farming is being practiced in all the talukas in varying degrees. Of the 13 talukas of the district, 4 talukas are tribal dominating with low economic development.

The major focus of the study is to critically analyze the overall performance of milk producer's cooperative societies in tribal region and its influence on dairy farming.

4.3 RESEARCH METHODS

A combination of following both qualitative and quantitative methods has been used in the study.

4.3.1 Qualitative methods

Apart from quantitative methods, following participatory tools and techniques were used for collecting qualitative information regarding issues of study.

[A] Informal discussion with concerned personnel of MPCs and cooperative leaders

During the course of study, a number of personnel both working in the dairy cooperatives and dairy development sectors at the district head quarter, project officials of village dairy project, key informants and local leaders in the villages were contacted and various issues related with cooperative dairy

development in the district were discussed. The views of these people were critically analysed and were used in drawing the conclusions of the study.

[B] Non participant observation

The researcher himself has collected the data from the field. The chairman, secretary and member farmers of each sample cooperative society were contacted for collecting data about MPCs. The selection of MPCs was based on random sampling. Further, from each MPCs, the member dairy farmers were selected at random and they were interviewed personally.

4.3.2 Quantitative methods

The quantitative data were collected from both secondary and primary sources as follows.

[A] Secondary sources

Most of the data pertaining to performance of the MPCs were collected from secondary sources. Appropriate checklists were prepared and pre-tested for collecting the available data from published and official records of MPCs, District Cooperative Milk Union and other concerned agencies of the district.

[B] Primary Sources

Data on personal, social, communication and psychological characteristics of the respondents were collected through personal interview by using appropriate schedules and scales available for measuring the selected variables of the study. For measuring the attitude of dairy farmers towards MPCs and dairy farming technology, scales were developed. A pilot study was

conducted prior to actual field survey. The schedules and scales were corrected based on pilot study.

4.4 SAMPLING TECHNIQUES

In the present study, simple random sampling and purposive sampling methods were used.

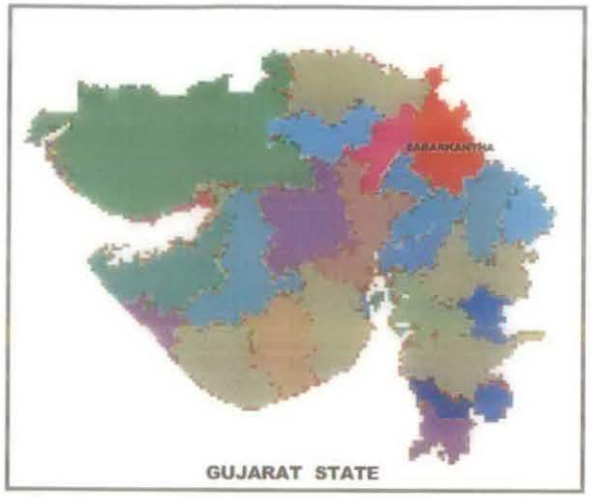
4.4.1 Selection of talukas

As far the milk production is concerned, Sabarkantha district hold third position in the state. (Gujarat State Animal Husbandry Department Bulletin, 2005-06).

The study was carried out in tribal area of the district. The tribal population in the district is concentrated in four talukas viz. Khedbrahma, Bhiloda, Vjaynagar and Meghraj. A list of MPCs of four tribal talukas was received from District Cooperative Milk Union, Himatnagar (Sabar dairy). Among them, Bhiloda and Khedbrahma talukas were purposively selected having more number of MPCs.

4.4.2 Selection of Villages and MPCs

A list of villages having MPCs was obtained from District Cooperative Milk Union. Of the 33 and 18 tribal MPCs functioning in Bhiloda and Khedbrahma talukas for the minimum last five years, respectively, 10 MPCs from Bhiloda taluka and 5 MPCs from Khedbrahma taluka were randomly selected. Thus, total 15 villages having MPCs were selected for study.



SELECTED TALUKAS

BHILODA

KHEDBRAHMA

SELECTED VILLAGES HAVING MPCs

N

Fig. 2 : SELECTED MILK PRODUCERS CO-OPERATIVE SOCIETIES FROM SELECTED TALUKA IN THE SABARKANTHA DISTRICT

4.4.3 Selection of the respondents

From the list of members of each respective MPC, ten respondents were selected using simple random sampling method making a sample of 150 respondents. A second selection list taking five dairy members from each selected MPCs was also prepared randomly to include them as a respondent for personal interview. If any member from the first list was not available then they were treated as substitute to complete the list of 150 respondents.

Table: 1 List of selected MPCs and number of respondents

Sr. No	Name of Taluka	Name of Village having MPC	Respondents Interviewed
1	Bhiloda	1. Dhanasan	10
		2. Ganthi	10
		3. Jayala	10
		4. Kalyanpur	10
		5. Lusadiya	10
		6. Malekpur	10
		7. Mota Kantharia	10
		8. Moti dodisara(Mahila)	10
		9. Vagheshwari	10
		10. Vejpur	10
	Khedbrahma	11. Chada	10
		12. Dodivada	10
		13. Kalol	10
		14. Naka	10
		15. Patadiya	10
		Total	**150**

4.5 SELECTION OF VARIABLES AND THEIR MEASUREMENT

An extensive review of published literature on the topic and discussion with various experts of the concerned subject was the basis for selection of various aspects for the study. Only those variables which were found to have most relevance to the present investigation were selected for the study. Three types of variables viz., organizational aspect of MPC, activity variables of MPC and characteristics of the respondents were selected for the study. The chronology of the variables and tools used for the measurements of the variables are presented in table 2.

Table 2: Variables and measurement techniques

No.	Variables		Measurement techniques
	Organizational aspects		
1.	Managerial and business performance of milk producers' cooperative societies(MPCs)		Based on criteria suggested by Gopi Krishna(2001), checklist & schedule were developed
2.	Factors influencing performance of MPCs		Structured schedule was developed
3.	Constraints in effective functioning of schedules MPCs		Structured schedule was developed
	Characteristics of respondents		
	(a)	**Personal characteristics**	
	1	Age	Structured schedule was developed
	2	Education	Scale developed by Trivedi (1963) was used after testing its reliability
	(b)	**Socio-economic characteristics**	
	3	Family size	Structured schedule was developed
	4	Family type	Structured schedule was developed
	5	Land holding	Structured schedule was developed
	6	Major occupation	Structured schedule was developed
	7	Social participation	Scale developed by Trivedi (1963) was used after testing its reliability
	8	Herd size	Structured schedule was developed
	9	Milk production	Structured schedule was developed
	10	Farm power possession	Structured schedule was developed
	11	Material possession	Structured schedule was developed
	(c)	**Communication characteristics**	
	12	Mass media exposure	Schedule will be developed
	13	Extension participation	Scale developed by Siddaramaiah and Jaihal (1983) was used after testing its reliability
	(d)	**Psychological characteristics**	
	14	Overall modernity	Scale developed by Mehta (1974) was used after testing its reliability
	(e)	**Other variable**	
	1	Knowledge	Test was developed
	2	Attitude	Scale was developed
	3	Adoption	Structured schedule was developed

4.5.1 Managerial and business performance

Performance indicators have been identified as those variables which measure the performance level of the particular dimension of the milk producer cooperative societies while making the comparison between two or more.

Gopi Krishna (2001) has identified several following performance indicators which determine the managerial and business performance of MPC. Among these, the indicators suited to MPCs working in the study area were included. Few other indicators based on the secondary information and discussion with officials at various levels were further included. The detail methods used for constructing this indicator is described as follows.

1. Total members in the MPC (I_1).

Total members in the MPC are defined as total numbers of the share holders of the MPC and it was obtained from the register of MPC.

2. Per cent household in village having cooperative membership (I_2).

It is the ratio of total members in MPC to the total house hold in village, converted in to percentage.

$$I_2 = \frac{\text{Total members in MPC}}{\text{Total households in village}} \times 100$$

3. Average membership growth of MPC in past 5 years (I_3).

It is the ratio of difference between total members in MPC on 31st March, 2006 and total members in MPC on 31st March 2001 to average numbers of members in MPC of five years.

$$I_3 = \frac{\text{Total members in MPC (31}^{st}\text{March, 2006)} - \text{Total members in MPC (31}^{st}\text{March, 2001)}}{\text{Average number of members in MPC of five years}} \times 100$$

4. Percentage of households selling milk to MPC in village (I_4).

It was calculated using following equation

$$I_4 = \frac{\text{Average number of households selling milk in MPC for last two years}}{\text{Total average number of households in village for last two years}} \times 100$$

5. Percentage of members selling milk to MPC (I_5).

Average number of members selling milk during last two years was taken and calculated using following formula

$$I_5 = \frac{\text{Average numbers of members selling milk in MPC}}{\text{Total numbers of members of MPC}} \times 100$$

6. Average number of members in the management committee of MPC (I_6).

It was taken from minute register maintained by each MPC for last two years.

7. Total number of meetings held during the year (I_7).

It was taken from minute register maintained by each MPC for last two years.

8. Number of paid staff employed by MPC (I_8).

It was obtained by asking the chairman or secretary.

9. Average annual milk procurement from members of MPC (I_9).

It was obtained from the milk purchased register of MPC for last two years.

10. Average annual per member milk procurement of MPC (I_{10}).

The average was worked out for last two years and calculated using following equation.

$$I_{10} = \frac{\text{Average annual milk purchased by MPC (litre)}}{\text{Average number of members in the MPC}} \times 100$$

11. Average annual per supplier milk procurement of MPC (I_{11}).

The average of last two years was worked out and obtained by using following equation.

$$I_{11} = \frac{\text{Average annual milk purchased by MPC (litre)}}{\text{Average number of member selling milk to the MPC}} \times 100$$

12. Average annual milk sale of MPC to DCMU(I_{12}).

It was obtained from the register maintained by MPC. The data of two years was taken and average was calculated.

13. Average annual milk purchased by DCMU from MPC for last two years (I_{13}).

The milk unions were sending the records of daily milk purchased from each MPC to all cooperative along with payments. The same information was utilized for this purpose.

14. Average annual income of MPC from milk sold to union (Average of last two years) (I_{14})

The annual income of MPC from the milk sold to union was obtained from the weekly / fortnightly payment sheets sent by the DCMU to all MPCs.

15. Average annual milk rate (Rs./lit.) realized by MPC (I_{15}).

The milk rate realized by MPC was calculated from the amount paid to the MPC and the quantity of milk sold to the union. Average of last two years was worked out.

16. Average annual value of milk suppliers from milk sold to union (I_{16}).

It was calculated from the milk payment sheet of each MPC. The data for milk payment of each MPC for two years was obtained from MPC and values were calculated.

17. Average commission of MPC from milk sold to Union for last two years (I_{17}).

It was obtained from the milk payment sheet sent by the Milk Union to concerned MPC.

18. Average annual commission rate paid to MPC by Milk Union on milk Supplier's value (I_{18}).

$$I_{18} = \frac{\text{Average annual commission amount received by MPC}}{\text{Average annual value of milk supplier's for milk sold to Union.}} \times 100$$

19. Average annual income of MPC from milk sale (I_{19}).

The annual income of MPC from milk marketing business was operationalized as the total value of milk and commission on milk price paid to supplier. It was work out for last two years and the same value was utilized for the purpose.

20. Average annual per member income of MPC from milk marketing business (I_{20}).

It was calculated using following formula.

$$I_{20} = \frac{\text{Average annual income of MPC from milk marketing business}}{\text{Average number of members in the MPC}}$$

21. Average annual per milk supplier income of MPC from milk marketing business (I_{21}).

Following equation was used for this purpose.

$$I_{21} = \frac{\text{Average annual income of MPC from milk marketing business}}{\text{Average number of milk suppliers in the MPC}}$$

22. Average annual gross profit of MPC from milk marketing business (I_{22}).

It is the difference between total annual value of MPC from milk marketing operation and total annual value paid to milk suppliers. Average of last two years was worked out.

23. Average annual per milk supplier gross profit of MPC from milk marketing business (I_{23}).

The gross profit per supplier was worked out by using following formula.

$$I_{23} = \frac{\text{Average annual gross profit of MPC from milk marketing business}}{\text{Average number of milk suppliers in the MPC}}$$

24. Per cent of annual gross profit of MPC to suppliers' value (I_{24}).

The data were collected for two years and average was worked out it was calculated using following equation.

$$I_{24} = \frac{\text{Annual gross profit of MPC from milk marketing business}}{\text{Annual average value of milk suppliers for milk sold to the MPC}} \times 100$$

25. Average annual purchase of milk products by MPC (I_{25}).

It was obtained by payment sheet of Milk Union for the last two years.

26. Proportion of suppliers' milk income spent on milk products purchase (I_{26}).

The information was collected for the two years, Average was worked out and calculated using following formula.

$$I_{26} = \frac{\text{Annual value of milk products purchased by MPC}}{\text{Annual value of milk suppliers from milk sold to the MPC}} \times 100$$

27. Average annual purchase of various milk inputs by MPC (I_{27}).

It was obtained by weekly / fortnightly payment sheet of milk union for the last two years.

28. Proportion of producer's milk income spent on milk inputs purchased by MPC (I_{28}).

Two years data were collected and it was calculated using following equation.

$$I_{28} = \frac{\text{Average value of milk inputs purchased by MPC}}{\text{Average value of milk suppliers for milk sold to MPC}} \times 100$$

29. Average annual cattle feed purchased by MPC (I_{29}).

It was calculated from the weekly / fortnightly payment sheet of milk provided by milk union. The data were collected for two years and average was calculated.

30. Average annual per milk supplier cattle feed purchased by MPC (I_{30}).

$$I_{30} = \frac{\text{Annual value of cattle feed purchased by MPC}}{\text{Average number of milk suppliers in the MPC.}}$$

31. Percentage of producer's milk income spent on cattle feed purchased by MPC (I_{31}).

The average of two years was calculated and using following formula, the same was calculated.

$$I_{31} = \frac{\text{Average annual value of cattle feed purchased by MPC}}{\text{Average value of milk suppliers for milk sold to MPC}} \times 100$$

32. Average annual total inputs purchased by MPC (I_{32}).

It was obtained by weekly / fortnightly payment sheet.

33. Percentage of annual milk income of supplier spent for purchase of total inputs by MPC (I_{33}).

$$I_{33} = \frac{\text{Average annual value of total inputs purchased by MPC}}{\text{Average annual value of milk suppliers for milk sold to the MPC}} \times 100$$

34. Average annual gross net income of MPC (I_{34}).

Annual gross income was operationalized as the total income of profit earning during the years through all cooperative business and other income generating activities and cash received by MPC as fees and fines etc. The data on audited balance sheet for two years were obtained from the MPC and the net income of each MPC was calculated.

35. Average annual operational expenditure of MPC (I_{35}).

It was obtained from audited balance sheet of two years.

36. Average annual audited (net) profit of MPC (I_{36}).

Annual audited profit was operationalized as the net amount remained balance with the MPC at the end of the cooperative year after meeting all the operational expenditure incurred during the year. Two years average was calculated.

37. Average annual per member net profit of MPC (I_{37}).

For the two year data were considered for averageing

$$I_{37} = \frac{\text{Net profit amount of MPC}}{\text{Average number of members in the MPC}}$$

38. Average annual per milk supplier net profit of MPC (I_{38}).

$$I_{38} = \frac{\text{Net profit amount of MPC for two years}}{\text{Average number of milk supplier in the MPC for two years}}$$

39. Proportion of gross profit to net profit of MPC (I_{39}).

It was operationalized as the ratio of gross income of MPC from milk marketing to net profit of the MPC. Two years average was workout.

$$I_{39} = \frac{\text{Annual net profit amount of MPC from milk marketing business}}{\text{Average gross income of MPC from milk marketing business}}$$

40. Average total of number dairy animals owned by household (I_{40}).

It refers to the number of dairy animals, a farmer had on the date of interview. The average was worked out for number of respondents interviewed for each MPC.

41. Average live stock density on cultivated land (I_{41}).

In was operationalized as the number of dairy animals being raised in one hectare cultivated land of the respondents. The same was worked out for number of respondents of each MPC and average was calculated for concerned MPC.

$$I_{41} = \frac{\text{Total number of animals owned by the respondents}}{\text{Total land holding size of the respondents (ha.)}}$$

42. Proportion of milking local cows to total local cows in herd (I_{42}).

The information was calculated for respondents interviewed of each MPC and then average was workout for MPC.

$$I_{42} = \frac{\text{Number of local cows in milk}}{\text{Total number of adult breedable local cows in herd}} \times 100$$

43. Proportion of milking buffaloes to total buffaloes in herd (I_{43}).

It was calculated using following formula.

$$I_{43} = \frac{\text{Number of buffaloes in milk}}{\text{Total number of adult buffaloes in herd}} \times 100$$

44. Average daily milk production by respondents from cows (I_{44}).

It has been operationalized as the total milk production from cows on the day before interview with the respondents.

45. Average daily milk production by respondent from buffaloes (I_{45}).

It is operationalized as the milk produced by milking buffaloes on the day before interview.

46. Average daily total milk production by household (I_{46}).

It has been operationalized as the total quantity of milk production from both cows and buffaloes on the day before interview of the respondent.

47. Proportion of cow milk to total household milk production (I_{47}).

$$I_{47} = \frac{\text{Quantity of milk production from cows on the day before interview with respondent}}{\text{Total quantity of milk produced by the household on the day before interview}} \times 100$$

48. Per person milk production of household (I_{48}).

$$I_{48} = \frac{\text{Quantity of milk produced by the household on the day before interview with respondent}}{\text{Total number of family members in the household}}$$

49. Average quantity of milk sale by household to MPC (I_{49}).

It refers to the actual quantity of milk sold to the MPC by the respondents on the day of interview.

50. Average milk consumption by household (I_{50}).

It was operationalized as the quantity of milk consumed by the household on the day of interview with the respondent.

51. Per person milk consumption by household (I_{51}).

$$I_{51} = \frac{\text{Total quantity of milk consumed by household on the day of interview}}{\text{Total number of members in the household}}$$

52. Proportion of household milk consumption to milk production of household (I_{52}).

$$I_{52} = \frac{\text{Total quantity of milk consumed by the household per day}}{\text{Total quantity of per day milk production of household}} \times 100$$

53. Proportion of income from the milk sale to on farm income of the household (I_{53}).

$$I_{53} = \frac{\text{Annual total income of the household from milk sale}}{\text{Annual total income from other on farm sources of income of the household}} \times 100$$

54. Proportion of annual income from milk sale to total income of the household (I_{54}).

$$I_{54} = \frac{\text{Annual total income of the household from milk sale}}{\text{Annual income of the household from milk sale and other on-farm and non-farm activities}} \times 100$$

4.5.1.1 Scoring methods used for constructing performance index of MPCs.

The parameters and indicators for constructing the cumulative performance index of MPCs were scored based on the individual value of each parameter. All together above 54 indicators were identified and selected for measuring the various dimensions of the performance of MPCs. These indicators were considered to measure the overall effectiveness and efficiency of the MPCs on various dimensions.

Out of 54 indicators, only annual expenditure of MPC was considered to be negative factor and the rest of the 53 were positive factors. The negative indicator was scored negatively according to their absolute value. All the performance indicators were scored in 2, 4 and 6 point scaling developed for the individual indicator based on the $\overline{X}$ and S. D. of the absolute values of the indicators.

4.5.1.2. Cumulative performance score of MPCs.

Each indicator was scored based on its absolute value. The scores of all the indicators were summed up separately for all 15 MPCs. The product of the sum of the individual score of 54 indicators gave the cumulative performance

score for each MPC. Based on cumulated score, performance index was calculated for each MPC by using following formula.

$$\text{Performance Index (PI)} = \frac{\text{Actual cumulative scores obtained by MPC}}{\text{Maximum possible obtainable cumulative scores of MPC}} \times 100$$

Based on the performance index, the MPC were grouped into three categories viz. best performance, average performance and poor performance.

4.5.2 Factors influencing the performance of MPCs.

The factors having direct or indirect influence on performance of MPCs were identified based on review of literature and discussion with the elected / designated members of the MPCs. Further, the employees of District Cooperative Milk Union (Sabar dairy) were contacted. There after elected members, employees of the MPCs and member farmers were asked to judge each factor on three point continuum. viz, highly affecting, affecting and not affecting factors. Based on the responses, factors were categorized as most important, important and less important. The factors which were identified are listed below.

1. Number of households in the operational area of MPC.
2. Location distance (Km) of MPC from Milk union / chilling centre.
3. Years of operation after registration of MPC.
4. Types of office building of MPC.
5. Market competition for milk in village.
6. Digital fat testing equipment and computer for daily accounting.

7. A. I. services / Bull service

8. Animal health service

4.6 CONSTRAINTS IN EFFECTIVE FUNCTIONING OF MPCs.

The constraints were operationally defined as the difficulties experienced by the farmers in effective functioning of MPCs.

The farmers were facing number of problems for milk production in the study areas. Government has been implementing a number of dairy development schemes for the benefits of the dairy producers of the district. In order to know the compability of those developmental programme of the government and the actual problems of the farmers, which ultimately hinder the effective functioning of MPCs, the respondents were asked 20 questions covering various dimensions of dairy production problems in the area in general and milk production at household level, in particular. The responses of respondents were recorded and one score was awarded for positive response and zero score for negative responses of the question. The score for all the statements were summed up and frequency and percentage of the responses were calculated. The constraints as perceived by respondents were then ranked.

4.7 CHARACTERISTICS OF RESPONDENTS

4.7.1. Personal characteristics

4.7.1.1. Age

Age has been operationalized as chronological age of the respondents in terms of number of years from the date of birth rounded to the nearest whole number at the time of interview. The respondents were classified into three groups.

Sr. No	Category	Age limit
1.	Young	Up to 35 years
2.	Middle	36 to 50 years
3.	Old	Above 50 years.

4.7.1.2 Education

Education has been operationalized as the number of years spent in formal education and academic credential acquired by the respondents. It was measured with the help of socio-economic status scale developed by Trivedi (1963). Before application of the scale, its reliability was tested and necessary modifications were made. The scoring system followed was as under.

Sr. No.	Level of education	Score
1.	Illiterate	0
2.	Primary education	1
3.	High school education	2
4.	Higher secondary education	3
5.	Graduate	4
6.	Post graduate	5

4.7.2 Socio-economic Characteristics

4.7.2.1 Family size

Family size has been operationalized as a group of members who are closely related and living together under one roof with common kitchen. Family size is defined as the total number of members in the family of a respondent. Depending on the number of members in a family, the families of

the respondents were categorized as small, medium and large. Score was assigned as under.

Sr. No.	Category	No. of family member
1.	Small size	Up to 5 members
2.	Medium size	6 to 10 members
3.	Large size	Above 10 members

4.7.2.2 Family type

The respondents according to their family type were grouped into two categories viz. joint family and nuclear family. Nuclear family comparised of parents and their unmarried children. When grand parents, parents and children of one or more parents comprised family, it was considered as a joint family. Score was assigned as under.

Sr. No.	Type of family	Score
1.	Nuclear	1
2.	Joint	2

4.7.2.3 Land holding

This refers to hectares of land possessed by an individual respondent for the purpose of obtaining agricultural production. It is an important factors, which determine economic status and potentiality of the farmers for adoption of new methods and practices of farming and animal husbandry. It was measured by actual number of hectare(s) of land owned and cultivated by the farmers. On the basis of land holding, farmers were categorized as under:

Sr. No.	Category	Land holding
1.	Marginal farmers	Up to 1.0 ha
2.	Small farmers	1.01 to 2.0 ha
3.	Medium farmers	2.01 to 4.0 ha
4.	Semi medium farmers	4.01 to 10.0 ha
5.	Big farmers	above 10.0 ha

4.7.2.4 Occupation

Family occupation has been operationalized as the source(s) of family income of respondents. Considering variation in the occupation of the farmers, it was quantified using the scoring procedure given below.

Sr. No.	Occupation	Score
1.	Farming and animal husbandry	2
2.	Farming along with animal husbandry and individual profession	3
3.	Farming along with animal husbandry and business	4
4.	Farming along with animal husbandry and service	5

4.7.2.5 Social participation

It refers to the degree of involvement of a respondent in formal organisations as a member or office bearer. It was measured with the help of scale developed by Trivedi(1963) with necessary modification. The reliability of the scale was tested before application.

Sr. No.	Social participation	Score
1.	Membership in organisation (each) at village level	1
2.	Membership in one organisation (each) outside village	2
3.	Office bearer (each)	3
4.	Distinctive features (MLA, MP etc.)	6

4.7.2.6 Herd Size:

The herd size was operationalized as number of dairy animals possessed by the respondent's family. The respondents were categorized in to small, medium and large herd size on the basis of Mean and Standard Deviation as under.

Sr. No.	Herd Size	Limit
1.	Small	$< \bar{X} - S.D.$
2.	Medium	In between $\bar{X} \pm S.D.$
3.	Large	$> \bar{X} + S.D.$

4.7.2.7 Milk production

It refers to total quality of milk produced on the farm or home of the respondents in a day. The respondents were categorized into following three groups using Mean $\pm$ S.D.

Sr. No.	Category	Milk produced
1.	Small producers' group	$< \bar{X} - S.D.$
2.	Medium producers' group	In between $\bar{X} \pm S.D.$
3.	Large producers' group	$> \bar{X} + S.D.$

4.7.2.8. Farm power possession

Farm power possession has been operationalized as the type (s) of power the respondents had and used to carryout various farm operations. A schedule was developed for this purpose. Following type of farm power was considered to be available to the respondents in the study area. The scoring pattern adopted was as under.

Sr. No.	Type of farm power	Score
1.	No draught power	0
2.	One ox	1
3.	One pair of bullock	2
4.	Power tiller	3
5.	Tractor	6

4.7.2.9. Material possession

It include those items which were generally durable, household types, having considerable costs and are used to discriminate the socio-economic status of a person in a given socio-economic system. The respondents were expected to have one or two of the following items in the study area. The respondents were grouped into three categories, viz. low, medium and high material possession based on Mean and S.D. The scoring pattern adopted was as under.

Sr. No.	Material possessed	Score
1.	Wall clock	1
2.	Wrist watch	1
3.	Bicycle	2
4.	Scooter / Motorcycle	3
5.	Radio	1
6.	Television	3
7.	VCP / VCR / VCD / DVD	2
8.	Chaff cutter	2
9.	Iron / Wooden coat	1

4.7.3 Communication characteristics

4.7.3.1 Mass media exposure

This refers to the frequency of reading news papers, farm magazine and other literature relating to dairy farming as well as use of radio and television by the milk producers. This variable was quantified by using following procedure

Sr. No.	Mass media	Frequency of exposure		
		Regular (3)	Occasional (2)	Never (1)
1.	News paper			
2.	Farm magazine			
3.	Leaflet			
4.	Radio			
5.	Television			

Score of three for regular exposure (participation), two for occasional exposure and one for no exposure was assigned separately for news paper, farm magazine, leaflet, radio broadcast and television programme relating to dairy farming. On the basis of $\overline{X}$ and S.D., the respondents were grouped into three categories.

Sr. No.	Category	Limit
1.	Low exposure to mass media	$< \overline{X} - S.D.$
2.	Medium exposure to mass media	In between $\overline{X} \pm S.D.$
3.	High exposure to mass media	$> \overline{X} + S.D.$

4.7.3.2 Extension participation

It was considered as a measure of overall linkage of the respondents with the dairy development and extension system with a view to obtain information, knowledge and skill related to agriculture and animal husbandry.

It was measured with the help of extension participation scale developed by Siddaramaiah and Jalihal (1983). Before application of the scale, its reliability was tested and necessary modifications were made.

The scale was administered to the respondents for obtaining the information regarding their participation in different extension activities like clinical camps, farmer's day, farmers' fair, demonstrations, exhibitions, livestock shows, farmer's group discussions, farmer's meetings, training etc. during last three years. The extension participation score of an individual is the sum of the scale value of the item in which respondents had participated.

On the basis of Mean and S.D., respondents were grouped into three categories viz., low, medium and high extension participation as under.

Sr. No.	Category	Limit
1.	Low extension participation	$< \bar{X} - S.D.$
2.	Medium extension participation	In between $\bar{X} \pm S.D.$
3.	High extension participation	$> \bar{X} + S.D.$

4.7.4 Psychological Characteristic

4.7.4.1 Overall modernity

It was operationalized as the extent to which a tribal dairy farmer was modern in thinking and outlook. It has two component (i) general awareness

about modern thinking and openness to new ideas and practices and (ii) modern agricultural facilities available and possessed.

The psychological overall modernity of the respondents was measured with the help of overall modernity scale of Mehta et. al. (1974)., which was an adaptation of the scale developed by Inkeless and Smith (1966). It was adopted with slight modification from the original modernity scale. The reliability of the scale was tested.

The index of overall modernization was calculated for each individual respondent with the help of the following formula:

$$\text{Overall modernity index} = \frac{\text{Sum of score of all items rated by individual}}{\text{Maximum score attributes to the item rated by individual}} \times 100$$

The respondents were classified on the basis of ± S.D. from the mean.

Sr. No.	Category levels	Overall modernity
1.	Low	$< \overline{X} - S.D.$
2.	Medium	In between $\overline{X} \pm S.D.$
3.	High	$> \overline{X} + S.D.$

4.8 Knowledge of dairy farmers about improved animal husbandry practices.

For the measurement of knowledge, a list of recommended animal husbandry practices was prepared. A teacher made objective test was developed and used. A score of one was assigned to correct answer and zero to

incorrect answer. The score of individual practices was than summed up to ascertain the knowledge of individual respondent about recommended animal husbandry practices. The knowledge index was calculated with the help of the following formula.

$$Ki = \frac{X_1 + X_2 + X_3 + \text{----------} + X_n}{N} \quad X \quad 100$$

Where,

Ki = knowledge index

$X_i + X_2 + X_3 + \text{---------} + X_n$ = Total number of correct answer

N = Total number of items in the test.

Based on the knowledge index of the respondents, they were categoriesed as under.

Sr. No.	Category	Score
1.	Low level of knowledge	$< \bar{X} - S.D.$
2.	Medium level of knowledge	In between $\bar{X} \pm S.D.$
3.	High level of knowledge	$> \bar{X} + S.D.$

4.9 Attitude of members towards MPCs and dairy farming technology.

It is universally accepted fact that attitude of an individual plays an important role to determine the behaviour with respect to a psychological object. Attitude is a state of readiness or a tendency to react favourably or unfavourably towards a designated class of stimuli, such as national or social group, a custom or an institution. Individual's attitude may be present but dormant most of the time. Attitude scales have been proved as useful tools to

measure the attitude of large number of individuals towards specific areas. Such an instrument stimulates people to express their attitude.

For the purpose of this study, the researcher standardized two attitude scales to measure, (1) the attitude of the members towards MPCs and (2) the attitude of the members towards improved dairy farming technology. While constructing the scales, the investigator applied the methodology suggested by Likert (1932). The method of summated rating was used in this study for scale construction.

4.9.1 Collection of statements.

The item of the attitude was called statement. A large number of statements covering the entire aspects of both the contents were collected separately by referring literature dealing with farmers' perception towards MPCs and improved dairy farming technology as well as sought the opinion and guidance of the peers and various experts in both the fields. Thus, an internal pool of fifty and fifty-six statements were prepared to construct both the scales, respectively. After thorough discussion with experts in both the subject the most relevant 39 and 38 statements were selected for construction of scales, Viz., attitude towards MPCs and attitude towards improved dairy farming technology, respectively. These include quite good number of non-ambiguous and non-factual positive and negative statements.

4.9.2 Item analysis:

All the statements finally selected were typed and converted into schedules for both the attitude scales separately. Both the schedules were

mailed to a panel of 120 judges / experts drawn from various agricultural universities, ICAR institutions, KVKs, NGO, District Cooperative Milk Unions of the state, state animal husbandry department and extension specialists who are by and large engaged in development and promotion of dairy farming, dairy development and cooperative milk marketing. They were requested to judge each statement critically with regards to it's relevancy to measure attitude towards MPCs and improved dairy farming technology on a five point continuum viz; strongly agree, agree, undecided, disagree and strongly disagree with the score of 5, 4, 3, 2 and 1 respectively for positive statements. The scoring was reversed for negative statements.

Among 120 judges, eighty five judges responded in time. But 9 judges responded partly and hence the same slips were eliminated. Similarly 4 judges did not respond properly and hence, these slips were not considered for final calculation. Thus, finally the responses of 72 judges were considered for calculation of the scales value.

Frequency distribution of scores of the judges was then done for both the scales. The subjects were than arranged in descending order on the basis of total scores obtained by them. For item analyses, 25 per cent (i.e.18 judges) of the subjects with the highest score and the other 25 per cent (i.e.18 judges) of the subjects with lowest score were selected.

Thus, each statement contained responses of 36 experts. The higher and lower quartiles were used as criterion group to evaluate individual statement. The probability value for each statement was calculated with Excel programme

in computer. This whole procedure was applied for both the attitude scales. Finally, for each scale 20 statements found significant at 0.01 level of probability were selected from both schedules for final scales which are given in appendix I and II.

The validity of a scale is a property which ensures that the constructed scales measures the variables, which are supposed to measure. While selecting the statements, due care was taken in obtaining a fair degree of content validity. All the statements were significant at 0.01 probability level which inferred that the statements of the attitude scales had discriminating value to measure the attitudes of the farmers towards MPCs and towards improved animal husbandry practices.

4.9.4 Reliability of the scales

The reliability of the scales was tested by using 'spilt half method'. The odd numbered and even numbered statements were separated for making two halves. The agreement between two halves of scores of the scale was determined by calculating correlation for these half tests. From the reliability of the half tests, the self- correlation of whole test was then estimated by the Sperman-Brown formula. This procedure was applied for both the scales.

The calculated values of reliability coefficient for whole test of both scales were 0.793 and 0.812, respectively which were highly significant. Therefore, it is concluded that the scales are reliable.

4.9.5 Application of the scales

There were 20 statements each in the both final scales which were administrated to the farmers and asked to express their reactions on five point continuum viz., strongly agree, agree, undecided, disagree and strongly disagree. The scores given for positive statements were 5, 4, 3, 2 and 1 respectively. The scoring for negative statements was just reversed. The maximum scale value thus one can obtained was 100 and minimum 20. The total attitudinal score for each respondent was obtained by adding the weights of his responses made to individual scale item. This procedure was followed for both the attitude scales.

The respondents were grouped into three categories on the basis of attitude towards MPCs and attitude towards improved dairy farming technology separately by using $\overline{X}$ + S.D. formula.

Sr. No.	Attitude	Limit
1.	Less favourable	$< \overline{X} - S.D.$
2.	Moderately favourable	In between $\overline{X} \pm S.D.$
3.	Highly favourable	$> \overline{X} + S.D.$

4.10 Adoption of improved animal husbandry practices by MPC members.

According to Rogers (1962), adoption is a decision to make full use of an innovation as the best course of action available. Adoption in the present study was operationalized as improved animal husbandry practices actually put into practices by dairy animal owners in their dairy farming.

Extent of adoption of improved animal husbandry practices by dairy animal owners having membership in their village milk producer's cooperative societies was measured with the help of teacher made test developed for the purpose. The respondent was given one score, if he adopts the practices as per recommendation. If respondent deviate from the recommendation, zero score was assigned.

The adoption index of each respondent was calculated using the following formula.

$$\text{Adoption Index} = \frac{\text{Score obtained}}{\text{Total recommendation package score}} \times 100$$

With the help of mean ($\overline{X}$) and standard deviation (S.D.), the respondents were categorized as low, medium and high with respect to the adoption for all the practices.

Sr. No.	Category	Limit
1.	Low extent of adoption	$< \overline{X} - S.D.$
2.	Medium extent of adoption	In between $\overline{X} \pm S.D.$
3.	High extent of adoption	$> \overline{X} + S.D.$

4.11 TOOLS OF THE STUDY

The well structured interview schedule was prepared in the light of the objectives and was used as a tool for collection of data. The schedule was prepared in consultation with teaching staff of the Department of Extension Education, C. P. College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University and guidance provided by the major advisor. Questions

and statements on each and every aspect of the study were framed in order to study with maximum possible accuracy, clarity and objectivity.

4.12 PRE-TESTING OF THE INTERVIEW SCHEDULE

The interview schedule was translated into Gujarati language and pre-tested in the field on separate thirty non-sampled farmers. On the bases of pre-testing, necessary modifications were made in the final draft, which was used as the instrument for data collection.

4.13 COLLECTION OF THE DATA

The basic information regarding the study was obtained from the records of Sabarkantha District Milk Union Limited (Sabar Dairy). The secondary data about the performance of MPCs were obtained from the records of the concern MPCs.

The primary data for the study were collected by personal interview of the respondents. Before the interview, the investigator has introduced him self to the respondents and purpose and objectives of the study were explained to them with a view to facilitate free responses. Every possible care was taken to establish good rapport with the respondent members to secure full cooperation for gathering reliable and valid information.

The secondary data and other relevant information related to study were gathered from the records and annual reports of MPCs and also from periodicals, journals, reference books, bulletin, reports, paper published by different authors and post-graduate theses pertaining to similar study.

4.14 STATISTICAL ANALYSIS

The data collected from both primary and secondary sources were classified, tabulated and computerized in order to draw meaningful conclusions in the light of objectives of the study. The following statistical methods were used for analysis of the data.

4.14.1 Frequency and percentage

Simple comparison was made on the basis of frequency and percentage.

4.14.2 Arithmetic mean ($\overline{X}$)

The arithmetic mean was calculated by using following formula.

$$\overline{X} = \frac{\Sigma X_i}{n}$$

Where,

$\overline{X}$ = Arithmetic mean

ΣX_i = Sum of individual score

n = Total number of respondents

4.14.3 Standard deviation (S.D.)

These techniques were used for classification of the respondents in to different categories. The standard deviation was worked out using the following formula:

$$S.D. = \sqrt{\frac{\sum_{i=1}^{n} (X_i - \overline{X})^2}{n-1}}$$

Where,

X_i = Individual score

$\overline{X}$ = Mean score

n = Total number of respondents

4.14.4 Pearson's coefficient of correlation

This technique was used to find simple correlation to explore the association between two variables with the help of following formula.

$$r = \frac{SP\,(xy)}{\sqrt{SS\,(x)\,SS\,(y)}}$$

Where,

r = Correlation coefficient

x = Independent variable

y = Dependent variable

SP (xy) = Sum of product of deviation of X and Y from their mean

SS (x) = Sum of square due to X variable

SS (y) = Sum of square due to Y variable

For testing the significance of 'r,' the 't' test was used. The formula for 't' test was as under :

$$t = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}}$$

Where,

r = Correlation coefficient

n = Total number of observation

4.14.5 Multiple regression

This analysis was done to know the combined effect of all the independent variables in explaining the variation in the dependent variable. The prediction equation used was:

$$= a + \sum_{i=1}^{k} b_i x_i$$

Where,

	:	Predicted dependent variable
a	:	Intercept or constant
b_i	:	Regression coefficient between i^{th} independent variable with dependent variable where i = 1,2,.....k
$x_i = x_1, x_2 ..... x_k$	:	Total number of independent variables included in the model.

4.14.6 Step-wise regression analysis

Finding significant relationship between variables is not the same as ascertaining the relative importance of each of these variables in explaining the dependent variable. The magnitude of simple correlation coefficient is not generally an accurate indicator of contribution of any variable because of the effect of other variables that cannot be readily controlled. However, the step-wise regression technique provides a means by which the contribution of each independent variable to change in the dependent variable can be estimated. This procedure permits the study of linear relationship between a set of independent variables and a dependent variable.

Further, it provides a judgment on the contribution made by each variable entered irrespective of its actual point of entry into the model. Any variable which provides a no significant contribution is removed from the model. This process is continued until no more variable will be admitted to the equation and no more are rejected. The step-wise regression analysis was used which was proposed by Draper and Smith (1966).The approach used in this programme for selection of independent variables was according to importance and significance.

In this model, the regression of Y (dependent variable) on all independent variables (X_1, X_2, X_3.... X_{16}) was calculated by the following way.

The prediction equation was:

$$= a + b_iX_1 + b_2X_2 + b_3X_3 + \ldots\ldots\ldots\ldots\ldots b_kX_k + e$$

Where,

= Predicted value of dependent variable

a = Constant

$b_1 \ldots b_k$ = Partial regression coefficient of k^{th} independent variables

$X_1 \ldots X_k$ = Independent variable

The partial regression coefficient (b_i) was tested by 't' test for the test of significance.

$$t = \frac{b_i}{\text{SE of } b_i}$$

4.14.7 Standard Partial Regression Co-efficient (SPRC)

The various independent variables had their own unit of measurement which did not permit a comparison of the partial regression co-efficient (b_i) values which were converted into standard partial regression co-efficient (b'_i) values which were free from the units of measurements.

In order to assign the rank to various selected independent variables, the standard partial regression co-efficients were used. It was calculated by using following formula (Snedecor and Cochran, 1967).

$$b'_i = b_i \times \frac{\text{S.D. of independent variable}}{\text{S.D. of dependent variable}}$$

Where,

b'_i = Standard partial regression co-efficient

b_i = Partial regression co-efficient (b'_i)

A comparison of any two standard partial regression co-efficients indicates the relative importance.

RESULTS AND DISCUSSION

V. RESULTS AND DISCUSSION

This chapter deals with the findings and discussion of the dissertation, which have been arrived at after collecting information from the respondents by means of personal interview and secondary data from MPCs. The data so collected were then classified, tabulated and analyzed in light of the objectives of the study. The fact and findings have been presented under following heads.

5.1 Managerial and business performance of MPCs.

5.2 Factors influencing the performance of MPCs.

5.3 Constraints in effective functioning of MPCs.

5.4 Selected characteristics of the respondents.

5.5 Knowledge of dairy farmers about improved animal husbandry practices.

5.6 Attitude of dairy farmers towards MPCs.

5.7 Attitude of dairy farmers towards dairy farming technology.

5.8 Extent of Adoption of improved animal husbandry practices by dairy farmers.

5.9 Relationship between selected characteristics of dairy farmers and their extent of adoption of improved animal husbandry practices.

5.10 Extent of variation caused by dependent variables on extent of adoption

5.11 Empirical model

5.1 MANAGERIAL AND BUSINESS PERFORMANCE OF MPCs.

5.1.1 Performance of MPCs

Performance is an indicator of an organisation in its business not only in terms of profit orientation but also in terms of social and economical aspects. The MPCs are the chief economic unit of dairy business in the study area. Hence, it was decided to know the performance of the MPCs in the dairy business.

For measuring the performance, total 54 criteria had been selected and performance score was obtained. Based of performance score, the performance index of each MPCs was calculated.

The data regarding performance of MPCs are depicted in Table 3& Fig.3.

Table: 3 Distribution of MPCs according to their performance Index

Sr. No.	Category	Frequency	Per cent
1	Poor performance (below 48.70 score)	3	20.00
2	Average performance (between 48.70 – 73.42)	9	60.00
3	Best performance (above 73.42)	3	20.00
	Total	**15**	**100.00**

$\overline{X}$ = 61.06 S.D. = 12.36

The data presented in Table 3 reveal that the average Performance Index Score of all the MPCs was 61.06. The categorization of the MPCs is made on the basis of average performance index. The data further show that 60 per cent

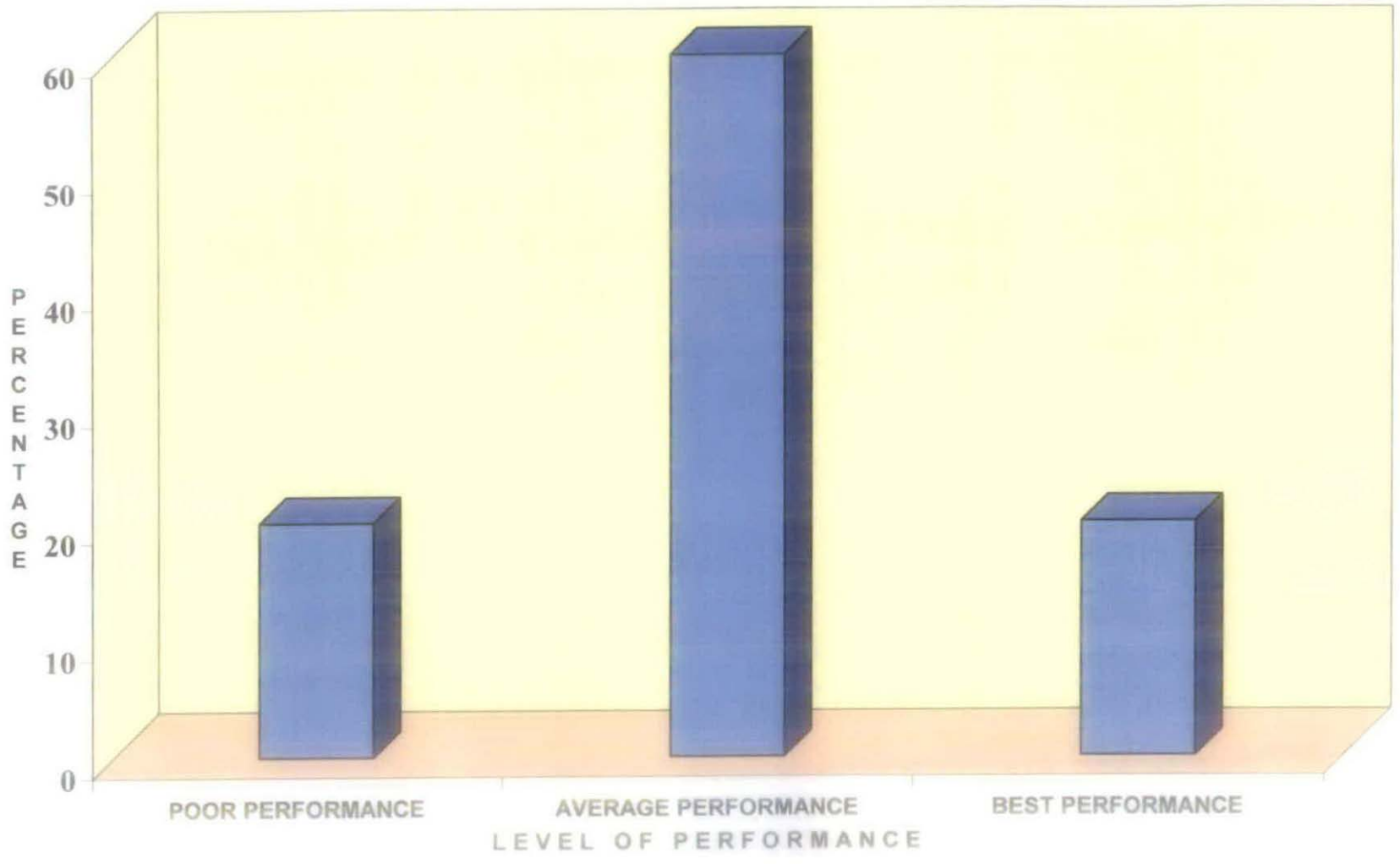


FIG. 3: DISTRIBUTION OF MPCs ACCORDING TO THEIR PERFORMANCE

of the total MPCs under study had average performance while, 20 per cent each of them had poor and best performance.

Looking to the performance index score, the MPCs were categorized into three groups viz. poor performance, average performance and best performance. The information regarding the MPCs falling in each group is depicted in Table 4.

Table:4 Categorization of MPCs according to their performance

Sr. No.	Category	Frequency	Name of MPCs
1	Poor performance	3	Jayala Lusadia Dodiwada
2	Average performance	9	Dhandhasan Ganti Kalyanpur Malekpur Mota kantharia Moti dodisara Wagheshwari Patadia Vejpur
3	Best performance	3	Chada Kalol Naka

Information on performance of each MPC portray that the 3 MPCs viz. Jayala, Lusadia and Dodiwada were having poor performance. While, other 3 MPCs viz. Chada, Kalol and Naka were having best performance. Majority

MPCs i.e. 60.00 per cent were found having average performance and they were Dhandhasan, Ganti, Kalyanpur, Malekpur, Mota kantharia, Motidodisara, Wagheshwari, Patadia and Vejpur.

5.1.2 Relationship of performance of MPCs with extent of adoption of improved animal husbandry practices by member farmers

It was hypothesized that the MPCs with better performance would definitely have well structured modalities to motivate its member for higher adoption of scientific animal husbandry practices leading to high milk yield per animal. The findings on adoption of scientific animal husbandry practices are depicted in the later part of this chapter.

If the functioning of the MPC is best automatically it has its impact on the members in framing favourable attitude leading to better adoption of improved animal husbandry practices. Thus, the performance of MPCs influence on the dairy business of the members. It is observed that the MPCs having good functioning would have definitely affected the adoption of animal husbandry practices of the dairy farmers of the respective MPCs. Hence, to examine the effect of performance of MPCs on the extent adoption of the member farmers, the correlation coefficient was worked out. The data in this regard are presented in Table 5.

Table: 5 Managerial and business performance of MPCs and its correlation with extent of adoption.

Sr. No.	Name of MPC	Performance score obtained	Performance Index	Adoption scroe (n = 150)	Coefficient of correlation ('r' value)
1	Dhandhasan	198	66.00	24.12	
2	Ganti	168	56.00	21.88	
3	Jayala	122	40.66	15.50	
4	Kalyanpur	176	58.66	29.00	
5	Lusadia	140	46.66	22.06	
6	Malekpur	172	57.33	50.30	
7	Motakantharia	190	63.33	58.00	
8	Motidodisara	178	59.33	29.10	
9	Wagheshwari	190	63.33	40.20	0.7753**
10	Vejpur	208	69.33	55.00	
11	Chada	224	74.66	57.50	
12	Dodiwada	140	46.66	45.75	
13	Kalol	228	76.00	62.28	
14	Naka	260	86.66	60.20	
15	Patadia	154	51.33	22.00	
	Mean		61.06	39.526	
	S.D.		12.36	16.822	

** positive and significant at 0.01 level of significance

The data presented in Table 5 show that the 'r' value was 0.7753 which was positive and significant at 0.01 level of significance indicating positive and significant relationship between performance of MPCs and extent of adoption of improved animal husbandry practices.

Therefore, it is concluded that the performance of the MPCs had influenced the extent of adoption of improved animal husbandry practices of dairy farmers.

Among the various performance criteria selected for the study, the criteria viz, net profit, commission received from DCMU and input services, might have influenced the farmers to adopt dairy farming business. More over, the service directed functions of MPCs viz, availing benefits of veterinary services, A. I. services, training, motivational tours and clinical camps also have definitely influenced the performance of the MPCs.

5.2 FACTORS INFLUENCING THE PERFORMANCE OF MPCs

The performance of MPCs is largely based on managerial and business indicators. Even than, several other factors in form of physical services are also responsible in deciding performance of MPCs. The overall image of the MPCs depends on how it provides the important physical services required for dairy farming. Keeping this in view, the information on factors influencing the performance of MPCs was collected from the member farmers and frequency and percentage were computed. The data regarding this aspect are presented in Table 6.

Table: 6 Factors influencing the performance of MPCs.

(n = 150)

Sr. No.	Factors	No. of respondents					
		Highly affecting		Moderately affecting		Not affecting	
		Frequ-ency	Per cent	Frequ-ency	Per cent	Frequ -ency	Per cent
1	Number of households in the operational area of MPCs.	43	28.67	76	50.67	31	20.66
2	Location distance (km) of MPCs from milk union or chilling centre	23	15.33	48	32.00	79	52.67
3	Years of registration of MPCs.	15	10.00	59	39.33	76	50.87
4	Types of office building of MPCs.	19	12.66	43	28.67	88	58.67
5	Market competition for milk in village	83	55.33	54	36.00	13	08.67
6	Digital fat testing equipment and computer for daily accounting	103	68.67	38	25.33	09	06.00
7	A. I. services / Bull services	101	67.34	35	23.33	14	09.33
8	Animal health services	90	60.00	42	28.00	18	12.00

The data in Table 6 indicate that availability of digital fat testing equipment and computer for daily accounting was the most important factor influencing the performance as more than two – thirds (68.87 %) of the farmers stated it as highly affecting factor. A. I. service / bull services was the other important factor influencing performance of MPC as reported by 67.34 per cent respondents to be highly affecting the performance. The other important factors reported as highly affecting factors by more than half of the respondents were

animal health services (60.00 %) and market competition for milk in the village (55.33 %).

The number of house holds in operational area was reported as moderately affecting factor by more than half (50.67 %) of the respondents while, 28.67 per cent and 20.66 per cent members had reported it as highly affected and not affected factor respectively.

The factor which have been perceived as non- affecting by more than half of the respondent was types of office building of MPCs (58.67 %). Where as 28.67 per cent and 12.66 per cent members perceived it as moderately and highly affecting factor respectively.

The location distance (km) of MPCs from milk union head quarter was reported as not affected factor by 52.67 per cent of the members where as, 32.00 per cent and 15.33 per cent members had reported it as moderately affected and highly affected factor respectively.

The year of registration was also reported as not affected factor by majority of the members (50.67 %). Further it was found that 39.33 per cent and 10.00 per cent members had reported it as moderately affected and highly affected factor respectively.

Only the factor, number of households in operational area of MPCs was found moderately affected as realized by more than fifty percent of the members.

Market competition for milk in village was realized as moderately affecting factor by 36.00 per cent and not affected by 8.87 per cent of the respondents.

Digital fat testing equipment and computerized accounting had perceived as moderately affecting and not affecting factor by 25.33 per cent and 6.00 per cent respondents.

The factor, availability of artificial insemination services was reported as moderately and not affecting factor by 23.33 per cent and 9.33 per cent of the members.

Thus, it can be concluded from the foregoing discussion that the factors which are directly related with the dairy business were perceived as highly affecting factors by the members. The factors emerged out as highly affecting were; digital fat testing equipment and computer facility for accounting. A. I services and animal heath services.

While distance from the milk union type of office building and how old was the MPC were not perceived as important factors by the members because they have no direct bearing on the profit/ loss of the dairy business.

5.3 CONSTRAINTS IN EFFECTIVE FUNCTIONING OF MPCs

The farmers were facing number of problems in milk production business. Inspite of active and sincere efforts by dairy, government agencies and NGOS, the dairy farming business had not developed yet at desired extent. One of the reasons for this can be attributed to the constraints at the end users level.

In order to know the actual problems of the farmers which ultimately hinder the effective functioning of the MPCs, a list of constraints was prepared and responses were obtained from each of the respondent. The frequency and percentage were worked out and ranks were given to the constraints. The data regarding the constraints are depicted in Table 7.

Table: 7 Constraints as perceived by member respondents in effective functioning of MPCs.

Sr. No.	Constraints	Frequency	Per cent	Rank
1	Agro-climatic condition is not suitable for dairying	73	48.66	XI
2	High price of milch animals	112	74.66	V
3	Low milk price to the producers	121	80.66	III
4	Lack of adequate knowledge about improved animal husbandry practices	117	78.00	IV
5	Ineffectiveness of dairy extension services	78	52.00	X
6	Lack of coordination among concerned line agencies	68	45.33	XIII
7	Unfavorable milk pricing policy for producers	90	60.00	VIII
8	Difficulty to get compensation from insurance company	46	30.66	XVII
9	High insurance premium	31	20.66	XX
10	Less availability of animal insurance in the village	48	32.00	XVI
11	Scarcity of green fodder	136	90.66	I

Sr. No.	Constraints	Frequency	Per cent	Rank
12	Unavailability and/or high costs of improved forage/ fodder seeds	70	46.66	XII
13	A. I. services are not available timely.	127	84.66	II
14	Non-availability of veterinary services at the place and in time	94	62.66	VII
15	High rate of dairy veterinary services than private practioener	55	36.66	XV
16	Milk holiday during flush season	37	24.66	XIX
17	Poor quality of cattle feed supplied by cooperatives	43	28.66	XVIII
18	High rate of concentrate feed supplied by the district milk union	82	54.66	IX
19	Young generation is not interested in dairying	57	38.00	XIV
20	Lack of subsidized credit facility	99	66.00	VI

The data presented in the Table 7 portray that important constraints reported by great majority of the farmers were; scarcity of green fodder (90.66 %); non availability of A. I. services timely (84.66 %), low milk price to the producers (80.66 %) lack of adequate knowledge of improved animal husbandry practices (78.00 %) and high price of milch animals (74.66 %) which were ranked first, second, third, fourth and fifth, respectively.

The constraints viz. Lack of subsidized credit facility (66.0 %), non availability of veterinary services at the place and time (62.66 %) unfavorable milk pricing policy (60.00 %), high rate of concentrate feed (54.66) and

ineffective dairy extension services (52.00 %) and were ranked sixth, seventh, eighth and ninth respectively. The remaining constraints were not considered to be the important as they are reported by less than half of the farmers.

Form the foregoing discussion of the constraint analysis, it can be concluded that scarcity of green folder, non availability of A. I. services, low milk price, lack of knowledge about improved animal husbandry practices and high price of milking animals were considered to be the most important constraints by the members.

Looking to the tribal area, all the constraints reported by the members of MPCs are of prime importance. Shortage of green fodder due to undulated land, less irrigation facility, low price of milk and high price of milking animals might have caused difficulty to adopt dairy farming by tribal members. Further, the after services like A. I. and veterinary were also not provided satisfactorily hence they were reported as important constraints.

5.4 SELECTED CHARACTERISTICS OF THE RESPONDENTS

In the present investigation, 14 characteristics of the farmers were selected for the study. These characteristics were categorized under four sub groups viz. personal, socio-economic, communication and psychological characteristics. The findings related to these characteristics are presented hereafter.

5.4.1 Personal characteristics

5.4.1.1 Age

Information regarding age of the respondents was collected by direct question. Based on chronological age, respondents were classified into three groups and the data are presented in Table 8.

Table: 8 Distribution of the respondents according to their age

Sr. No.	Age	No. of farmers	Per cent
1	Young (up to 35 years)	28	18.67
2	Middle (36 to 50 years)	89	59.33
3	Old (above 50 years)	33	22.00
	Total	**150**	**100.00**

A perusal of the data in Table 8 reveals that 59.33 per cent of the member farmers were found in middle age group. While 22.00 per cent were found in old age group. Remaining 18.67 per cent member farmers were found in young age group.

Following unsuccessful attempt to gain secured employment, the respondents might have resorted to take up dairy farming as a means of self-employment which is fairly remunerative in present days. This might be the reason to find more number of member farmers in middle age group.

The present finding substantiates the findings of Lad (1991), Vyas (1991), Singh (1992), Faizuidin (1995) and Ashwar (2005).

5.4.1.2 Education

Literacy is the pre-requisite in the present information era and without literacy, no one can comprehensively understand the new technology. The information regarding formal education received by the respondents is presented in Table 9.

Table: 9 Distribution of the respondents according to their educational.

Sr. No.	Educational level	No. of farmers	Per cent
1	Illiterate	17	11.33
2	Primary school level	25	16.67
3	Secondary school level	61	40.67
4	Higher secondary school level	39	26.00
5	College education	08	05.33
	Total	**150**	**100.00**

The data presented in Table 9 reveal that 40.67 per cent respondents were educated up to secondary level followed by 26.00 per cent who had higher secondary level education and 16.67 per cent having primary education. On the other hand, 11.33 per cent members were illiterate. It is unfortunate to note that only 5.33 per cent had completed graduation level education. The probable explanation for such findings might be that the respondents might have realized the importance of education in their development and formal schooling facilities available in the study area at the schooling age of the respondents.

Similar findings were reported by Patel (1989), Nanda (1995), Patel (1995) and Ashwar (2005).

5.4.2 Socio-economic characteristics

5.4.2.1 Family size

The family size is a factor which determines man power. Information regarding family size of the respondents is furnished in Table 10.

Table: Distribution of the respondents according to their family size.

Sr. No.	Family size	No. of respondents	Per cent
1	Small size (up to 5 members)	50	33.33
2	Medium size (6 to 10 members)	85	56.67
3	Large size (above 10 members)	15	10.00
	Total	**150**	**100.00**

The data revealed that little more than one-half of the respondents (56.67 %) were from medium sized family, followed by 33.33 per cent belonged to small family. Only 10.00 per cent respondents were belonged to large family.

Thus, two-thirds of the respondents were from families having more than five members. The probable reason behind this might be social custom of joint family particularly among tribal society.

The present finding is supported by the finding of Mundhwa (1995) and Patel (2006).

5.4.2.2 Family type

Distribution of the respondents according to their type of family is presented in Table 11.

Table:11 Distribution of the respondents according to their type of family.

Sr. No.	Type of Family	No. of respondents	Per cent
1	Nuclear	71	47.33
2	Joint	79	52.66
	Total	**150**	**100.00**

It is evident from Table 11that 52.67 per cent of the respondents lived in joint family. Remaining 47.33 per cent respondents were the members of nuclear family. Thus, the distribution of the respondents into joint and nuclear family was found to be close.

The finding supports the findings recorded by Desai (1997).

5.4.2.3 Land holding

The farm size is an important factor, which determines economic status and potentiality of the farmers in adoption of new methods and practices of farming. Respondents were grouped into five categories. The data in this regard are presented in Table 12.

Table: 12 Distribution of the respondents according to their land holding.

Sr. No.	Land holding		No. of farmers	Per cent
1	Marginal farmers	(up to 1.00 ha)	44	29.34
2	Small farmers	(1.01 to 2.00 ha)	63	42.00
3	Semi-medium farmers	(2.01 to 4.00 ha)	27	18.00
4	Medium farmers	(4.01 to 10.00 ha)	11	07.33
5	Big farmers	(above 10.00 ha)	05	03.33
	Total		**150**	**100.00**

A perusal of the data in the above Table 12 shows that 42.00 per cent and 29.34 per cent of the respondents were small and marginal farmers, respectively. The respondents with semi-medium, medium and big holding were 18.00 per cent, 7.33 per cent and 3.33 percent, respectively.

It is thus concluded that majority (71.34 %) of the respondents were cultivating marginal to small size of farm. The possible reason for this might be that the average size of land holding in North Gujarat is 2 to 10 hectares. Secondly, the tribal area is mostly hilly and therefore very less area is available for agriculture. Increasing trend of nuclear family in tribals and division of land among the elders had left the farmers with a small piece of land in their custody. Moreover, the economic condition of tribal farmers is the main reason limiting them to extend their farm size. This is the actual reason for increasing preference towards animal rearing or mixed farming system in tribal area.

These findings are similar to those of Thakkar and Patel (1995), Patel (1996) and Ashwar (2005).

5.4.2.4 Occupation

It is well known that agriculture and animal husbandry are contributory occupations to each other. Person's involvement in more than one occupation reduces risk in earning and increase income. The information on occupation of the respondents is depicted in Table 13.

Table: 13 Distribution of the respondents according to their occupation.

Sr. No.	Category	No. of farmers	Per cent
1	Farming + Animal husbandry (AH)	121	80.67
2	Farming + AH + Individual profession	004	02.66
3	Farming + AH + Business	006	04.00
4	Farming + AH + Service	019	12.67
	Total	**150**	**100.00**

It is apparent from the above data that majority of the respondents (80.67 %) had farming with animal husbandry as their occupation. The number of respondents having farming and animal husbandry along with service as their occupation was 12.67 per cent. Remaining 4.00 per cent and 2.66 per cent of the respondents had farming + animal husbandry with business and farming + animal husbandry with individual profession as their occupation, respectively.

Thus, it can be concluded that most of the respondents (80.67 %) were engaged in farming with animal husbandry as their occupation.

The findings essentially agree with those of Vyas (1991), Patel (1996) Vaidehi and Joshi (1995) and Patel (2006).

5.4.2.5 Social participation

Social participation denotes the extent to which an individual actively participate in the affairs of community. It also encourages the farmers to establish contact with support system. Keeping this in view, social participation was studied and the data regarding it are presented in Table 14.

Table:14 Distribution of the respondents according to their social participation.

Sr. No.	Social participation	Number of farmers	Per cent
1	Low	86	57.33
2	Medium	58	38.67
3	High	06	04.00
	Total	**150**	**100.00**

It is evident from the Table 14 that 57.33 per cent of the respondents had low level of social participation, while 38.67 per cent had medium level participation. Only miniscule level respondents (4.00 %) had high participation in social organizations.

It shows that interest of the tribal member farmers in social organizations was low, which could be due to lack of leisure time. The personal interview revealed that majority or almost all of the tribal dairy farmers had participated only in village milk cooperative society through its membership. The another probable reason might be that the most popular and service oriented village organizations viz. service cooperative societies, credit cooperative societies were not yet established in many tribal villages.

These findings corroborate those of Patel (1996), Bariya (1997), Shind et.al. (1998) and Ashwer (2005).

5.4.2.6 Herd size

Herd size includes number of dairy animal possessed by the respondents. The information regarding herd size is depicted in Table 15.

Table: 15 Distribution of the respondents according to their herd size.

Sr. No.	Heed size	Number of farmers	Per cent
1	Small (up to 2 dairy animal)	021	14.00
2	Medium (2 to 5 dairy animal)	105	70.00
3	Large (above 5 dairy animal)	024	16.00
	Total	**150**	**100.00**

It is apparent from the Table 15 that majority of the respondents (70.00 %) had medium sized herd, followed by 16.00 per cent and 14.00 per cent respondents with large and small sized herd, respectively. The average herd size was 3.20.

It is interesting to note that majority of the respondents (70.00 %) had 5 or above dairy animals. The probable reason might be the better appreciation of the role of dairy business in their economic well being, particularly the regular flow of income from dairy animals which are regarded as mobile bank.

These findings are in agreement with the findings of Singh et. al. (1979), Chaudhary (1988) singh (1992) and Ashwar (2005).

5.4.2.7 Milk production

Milk production provides continuous flow of income in rural area. As more milk produced at farmers' home, more will be his income through it's sale and better will be his living. With more income, the individual will be in a better position to adopt improved dairy farming practices. The data regarding milk production is depicted in Table 16.

Table: 16 Distribution of the respondents according to milk production.

Sr. No.	Milk production	Number of farmers	Per cent
1	Small producers group	022	14.67
2	Medium producers group	102	68.00
3	Large producers group	026	17.33
	Total	**150**	**100.00**

It is evident from the Table 16 that majority (68.00 %) of farm families were in medium producers group followed by 17.33 per cent under large producers group. Only 14.67 per cent respondents were in the small scale producer group.

It is obvious from the Table that majority of member farmers had medium milk production per day. The probable reason could be that they were small farmers and had medium herd size.

The above findings are in conformity with those of Thaker (1992) and Patel (1996). and they did not confirm to those of Ashwar (2005).

5.4.2.8 Farm power possession

Farm power possession denotes the various animals and machinery used by the respondents to carryout various farm operations. The data regarding it are presented in Table 17.

Table: 17 Distribution of the respondents according to their farm power possession.

Sr. No.	Type of farm power	Number of farmers	Per cent
1	No draught animal	20	13.33
2	One ox	32	21.33
3	One pair of bullock	86	57.34
4	Power tiller	06	04.00
5	Tractor	06	04.00
	Total	**150**	**100.00**

The Table 17 apparently reveal that 57.34 per cent of the respondents had one pair of bullock, while 21.33 per cent of the respondents had only one bullock as their draught power to carryout different farm operations. Nearly 13.00 per cent respondents did not have any draught animal. Only miniscule level respondents had tractor (4.00 %) and power tiller (4.00 %) as their farm power.

It could be inferred from the above observations that majority of the tribal farmers were carrying their farm operations using minimum farm power i.e. 1 to 2 bullocks. The possible explanation might be that tribal farmers possessed very low cultivated land and hence, they required minimum draught power.

5.4.2.9 Material possession

It include those items which are generally durable, household types, having considerable costs and are used to discriminate the socio-economic status of a person in a given socio-economic system. The data regarding material possession are presented in Table 18.

Table:18 Distribution of the respondents according to their material possession.

Sr. No.	Material possession	Number of farmers	Per cent
1	Low	36	24.00
2	Medium	93	62.00
3	High	21	14.00
	Total	**150**	**100.00**

A perusal of the data in the Table 18 show that 62.00 per cent of the respondents had medium material possession followed by 24.00 per cent of the respondents who had low material possession. Only 14.00 per cent of the respondents had high material possession.

It is thus concluded that majority (86.00 %) of the respondents had low to medium material possession. The probable reason for this might be the low annual income of the tribal farmers due to less land holding and vagaries of nature which affect the agricultural production leading to poor economic condition.

This finding is supported by Jagdeshwara (1994) and Kawale (2000).

5.4.3 Communication characteristics

5.4.3.1 Mass media exposure

It refer to the frequency of reading news paper, farm magazines and other literature relating to agriculture, animal husbandry and listening to radio and television programmes by the respondents. The data presented in this regards are depicted in Table 19.

Table: 19 Distribution of the respondents according to their mass media exposre.

Sr. No.	Mass media exposure	Number of farmers	Per cent
1	Low	81	54.00
2	Medium	53	35.33
3	High	16	10.67
	Total	**150**	**100.00**

It can be seen from the table 19 that more than half of the respondents (54.00 %) had low mass media exposure followed by 35.33 per cent of the respondents who had medium exposure to mass media. Only 10.67 per cent of them had high mass media exposure. Thus, it is concluded that majority (76.67 %) of the dairy farmers had low to medium level of mass media exposure. The probable reason could be that the tribals are mostly concentrated in the hilly, forest and naturally isolated regions. Due to poor transportation and communication facilities, spread of news paper and agricultural magazines is low. Hence, use of such mass media is very low. Further due to their poor economic condition, they can not buy the electronic mass media instruments.

The findings are similar to findings of Vyas (1995) and Bariya (1997).

5.4.3.2 Extension participation

The extension participation encourages the farmers to achieve targeted goals in farming. The farmers' participation in various extension activities motivates them to adopt new technologies. Therefore, it was studied and data regarding this aspect are presented in Table 20.

Table:20 Distribution of the respondents according to their extension participation

Sr. No.	Extension participation	Number of farmers	Per cent
1	Low	34	22.67
2	Medium	90	60.00
3	High	26	17.33
	Total	**150**	**100.00**

The results of the study reported in Table 20 reveal that 60.00 per cent of the respondents had medium level of extension participation followed by 22.67 per cent and 17.33 per cent of them having low and high level of extension participation respectively. Thus, it is clear that majority of the dairy member farmers (82.67 %) had low to medium level of extension participation. The dairy farmers were found participating only in clinical camp, short term training organized by veterinary division of milk union, and farmer's meet organized at their village by different government development agencies and NGOs. Hence their extension participation was found to be medium.

These findings are supported by Vyas(1995) and Shinde (1994) and are in contrast to those of Thakor (1992) who reported that majority of the respondents had no extension participation in any extension activity.

5.4.4 Psychological characteristic

5.4.4.1 Overall modernity

Overall modernization is a psychological state of mind. It encompassed all other modernization characteristics. In nutshell, modernization is a process by which an individual changes from a traditional way of life to a more complex, technologically advanced and rapidly changing style of life.

The data pertaining to overall modernization are presented in Table21.

Table: 21 Distribution of the respondents according to their level of overall modernization.

Sr. No.	Overall modernization	Frequency	Per cent
1	Low	36	24.00
2	Medium	92	61.33
3	High	22	14.67
	Total	**150**	**100.00**

It can be seen from the Table 21 that 61.33 per cent of the respondents had medium level of overall modernity followed by 24.00 per cent of the respondents with low overall modernity. Remaining 14.67 per cent of the respondents had high level of overall modernity.

Thus, it could be inferred that majority (85.33%) of dairy farmers had low to medium level of overall modernity. The probable reasons might be their illiteracy and medium exposure to mass media and medium extension participation.

The findings are in conformily with the findings as reported by Trivedi (1984), Gaikwad (1985), Vekaria (1989), Prajapati (1991) and Solanki (2002).

5.5 Knowledge of dairy farmers about improved animal husbandry practices.

Knowledge is the cognitive behaviour of an individual. The body of knowledge is the product of learning process. Once the knowledge is acquired, it produces changes in thinking process of an individual, which would lead to further change in the mental attitude and thereby in his adoption behaviour. Therefore, knowledge of dairy farmers was studied and the data regarding it are presented in Table 22 & Fig. 4.

Table: 22 Distribution of the respondents according to their knowledge.

Sr. No.	Knowledge	No. of farmers	Per cent
1.	Low	46	30.67
2.	Medium	77	51.33
3.	High	27	18.00
	Total	**150**	**100.00**

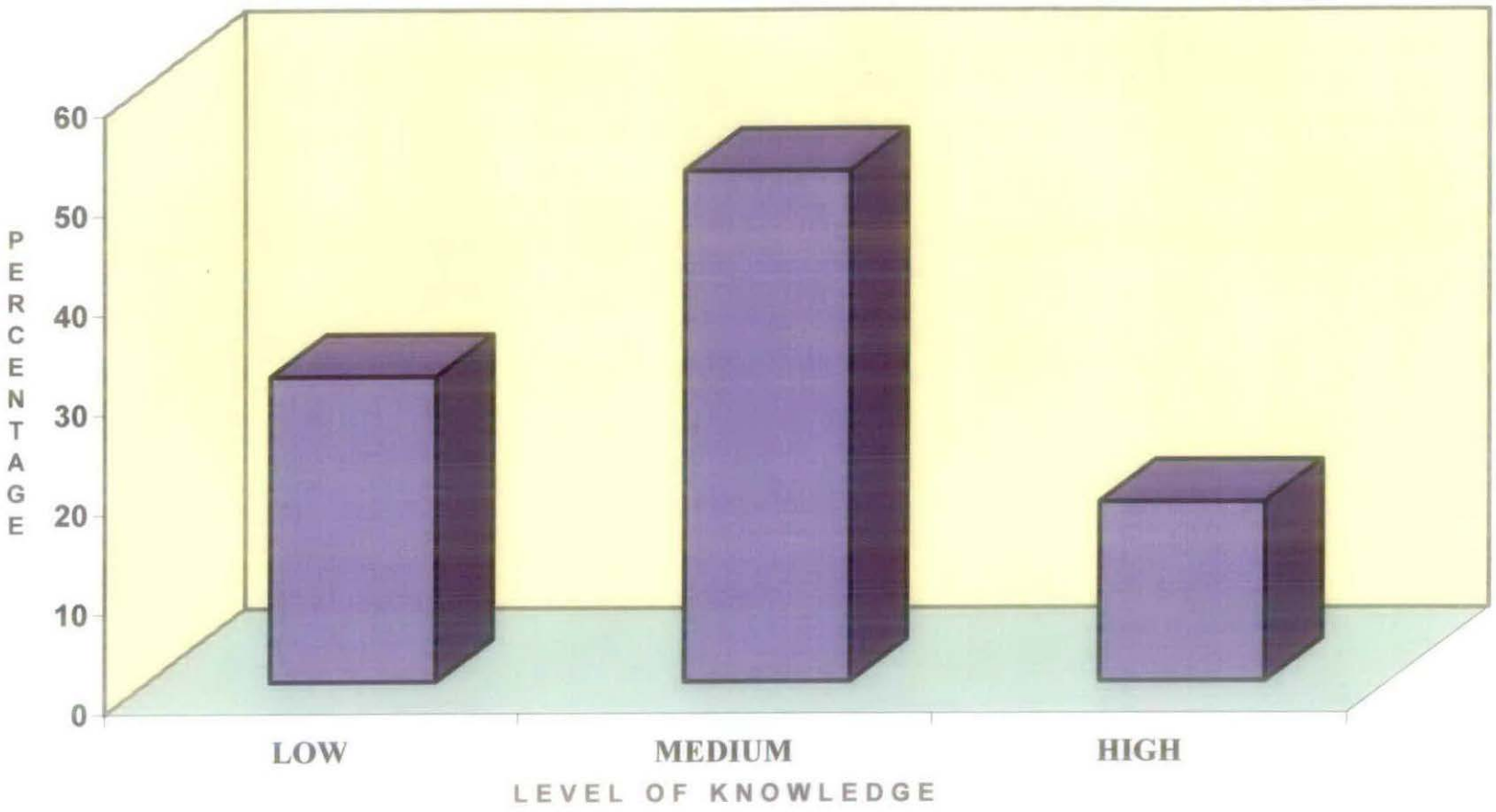


FIG. 4: LEVEL OF KNOWLEDGE OF DAIRY FARMERS ABOUT IMPROVED ANIMAL HUSBANDRY PRACTICES

Data presented in above Table 22 portray that majority of the respondents (51.33 %) had medium level of knowledge of scientific dairy farming. The respondents with low and high level of knowledge were to the extent of 30.67 per cent and 18.00 per cent respectively. The average knowledge score was 38.56.

It can be thus concluded that majority of the dairy farmers had low to medium knowledge of the improved animal husbandry practices. Thus, there is a need to motivate dairy farmers to acquaint with improved animal husbandry practices in their own interest. First, they should get familiarized with latest technology and its utility. Thus, there is vast scope to strengthen the cooperative dairy business.

Patel (1994), Tripathi et. al. (1995), Dana and Kanabi (1998), Shinde et. al. (1998), Meena and Chauhan (1999), Temkar (2000) and Ashwar (2005) reported similar findings that majority of the dairy farmers had medium level of knowledge of improved animal husbandry practices.

5.6 ATTITUDE OF DAIRY FARMERS TOWARDS MPCS.

Attitude show the agreeableness of an individual toward any idea or object. For measuring the member's attitude towards the MPCs, the researcher had developed an attitude scale. The same was administrated to the dairy farmers and information received is portrayed in Table 23 & Fig. 5.

Table: 23 Distribution of the respondents according to their level of attitude towards MPCs.

Sr. No.	Attitude	No. of farmers	Per cent
1	Less favourable	19	12.67
2	Moderately favourable	90	60.00
3	Highly favourable	41	27.33
	Total	**150**	**100.00**

The data presented in Table 23 indicate that 60.00 per cent of respondents had moderately favourable attitude towards Milk Producers' Cooperative Societies (MPCs) followed by 27.33 per cent respondents having highly favourable attitude towards MPCs. Only 12.67 per cent of the respondents had less favourable attitude towards MPCs.

It is therefore concluded that majority (87.33) of the respondents had moderately to highly favourable attitude towards MPCs. This might be due to reason that dairy cooperative have emerged as a boon for resource poor milk producers and played an important role in boosting socio-economic life of small & marginal farmers and land less cattle owners scattered over large areas, through its institutional structure.

Thus, dairy cooperatives had not only been aimed at maximizing profits through milk marketing business, but they also contribute in socio-economic upliftment of village communities. Now a days dairy cooperatives thus become the fountain head of other social and cultural changes also.

These findings are similar to finding of Patel (1981) and Patel (1985).

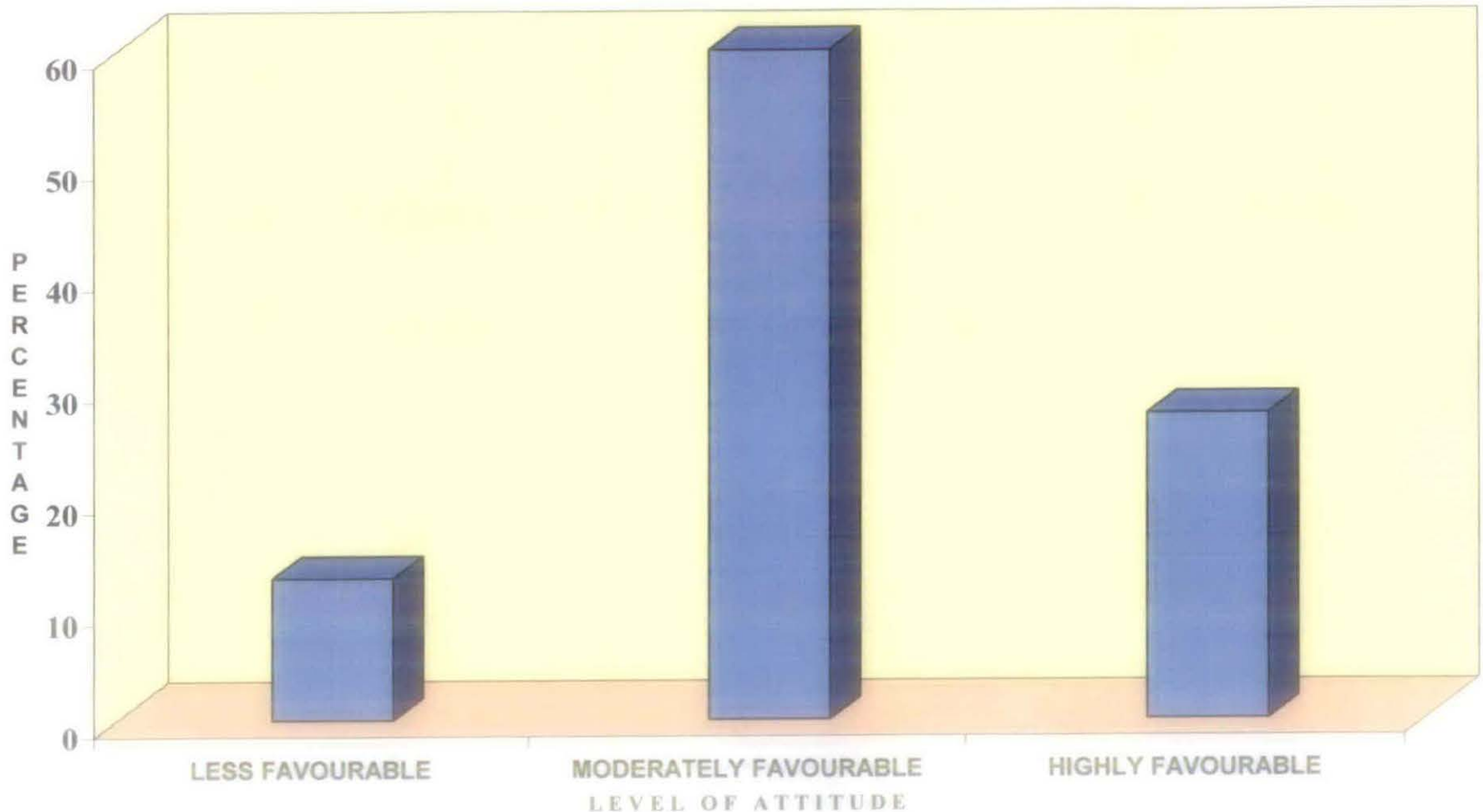


FIG. 5: LEVEL OF ATTITUDE OF DAIRY FARMERS TOWARDS MPCs

5.7 ATTITUDE OF THE DAIRY FARMERS TOWARDS DAIRY FARMING TECHNOLOGY

To study the attitude of the dairy farmers towards dairy farming technology, the attitude had been conceptualized as dairy farmer's degree of favourable or unfavorable feeling towards dairy farming technology. For measuring this, the researcher had developed a scale and the same was administrated to the dairy farmers and the data received are presented in Table 24 & Fig. 6.

Table:24 Distribution of the respondents according to their level of attitude towards dairy farming technology.

Sr. No.	Attitude	No. of farmers	Per cent
1	Less favourable	22	14.67
2	Moderately favourable	93	62.00
3	Highly favourable	35	23.33
	Total	**150**	**100.00**

It is evident from the above table that 62.00 per cent of the dairy farmers demonstrated moderately favourable attitude towards dairy farming technology. The dairy farmers with highly favourable and less favourable attitude were 23.33 per cent and 14.67 per cent, respectively.

It is interesting to note that more than 85.00 per cent of the respondents had moderately to highly favourable attitude towards dairy farming technology. This might be due to the fact that farmers have understood the importance of dairy farming as means of socio-economic upliftment. Further, literacy rate,

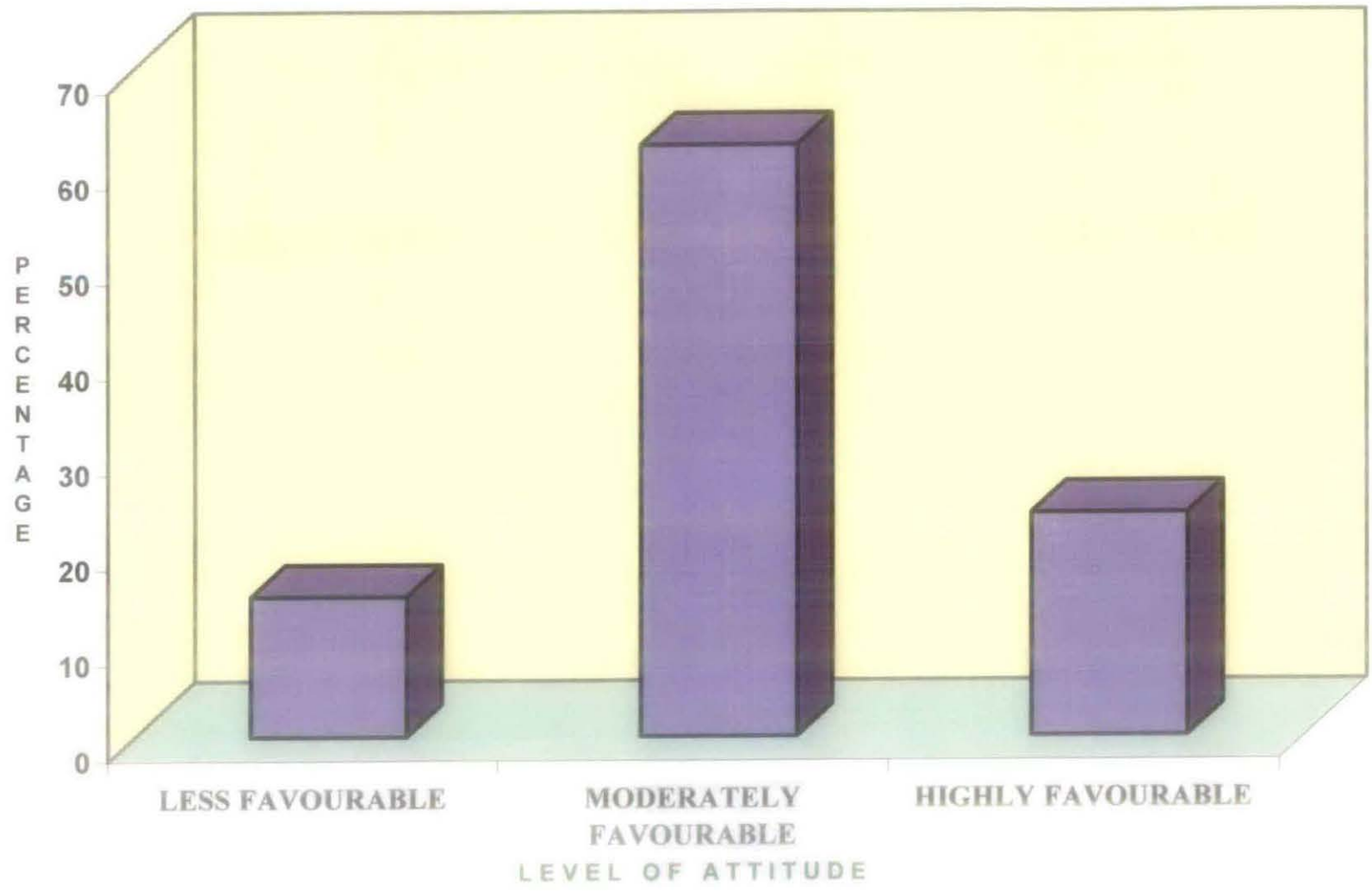


FIG. 6: LEVEL OF ATTITUDE OF DAIRY FARMERS TOWARDS DAIRY FARMING TECHNOLOGY

extension participation, mass media exposure and attitude towards MPCs etc. have also contributed in developing positive attitude.

The above findings substantiate the findings of Dixit et. al. (1991), Lad (1991), Vyas (1991), Temkar (2000), Thakkar (2001) and Ashwar (2005).

5.8 EXTENT OF ADOPTION OF IMPROVED ANIMAL HUSBANDRY PRACTICES BY DAIRY FARMERS

According to Rogers (1962) adoption is a decision to make full use of an innovation at the best course of action available. In this study adoption is operationalized as improved animal husbandry practices followed by dairy farmers. Extent of adoption of improved animal husbandry practices by dairy farmers was measured with the help of teacher made test developed for the purpose. The results regarding extent of adoption is depicted in Table 25 & fig.7.

Table: 25 Extent of adoption of improved animal husbandry practices by dairy farmers.

Sr. No.	Extent of adoption	No. of farmers	Per cent
1	Low	48	32.00
2	Medium	73	48.67
3	High	29	19.33
	Total	**150**	**100.00**

The data portray in Table 25 indicate that about half of the respondents (48.67 %) had medium extent of adoption followed by 32.00 per cent of the respondents who had low extent of adoption. Remaining 19.33 per cent of the

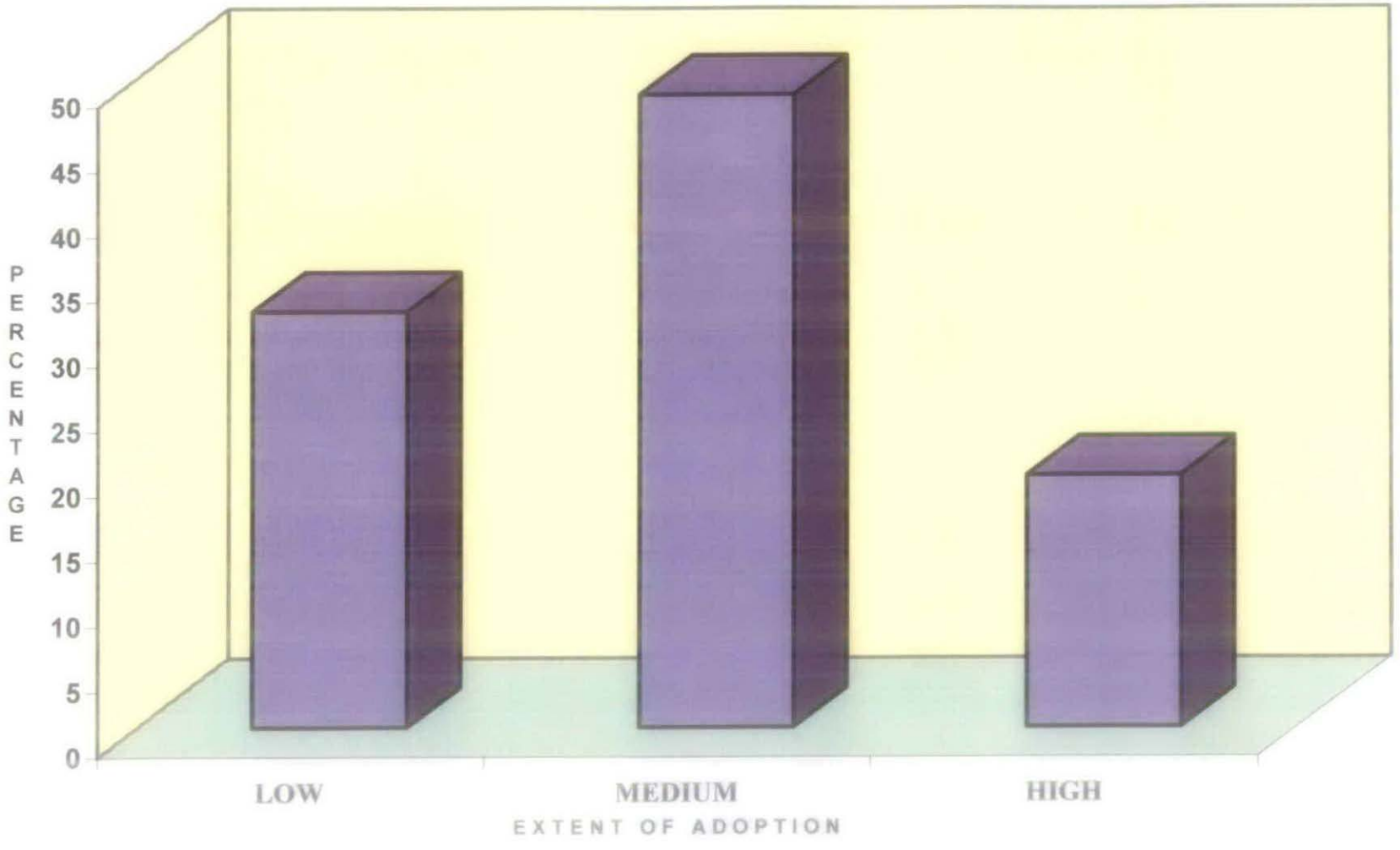


FIG. 7: EXTENT OF ADOPTION OF IMPROVED ANIMAL HUSBANDRY PRACTICES BY DAIRY FARMERS

respondents had high extent of adoption of improved animal husbandry practices.

Hence, it can be concluded that majority (48.67%) of the respondents had medium extent of adoption of improved dairy farming technology.

The average adoption of improved animal husbandry practices by the farmers was about 32 per cent. Though the farmers had medium level of knowledge and extension participation, moderately attitude towards dairy farming technology, the adoption level was not satisfactory. There is a scope for strengthening animal husbandry extension services which is in a primitive stage, when we compare it with agricultural extension services in the state. This has resulted in poor knowledge and ignorance of the importance of adoption of improved animal husbandry practices among dairy farmers leading to such a poor adoption. This deserves special focus of the animal husbandry extension agencies and personnel.

Similar findings of majority dairy farmers having medium level of adoption had also been reported by Patel (1994), Tripathi, et. al. (1995), Dana and kanabi (1998), Shinde et. al. (1998), Meena and Chauhan (1999), Temkar (2000), Gour (2002), Verma and Sharna (2003) and Ashwar (2005).

5.9 RELATIONSHIP BETWEEN SELECTED CHARACTERISTICS AND EXTENT OF ADOPTION OF IMPROVED ANIMAL HUSBANDRY PRACTICES

To ascertain the relationship between selected independent variables and extent of adoption of dairy farming practices by the members of the MPCs, the

correlation coefficient was calculated. On the basis of operational measures developed for the variables, null hypotheses were stated for testing the relationship and their significance on zero order correlation. The values of zero order correlation are given in Table 26.

Table: 26 Correlation coefficient showing relationship of selected independent variables with adoption of dairy improved animal husbandry practices.

(n = 150)

Sr. No.	Independent variables	Correlation coefficient 'r'
1	Age	0.3219**
2	Education	0.5722**
3	Family size	0.0466 NS
4	Family type	0.0630 NS
5	Land holding	0.2651**
6	Occupation	0.3299**
7	Social participation	0.3678**
8	Herd size	0.0638 NS
9	Milk production	0.2929**
10	Farm power possession	0.2997**
11	Material possession	0.5180**
12	Mass media exposure	0.3235**
13	Extension participation	0.4748**
14	Overall modernity	0.7095**
15	Knowledge	0.8006**
16	Attitude towards MPC	0.7138**
17	Attitude towards Dairy farming technology	0.7145**

* Significant at 0.05 level of significance NS = Non significant

** Significant at 0.01 level of significance

The observed relationships are discussed under subheads as follows.

5.9.1 Age and extent of adoption

The calculated coefficient of correlation (r = 0.3219) showing relationship between age and extent of adoption was positively significant at 0.01 level of significance. Hence H. 2.1 is rejected.

Therefore, it can be concluded that the age had positive and significant relationship with extent of adoption. It indicates that as the age of dairy farmers increases, the extent of adoption increases. This may be because of their vast experience and accumulation of practical knowledge in the field of dairy farming.

This finding is supported by the finding of Chaudhary and Singh (1997), Sinde et. al. (1999). etc.

5.9.2 Education and extent of adoption

The data in Table show that the calculated 'r' value (0.5722) was found positive and significant at 0.01 per cent level of significance. Hence H. 2.2 is rejected. The above result indicates that education had positive and significant relationship with extent of adoption of improved animal husbandry practices. It is obvious that education helps the farmers in acquiring more information through the use of mass media, printed literature viz, farm magazine, bulletins, leaflets etc. that keep the farmers upto date with latest know-how in dairy farming. Education also improves the ability to comprehend and interpret new technology, which results in changing their behaviour.

The findings of the study are similar to the study of Yadav (1993), Narwal et. al.(1996), Lad (1997), Kulkarni et, al, (1998), Gaur (2002) abd Ashwar (2005).

5.9.3 Family size and extent of adoption

The calculated 'r' value (0.0466) was found non significant for family size indicating no association of family size with extent of adoption of dairy farming technology. Therefore, H. 2.3 is accepted.

Hence, it is concluded that family size had not any significant role in adoption of animal husbandry practices. It might be due to the reason that all the members irrespective of their family size have adopted the dairy business.

This finding is in line with the finding of Patel (1996).

5.9.4 Family type and extent of adoption

The data on relational analysis showed that the 'r' value (0.0630) of the family type indicated non significant association with extent of adoption of dairy farming technology. Hence, the hypothesis H. 2.4 is accepted.

The above result implies that the family type had no influence on extent of adoption of dairy farming technology of the members of MPCs.

This finding is supported by the findings of Lad (1991) and Patel (1996)

5.9.5 Land holding and extent of adoption

The calculated 'r' value was 0.2651, which indicated highly significant relationship of land holding with extent of adoption of dairy farming practices. Hence, the hypothesis H. 2.5 is rejected.

It shows that land holding had played decisive role in adoption of animal husbandry practices. Large size farm might have provided the opportunity to the farmers to spare the land especially for fodder crop. It is quite fact that larger the farm size, better would be the resource availability to adopt new enterprise. Hence, dairy farmers who own large farm size would have adopted the dairy farming practices on a larger scale.

The present finding is supported by the results reported by Shinde et. al. (1999) and Ashwar (2005).

5.9.6 Occupation and extent of adoption

Occupation of the members of MPCs was found positively and significantly related with extent of adoption (0.3299) at 0.01 level of significance. Hence H. 2.6 is rejected. This indicates that that occupation had played decisive role in adoption of dairy farming technology might be due to the reason that the dairy farming is emerging as a secondary business with agriculture.

The finding of Patel (1996) is in line with the present finding

5.9.7 Social participation and extent of adoption

The correlation coefficient for the social participation was 0.3678 which was significant at 0.01 level of significance indicating that the social participation was positively and significantly associated with extent of adoption. Hence, H. 2.7 is rejected. This implies that as social participation increases the extent of adoption of dairy farming practices had also increased. The village level institutions like service co-operatives, dairy cooperatives had

decisive role in motivating farmers to adopt dairy farming practices, where in almost all the farmers are enrolled as members in MPC. This may be the reason for having positively significant relationship of social participation with extent of adoption.

The similar findings were reported by Ashwar (2005).

5.9.8 Herd size and extent of adoption

Herd size was not found correlated with extent of adoption as its 'r' value being 0.0638 was not significant. Hence H. 2.8 is accepted. Therefore, it can be concluded that herd size had not any decisive role in establishing its relation with extent of adoption of dairy farming practices. This might be due to the reason that adoption of dairy farming practices had no direct bearing with the number of animals the farmer possess.

The present finding is supported by Patel (1993), Sinde et. al. (1999) and Ashwar (2005).

5.9.9 Milk production and extent of adoption

The data on relational analysis showed that non-significant 'r' value (0.2929) of the milk production indicate that there was relationship between milk production of dairy farmers and extent of adoption of dairy farming practices. Hence H. 2.9 is rejected.

The above result implies that individual member's milk production from his dairy farming has important role in extent adoption of dairy farming practices.

As it is known that milk production depends on animal management, health care and breeding practices. Those getting high milk production from their animal might have adopted all the above dairy farming practices. Hence, it has establish significant relationship with extent of adoption.

The findings of Patel (1994) and Ashwar (2005) are in contradiction with the present study.

5.9.10 Farm power possession and extent of adoption

The correlation coefficient (r = 2997) was positively significant at 0.01 level of significance which revealed that there is significant and positive relationship between farm power possession and extent of adoption of dairy farming practices. Therefore, the hypothesis H. 2.10 is rejected.

It might be due to the fact that majority dairy farmers were having drought animals. Those having a pair of bullock can take land preparation, inter culturing, threshing etc. in a better way as compared to those having no/one drought animal. Due to this reason the farm power possession had influenced the extent of adoption of dairy farming practices.

The findings of present study are found in line with the findings of Gopi Krishna (2001).

5.9.11 Material possession and extent of adoption

Material possession of the dairy farmers was found positively and significantly correlated whit extent of adoption (0.5180) at 0.01 level of significance. Hence, H. 2.11 is rejected.

Material possession shows the economic strength of a farmer. The economically sound farmer may have diverted the more money in dairy farming that would have shown such influence on extent of adoption of dairy farming practices.

The present finding of the study is supported by the findings of Kawale (2000) and Patel (2004).

5.9.12 Mass media exposure and extent of adoption

The mass media exposure was found to be positively and significantly associated with extent of adoption as the correlation coefficient (r = 0.3235) was significant and positive at 0.01 level of significance. Hence, the hypothesis H. 2.12 is rejected.

The farmers having more mass media exposure automatically gain better knowledge and understanding about scientific dairying resulting into higher adoption.

This might be the probable reason for having positively significant relationship of mass media exposure with extent of adoption.

The findings of Chauhan et. al. (1994), Patel (1997) and Ashwar (2005) are in consonance with the findings of present study.

5.9.13 Extension participation and extent of adoption

Extension participation was found positively and significantly associated with extent of adoption as r = 0.4748 was positive and significant at 0.01 level of significance. Hence the H. 2.13 is rejected. It was found that the co-operative district milk union Sabarkantha has organized many extension

activities for the benefit of the member farmers of the MPCs. The union is arranging the motivational tours for the members which might have influenced the extent of adoption of dairy farming practices.

The present finding is found similar to the finding of Meti and Sundara Swami (1998), Shinde et. al (1999) and Gaur (2002).

5.9.14 Overall modernity and extent of adoption

The 'r' value 0.7095 being positive and significant at 0.01 level of significant indicated that there was positive and significant relationship between overall modernity and extent of adoption. Hence, the hypothesis H. 2.14 is rejected.

Overall modernity thus was emerged as an important factor to influence the extent of adoption of dairy farming technology. The farmers having modern thinking are obviously innovative in adoption. Hence, it could have established such positive association.

This finding is supported by the findings of Patel (1997), Vankar (2000) and Solanki (2002).

5.9.15 Knowledge and extent of adoption

The correlation coefficient (r = 0.8006) for relationship of knowledge with extent of adoption of dairy farming technology was found positive and significant at 0.01 level of significance. Hence, the hypothesis H. 2.15 is rejected. This indicate that knowledge was found important factor in deciding adoption of dairy farming technology.

It is quite obvious that before adoption of any technology person should know the same. Hence, knowledge has played such crucial role in increasing adoption of dairy farming technology.

The findings of Mina and Chauhan (1999), Temkar (2000), Ashwar (2005) have supported the present findings

5.9.16 Attitude towards MPCs and extent of adoption

There was positively significant association of farmers' attitude towards MPCs with extent of adoption as its correlation coefficient (0.7138) was positively significant at 0.01 level of significance. Hence, H. 2.16 is rejected.

Thus, it can be concluded that farmer's attitude towards MPCs had influenced the extent of adoption. This might be due to the reason that MPCs serve the members in the area of veterinary services, milk marketing services and in providing other inputs required for dairy farming.

The findings of present study is found similar to the findings of Patel (1981), Patel (1983) and Vekaria (1989).

5.9.17 Attitude towards dairy farming and extent of adoption

The calculated coefficient of correlation (r = 0.7145) was positively significant at 0.01 level of significant. It implies that attitude had significant and positive association with extent of adoption. Hence, the hypotheses H. 2.17 is rejected.

The above result shows that attitude had a decisive role in determining adoption of dairy farming practices. It is expected that who had positive attitude towards dairy farming had become more interested to adopt the same.

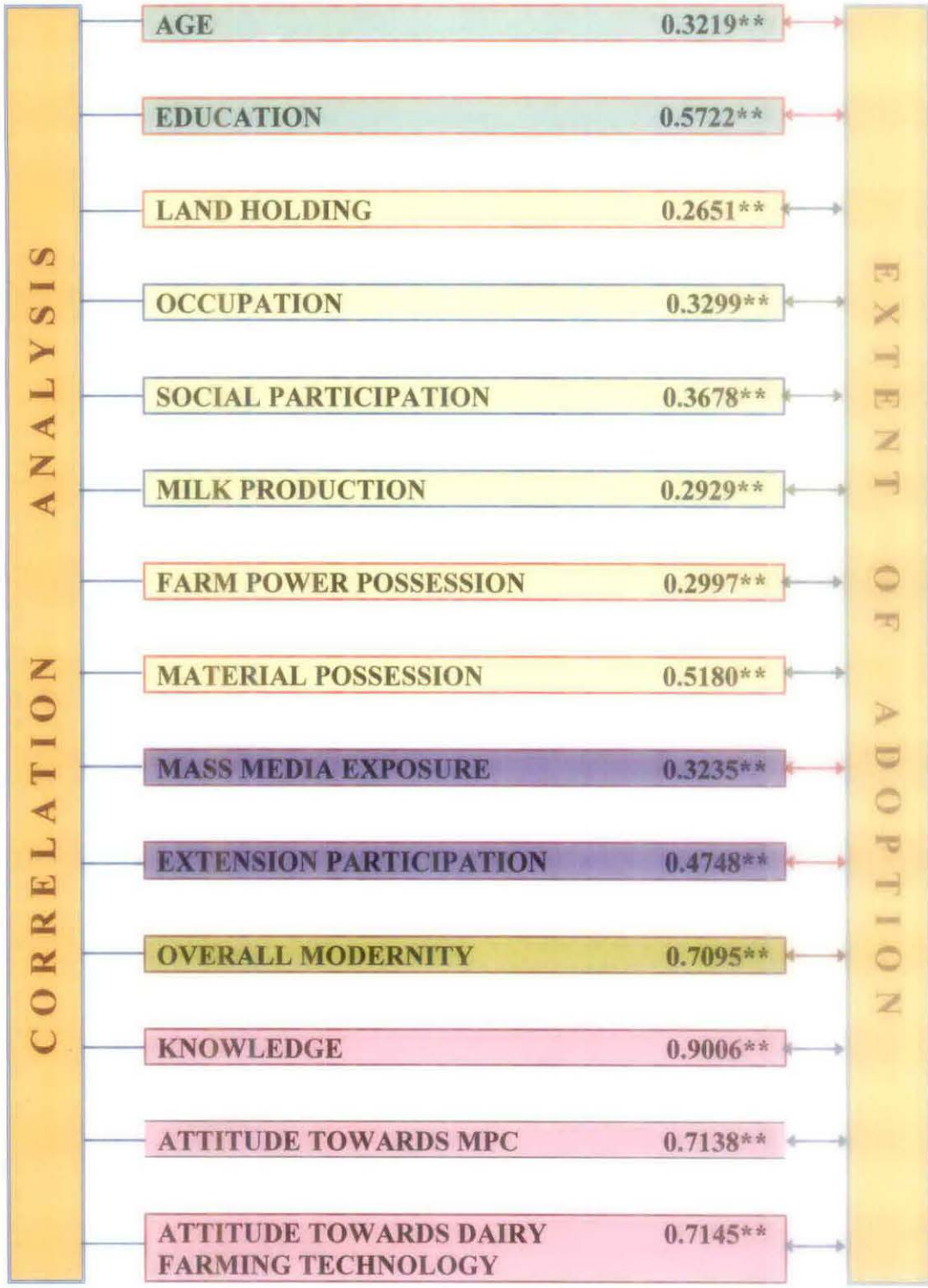


Fig. 8 Variables significantly correlated with extent of adoption of improved animal husbandary practices

The findings of Vyas (1995), Temkar (2000), Thakkar (2001) and Ashwar (2005) are in line with the present findings.

5.10 Extent of variation caused by dependent variables on extent of adoption

5.10.1 Multiple regression analyses of selected variables on extent of adoption of animal husbandry practices

Correlation analyses only shows co-existence of association between two variables. This does not capture the interaction effect among variables. One variable is associated with other or is simultaneously depends on several others. Adoption of dairy farming was postulated as linear function of personal, socio-economic, communication and psychological variables. It is not by any of these factors taken in isolation but as a part of complex and interacting system. Based on this approach, the multiple regression analysis using liner model was carried out to find the combined effect of the independent variables in explaining the total variation in the dependent variable.

In multiple regression analysis, 17 variables including knowledge and attitude were fitted to explain the variation in adoption of dairy farming. The results are presented in Table 27.

Table: 27 Multiple regression analyses of selected variables of the respondents

(n = 150)

Sr. No.	Independent variables	Regression coefficient (bi)	SE of bi	't' value (df = 132)
1	Age (X_1)	0.1091	0.0340	3.209**
2	Education (X_2)	0.2297	0.3626	0.625
3	Family size (X_3)	0.0891	0.2576	0.346
4	Family type (X_4)	0.0191	0.7853	0.024
5	Land holding (X_5)	0.8412	0.3706	2.270*
6	Occupation (X_6)	0.5240	0.6051	0.866
7	Social participation (X_7)	0.0956	0.3000	0.319
8	Herd size (X_8)	0.2991	0.2425	1.233
9	Milk production (X_9)	0.1627	0.0737	2.206*
10	Farm power possession (X_{10})	0.0864	0.0530	1.633
11	Material possession (X_{11})	0.1693	0.1735	0.976
12	Mass media exposure (X_{12})	0.0232	0.1654	0.140
13	Extension participation (X_{13})	0.4202	0.3527	1.191
14	Overall modernity (X_{14})	0.0335	0.0555	0.603
15	Knowledge (X_{15})	0.6894	0.0542	12.716**
16	Attitude towards MPC (X_{16})	0.586	0.0649	0.903
17	Attitude towards Dairy farming technology (X_{17})	0.2114	0.0569	3.718**

* Significant at 0.05 level of significance
** Significant at 0.01 level of significance

R^2 = 0.8849
Constant = 2.8571
Multiple R = 0.9407

The independent variables mentioned in table 27 explained as much as 88.49 percent variation in adoption of dairy farming technology. The unexplained variation of 11.51 per cent may be due to the factors out side the

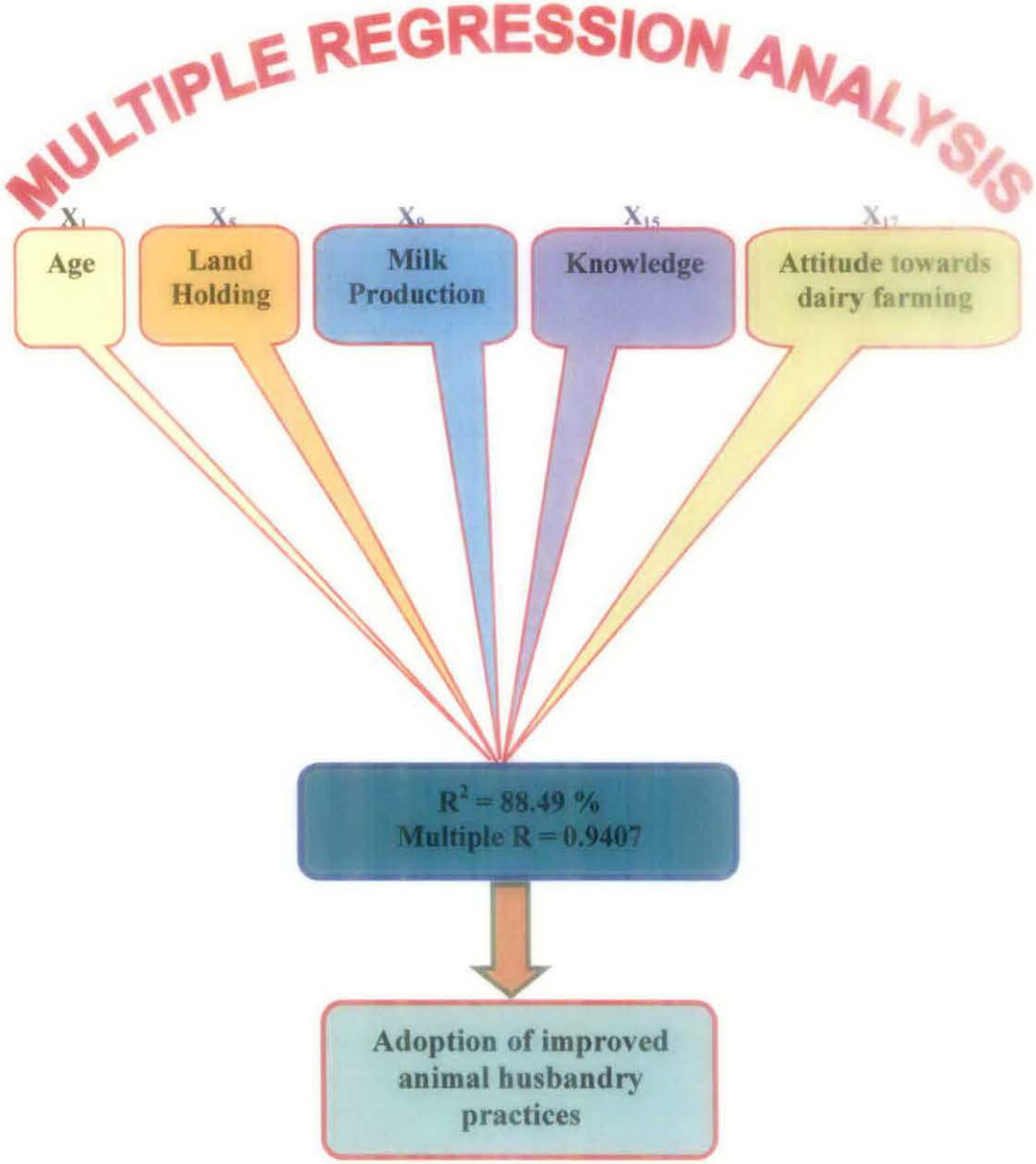


Fig. 9 Multiple regression analysis of independent variables and extent of improved animal husbandry practices

scope of the study. Further, it can be seen that the Z value of the three variables viz, age, knowledge and attitude towards dairy farming were significant at 0.01 level. On the other hand, the Z value of two variables namely, land holding and milk production were found significant at 0.05 level of significance indicating contribution of these five variables in explaining the variation in adoption of dairy farming. Remaining variables had no significant contribution in adoption of animal husbandry practices by the dairy farmers.

The above discussion lead to conclude that 88.49 per cent total variation was explained by a set of 17 variables taken together. Further, close observation of the data indicated that out of 17 variables, only five variables. viz; age, land holding, milk production, knowledge and attitude towards dairy farming had significant contribution in adopting dairy farming. This study provided evidence about the extreme important role of five variables played in determining extent of adoption of dairy farming which are presented in Fig. 9.

5.10.2 Step-wise multiple regression analysis

The step-wise regression is one method which has been widely used in regression analysis now a days. It has got the additional advantage that at each stage of analysis every variable is subjected to an examination for its predictive value. Based on this approach the step-wise multiple regression analysis was carried out to know the important variables with their predictive ability in explaining the variation in dependent variable.

In this analysis, all 17 variables were considered and the results are depicted in Table 28.

Table: 28 Step-wise multiple regression analysis of independent variables

Sr. No.	Independent variables	PRC (bi)	SE of bi	't' value (df = 144)	'F' value (df = 144)	SPRC	Rank
1	Age (x_1)	0.1446	0.0263	4.97**	24.74**	0.1802	II
2	Land holding (x_5)	0.0620	0.2535	3.08**	9.52**	0.0080	IV
3	Extension participation (x_{13})	0.0245	0.3199	1.90	3.61	0.0026	V
4	Knowledge (x_{15})	0.6713	0.0396	17.14**	294.06**	0.9804	I
5	Attitude towards Dairy farming technology (x_{17})	0.1485	0.0360	5.01**	25.11**	0.1655	III

* Significant at 0.05 level of significance
** Significant at 0.01 level of significance
PRC = Partial Regression Coefficient
SPRC = Standard Partial Regression Coefficient

R^2 = 0.8731
Constant = 3.4846
Multiple R = 0.9344

The data in Table 28 clearly indicate that the five variables viz. knowledge, attitude to wards dairy farming, age, land holding and extension participation put together explained as much as 87.31 per cent of total variation in adoption of dairy farming technology. The unexplained variation of 12.69 per cent may be due to the factors other than those included in the study.

It can also be seen from the above table that 'Z' values of 'F' test for four variables viz; knowledge, age, landing holding and attitude towards dairy farming were found significant at 0.01 level of significance, indicating significant contribution of these four variables in adoption of dairy farming technology. Partial regression coefficient indicated that one unit change in age,

land holding, knowledge and attitude would change 0.1446, 0.0620, 0.6713 and 0.1485 units in the extent of adoption of dairy farming technology respectively.

As a result of step-wise regression analysis, following regression model was obtained. The prediction equation was

$$= a + b_1 X_1 + b_5 X_5 + b_{13} X_{13} + b_{15} X_{15} + b_{17} X_{17}$$

Where,

	=	Predicted value of dependant variable
a	=	Intercept i.e. 3.4846
$b_1 X_1$	=	Partial regression coefficient of Y on X_1 (age)
$b_5 X_5$	=	Partial regression coefficient of Y on X_5 (land holding)
$b_{13} X_{13}$	=	Partial regression coefficient of Y on X_{13} (extension participation)
$b_{15} X_{15}$	=	Partial regression coefficient of Y on X_{15} (knowledge)
$b_{17} X_{17}$	=	Partial regression coefficient of Y on X_{17} (attitude towards dairy farming technology)

Therefor, the fitted equation is as under

$$= 3.4846 + (0.1466) X_1 + (0.0620) X_5 + (0.0245) X_{13} + (0.6713) X_{15} + (0.1485) X_{17}$$

The step-wise variations accounted by different variables are depicted in Table 29.

The various independent variables with own units of measurement did not permit a comparison of the partial regression coefficient values. To facilitate the comparison; the partial values were converted into standard partial vaules, which were free from units of measurements. The independent variables than were ranked on the basis of Standardized Partial Regression Coefficient value (bi') which are presented in earlier table 29.

Table: 29 Step-wise variation accounted by selected independent variables in adoption of improved animal husbandry practices.

Sr. No.	Variables included	Multiple R	Total variation accounted R^2	Variation between steps
1	Knowledge (x_{15})	0.9006	0.8111 (81.11)	81.11
2	Attitude towards Dairy farming technology (x_{17}) + x_{15}	0.9197	0.8458 (84.58)	3.47
3	Age (x_1) + x_{17} + x_{15}	0.9274	0.8600 (86.00)	1.42
4	Land holding (x_5) + x_1 + x_{17} + x_{15}	0.9327	0.8699 (86.99)	0.99
5	Extension participation (x_{13}) + x_5 + x_1 + x_{17} + x_{15}	0.9344	0.8731 (87.31)	0.32
			Total	**87.31**

The orders of these five variables from highest to lowest were; (1) Knowledge (0.8111), (2) Attitude towards dairy farming technology (0.8458), (3) Age (0.8600), (4) Land holding (0.8699) and (5) extension participation (0.8731).

It is obvious from the data in Table 29 and figure 10 that the variables viz. Knowledge, Attitude towards dairy farming technology, age, land holding and extension participation collectively contributed 87.31per cent variation. However, the variable, knowledge of dairy farming technology alone accounted for 81.11 per cent contribution in extent of improved animal husbandry practices followed by knowledge + attitude towards dairy farming

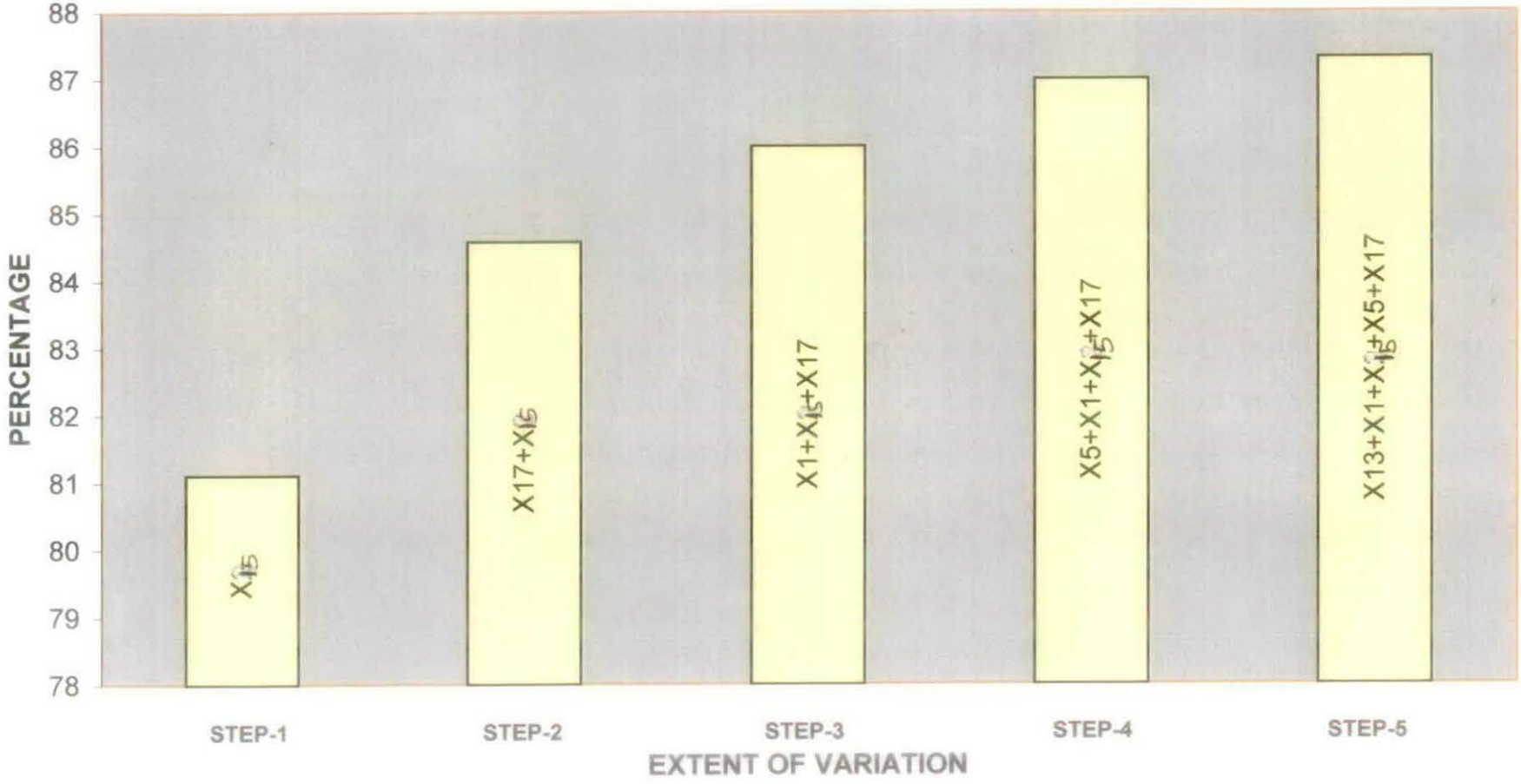


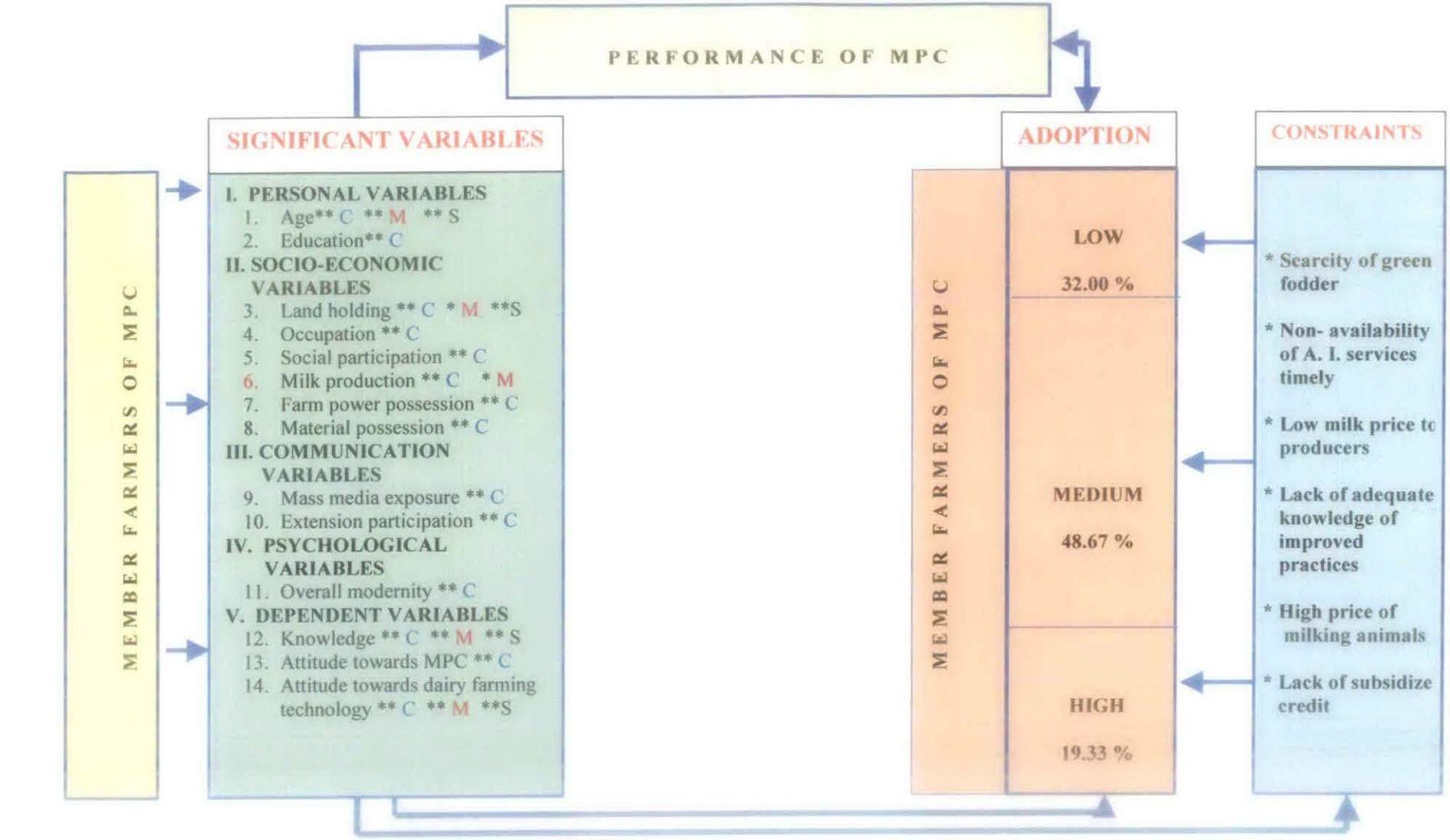
FIG. 10 STEPWISE REGRESION ANALYSIS SHOWING CONTRIBUTION OF INDEPENDENT VARIABLES TO THE EXTENT OF ADOPTION

technology (84.58%), knowledge + attitude towards dairy farming technology +age (86.00%), knowledge + attitude towards dairy farming technology + age + land holding (86.99%) and knowledge + attitude towards dairy farming technology + age +landing + extension participation (87.31%).

Further, the standard partial values clearly indicated that the knowledge (0.9804), attitude towards dairy farming technology (0.1655), age (0.1802), land holding (0.0080) and extension participation (0.0026) were in the highest order of magnitude, which reflected their importance in adoption of improved animal husbandry practices.

5.11 EMPIRICAL MODEL

It was postulated that performance of the MPCs and adoption of the improved animal husbandry practices are affected by various factors working around and individual viz., social, economic, communication and psychological. A conceptual model (Fig. 1) was formulated considering 17 variables which have relevance on performance of MPCs and the adoption of improved animal husbandry practices. When the model was empirically tested (Fig. 11) it was observed that out of 17 variables 14 variables viz., age, education, land holding, occupation, social participation, milk production, farm power possession, material possession, mass media exposure, extension participation, overall modernity, knowledge, attitude towards MPCs and attitude towards dairy farming technology were found significantly correlated with the adoption of improved animal husbandry practices.



* Significant at 0.01 level ** Significant at 0.05 level C = Correlated with adoption M = Multiple regression S = Step wise regration

FIG. 11 EMPIRICAL MODEL

Performance of MPCs was found having significant correlation with adoption of animal husbandry practices by member farmers.

Variables were further tested to know the prediction effect on adoption of improved animal husbandry practices. It was revealed that 87.31 per cent variation on adoption of improved animal husbandry practices was exercised by set of five variables viz., knowledge, and attitude towards dairy farming technology, age, land holding and extension participation. Among them except extension participation, all the four variables were found having significant contribution to the extent of adoption of improved animal husbandry practices by the member farmers. Hence, it implies that better exposure of these variables would influence in better adoption of improved animal husbandry practices.

SUMMARY & CONCLUSIONS

VI. SUMMARY AND CONCLUSIONS

Agriculture is one of the largest sectors of Indian economy. Dairying is an integral part of agriculture system and it occupies a key position in Indian rural economy as well as socio-economic development. The contribution of dairy farming is about 8.0 per cent of the GDP (23rd survey report: 2005-06, Dept. of A. H. Gujarat state). India occupies first position in milk production of the world with an annual production of about 84 million tones. Gujarat is a leading state in milk production with exemplary network of cooperatives for efficient marketing.

Dairy development has now opened up a new eara of Indian dairy farming community. The new technologies have established their superiority over the old ones. It is therefore, believed that the changes in such technologies will lead to socio-economic development of the country. Animal husbandry is an exclusive source of animal protein food and nutrition for country's population and substantial source of income and employment for rural population particularly small, marginal and landless labourers assuming better standard of living.

The gains of the White Revolution has benefited the producers and also generated self sustaining and progressively accelerating momentum. Dairy cooperatives have demonstrated their utility in the rural development by providing effective marketing facilities for the surplus milk produced in

villages, milk input and product supply, A. I. service, animal health service and increasing knowledge about improved dairy farming technology.

As dairy production is now become a regular supply of income of village farmer, the member of village Milk Producers' Cooperative Societies has been increasing. But many of dairy cooperatives are not operating successfully and not performing well in terms of milk procurement and other services, mostly existing in rural remote or tribal areas due to many reasons.

Sabarkantha district have 20.18 per cent tribal population to its total population (Census, 2001). Tribal economy is dependent mainly on agriculture. They practices old age system of agriculture, hence the production of crops is low per unit area. Tribal farmers also adopted dairy farming to supplement their income for betterment of life but, still they carried out milk production in a traditional way. Milk production per animal is far below the average. An appreciable gap exists between availability and adoption of dairy farming technology. Mere availability of technology and persuasions of developmental agencies is not the key to motivate persons to adopt process but pre-requisite is to have positive attitude of farmers towards technology and sufficient knowledge about its utility, should be convinces to adopt the technology for their own benefits.

Keeping above all the consideration, a study on **"Performance of milk producers' cooperative societies and its influence in relation to animal husbandary practices adopted by tribals of Sabarkantha district"** was undertaken with the following objectives.

6.1 OBJECTIVES

[1] To assess the managerial and business performance of MPCs.

[2] To identify the organizational and non organizational factors influencing performance of MPCs.

[3] To identify the constraints as perceived by member respondents in effective functioning of MPCs.

[4] To study personal, socio-economic, communication and psychological characteristics of the members of MPCs.

[5] To assess the knowledge of MPCs members about improved animal husbandry practices.

[6] To measure the attitude of members towards MPCs and dairy farming technology.

[7] To study the adoption of improved animal husbandry practices by MPCs members.

[8] To determine the relationship between selected personal, socio-economic, psychological and communication characteristics of members and their adoption of improved animal husbandry practices.

6.2 METHODOLOGY

The study was divided into two parts; the first part consists of performance of milk producers' cooperative societies in respect of managerial and business activity of MPCs. The second part consist of two scales construction for measuring the (i) attitude of member farmers towards MPCs and (ii) attitude towards dairy farming technology and execution of both the

scales among the member farmers of milk cooperative societies functioning in tribal area.

The study was also aimed at to identify the important characteristics of member farmers. The level of knowledge of member farmers and the extent of adoption of improved animal husbandry practices by member farmers were also measured with the help of teacher made tests. Relationship between selected attributes and extent of adoption was measured to find out important determinants of adoption by computing correlation coefficient. The extent of variation was also measured by using multiple and stepwise regression. Other aspect included was problems faced by the member farmers in effective functioning of MPCs.

Using the performance indicators suggested by Gopi Krishna (2001), the performance of MPCs was judged and grouped into three categories. The factors having direct or indirect influence on performance of MPCs were studied and grouped as most important, important and less important.

The attitude scales were constructed by using Likert (1932) summated rating techniques. Both the scales were consisting 20 statements each as shown in Appendix I and II. The scales were administrated to the member farmers to measure their attitude towards MPCs and dairy farming technology.

Ex. Post-facto research design was used for the study. The tribal population in the Sabarkantha district is concentrated in four talukas, viz. Khedbrahma, Bhiloda, Vijaynagar and Meghraj. Among them, Bhiloda and Khedbrahma talukas were purposively selected having more number of MPCs

running since last five years. Ten MPCs from Bhiloda talukas and five MPCs from Khedbrahma talukas were randomly selected. Thus total 15 villages having MPCs were selected for the study. From each MPCs, 10 members were selected using simple random sampling making a sample of 150 respondents for the study.

Most of the data pertaining to performance of MPCs were collected from secondary sources. For primary data, the respondents were contacted in person and information was collected with the help of well-structured and pre-tested interview schedule during the period of May, June, July-2006.

The collected data were coded, classified, tabulated and analyzed in order to make the findings meaningful. The statistical tools such as percentage, mean score, mean, standard deviation, coefficient of correlation, multiple regression, step-wise regression and standard partial regression coefficient were used.

6.3 MAJOR FINDINGS

6.3.1 Performance of MPCs.

6.3.1.1 Managerial and business performance of MPCs.

The average Performance Index score of all 15 MPCs under study was 61.06. majority of the MPCs (60.00 per cent) had average performance and 20.00 per cent each of them had poor and best performance.

6.3.1.2 Relationship between performance of MPCs and extent of adoption

Correlation coefficient of performance of MPCs with extent of adoption of improved animal husbandry practices by dairy farmers was positive and significant. Thus, the performance of MPCs influence the dairy business of the tribal members.

6.3.2 Factors influencing the performance of MPCs.

The important factors which were emerged out as highly affecting to the performance of MPCs were; digital fat testing equipment and computer facility for accounting, A. I. services and animal health services.

6.3 Constraints as perceived by member farmers in effective functioning of MPCs.

The important constraints faced by tribal member farmers in effective functioning of MPCs were; scarcity of green fodder for animals as reported by 90.66 per cent of tribal member farmers, followed by non availability of A. I. services timely, and low milk price to the producers as reported by 84.66 per cent and 80.66 per cent members respectively.

Lack of adequate knowledge of improved animal husbandry practices, high price of milking animals, lack of subsidized credit facility and non availability of veterinary services at the place and time were also reported by large number of tribal member dairy farmers as the important constraints.

6.3.4 Characteristics of respondents

6.3.4.1 Personal characteristics

The findings of the present study revealed that nearly 60 per cent of the tribal member dairy farmers were in middle age group and about 89 per cent were literate having education from primary to college level.

6.3.4.2 Socio-economic characteristics

With regards to their socio-economic characteristics, 56.67 per cent of the respondents belonged to medium size family, slightly more than half (52.66 %) of them were members of joint family. Despite being land holders, 71.34 per cent member dairy farmers came under category of marginal to small farmers. Most of the dairy farmers (80.67 %) had farming with animal husbandry as their occupation; majority dairy farmers (57.33 %) had low level of social participation. The average herd size was 3.20 animals and majority (70.00%) was in medium herd size (2 to 5 animals) category. In case of milk production at their home, 68.00 per cent of the respondents were in medium producers group. Majority dairy farmers (57.34 %) had one pair of bullock as their draught power and medium material possession (62.00 %).

6.3.4.3 Communication characteristics

The information regarding communication attributes revealed that slightly more than half (54.00 %) of the dairy farmers had low mass media exposure and majority (60.00 %) had medium extension participation.

6.3.4.4 Psychological characteristics

The finding of the study revealed that 61.33 per cent of respondents had medium level of overall modernity followed by 24.00 per cent with low overall modernity.

6.3.5 Knowledge about improved animal husbandry practices

Majority of the respondents (51.33 %) had medium level of knowledge followed by low level of knowledge (30.67 %) of respondent about improved animal husbandry practices. The average knowledge score was 38.56.

6.3.5 Attitude towards MPCs.

Majority of the member dairy farmers possessed moderately favourable attitude towards MPCs. The average attitude score was also higher (60.85) indicating their positive feelings towards dairy farming.

6.3.6 Attitude towards dairy farming technology

Majority of member the dairy farmers possessed moderately favourable attitude towards dairy farming technology. The average score was also higher (60.48) indicating their positive attitude towards dairy farming technology.

6.3.7 Adoption of improved dairy farming technology

The results indicated that the extent of adoption of improved animal husbandry practices was found medium. The average adoption score of dairy farmers was poor, indicating that adoption of improved animal husbandry practices need to be strengthen to improve dairy farming as a whole.

6.3.8 Relationship of characteristics with adoption

The calculated coefficient of correlation show that among all 17 variables, 13 variables were found having positive and significant relationship with extent of adoption. They were, age, education, land holding, occupation, social participation, farm power possession, material possession, mass media exposure, extension participation, overall modernity, knowledge, attitude towards MPCs and attitude towards dairy farming technology.

Multiple regression analysis indicated that all variables exerted as much as 88.49 per cent of total variation in adoption of improved animal husbandry practices. It was also observed that the 't' values of three variables viz. age, knowledge and attitude towards dairy farming were significant at 0.01 level of significance. Whereas, the two variables namely land holding and milk production were significant at 0.05 level of significance.

The result of step-wise regression analysis indicated that 87.31 per cent of the total variation in adoption was accounted by a set of five variables viz, age, land holding, extension participation, attitude towards dairy farming technology and knowledge. Knowledge alone had accounted 81.11 per cent variation.

6.4 IMPLICATIONS OF STUDY

[1] The performance of the MPCs under study was found average and the correlation between performance of MPCs and adoption of improved animal husbandry practices by member farmers was positively significant. Hence, it is for the chairman, secretary and delegates of

MPCs, to perform the activities of MPCs in better manner and effective administration can further improve the adoption of scientific dairy farming by dairy farmers. There must be linkages between government department, finance institution, milk union, MPCs, extension agencies, NGOS etc. engaged in tribal upliftment through execution of various dairy development programmes.

[2] The factors emerged out as highly affecting performance of MPCs may be utilized to update the MPC with new technology of fat testing equipment, weighing of milk and daily accounting of milk suppliers as well as of MPC. The services like A. I. service and animal heath service by MPCs may be timely and at the doorstep of the dairy farmers satisfactorily.

[3] The constraints faced by majority of dairy farmers should be overcome by testing corrective measures. This would help in effective functioning of MPCs consideration may be given in while formulating the strategies for expansion of dairy farming.

[4] Correlation study suggested that due weightage should be given to such characteristics of the tribal dairy farmers viz., age, education, land holding, occupation, social participation, farm power possession, material possession, mass media exposure, extension participation, overall modernity, knowledge and attitude towards MPCs and dairy farming technology. The careful understanding of these characteristics is necessary to be persued by development agencies to streamline their

efforts in proper direction to get maximum responses from the tribal farmers and to make them more prone to adopt scientific dairy farming.

[5] Stepwise regression showed that five variables viz., age, land holding extension participation, attitude towards dairy farming technology and knowledge were important variables changing in adoption behavior. Hence, attempt should be made to seek maximum involvement of those tribal farmers those possessing these characteristics. Such farmers can help the extension agencies in convincing other farmers to know and adopt recommended technology at a faster rate.

[6] The moderately favourable to high favourable attitude of member farmers towards MPCs was found during the study. Hence, attempts need to change their attitude for the development and smooth running of MPCs. For effective milk marketing business, supply of milk inputs and milk products, concentrated feed, seed and sapling of fodder crops, A. I. and animal health services and organization of various training camps to aware the tribal farmers about improved animal husbandry practices etc. are necessary.

[7] Positive attitude towards dairy farming technology was found to be important contributing factor leading toward higher adoption of improved animal husbandry practices. Hence, a massive campaign is needed to aware the tribal farmers about potentialies of dairy farming, it's benefits and financial advantages. This may help in changing the attitude of farmers towards dairy farming technology.

[8] The study revealed that the knowledge of tribal farmers of improved animal husbandry practices was also medium to low. The dairy farmers with more knowledge would generally have more capabilities to understand the results of its adoption. Hence, an attempt should be made by Animal Husbandry extension services to augment the knowledge level of tribal farmers about scientific dairy farming by various extension effects.

[9] It has been seen from the study that there has been a wide gap between the recommendations of scientists and practices of dairy farmers. The reception granted to the innovations has somehow not been ceremonial and encouraging. There are various factors which deemed to have held back the wide scale adoption of improved animal husbandry practices which may be identified and corrective measures may be taken up to popularize the innovation among dairy farmers. Adoption of improved animal husbandry practices would definitely increase per animal production and milk production of the nation as a whole.

6.5 SUGGESTIONS FOR FUTURE RESEARCH

In light of the findings of the study and the experience gained during the course of investigation, some new areas have emerged for future research. These are as under.

[1] The present study was confined to one district which has considerable tribal population. A similar study could be replicated in other tribal and

non-tribal parts of the state as generalization out of this result may not be applicable to remaining areas.

[2] The study concentrated on behavioral aspect of the farmers. Future studies can be done to investigate the economic aspect of dairy farming and that could support to promotion of dairy farming

[3] The variables other than those included in the present investigation might be influencing attitude and extent of adoption of dairy farming technology. such variables could be included in future research study.

[4] During the course of the study, it was felt that knowledge of tribal dairy farmers about improved dairy farming technology was medium to low which need to be improved. A training module can be developed to fulfill the needs of farmers and extension personnel.

[5] The size of sample may be enlarged to draw more valid conclusions.

[6] A study on functioning of village milk producers' cooperatives and suggestions for their effective functioning in providing better services for overall socio-economic development of members may be conducted.

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APPENDICES

APPENDIX

"Performance of milk producers' cooperative societies and its influence in relation to animal husbandary practices adopted by tribals of Sabarkantha district"

Interview schedule : 1

Interview Schedule No. ..... Date : / /2006

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1. Name of MPC .....

2. Name of village ..... 3. Taluka .....

(A) Managerial and business information of MPC

Sr. No.	Particulars	Year				
		2001-02	2002-03	2003-04	2004-05	2005-06
1	Number of total member in MPC					
2	Number of members selling milk to MPC					
3	Number of households in village					
4	Number of households selling milk to MPC					
5	Numbers of members in management committee					
6	Meetings of management committee held during year					
7	Number of paid staff employed by MPC					
8	Annual milk procurement by MPC Litre Rs.					
9	Annual milk sale of MPC to DCMU Litre Rs.					
10	Annual milk purchased by DCMU From MPC Litre Rs.					
11	Annual commission of MPC from milk sold to union					
12	Annual gross profit of MPC					
13	Annual purchase of milk product by MPC (Rs.)					

14	Annual purchase of milk inputs by MPC (Rs.)		
15	Annual purchase of cattle feed by MPC (Rs.)		
16	Annual purchase of total milk inputs by MPC (Rs.)		
17	Annual gross income of MPC		
18	Annual operational expenditure of MPC		
19	Annual net profit of MPC		

"Performance of milk producers' cooperative societies and its influence in relation to animal husbandary practices adopted by tribals of Sabarkantha district"

Interview schedule : 2

Interview Schedule No. ..... Date : / /2006

PART – I

1. Name of farmer.....

2. Name of village..... 3. Taluka .....

(Put "√" mark wherever applicable)

Attribute of farmers:

[1] Age (completed year): .....

[2] Education:

(a) Illiterate (0) .....
(b) Primary education (1) .....
(c) Secondary education (2) .....
(d) Higher secondary education (3) .....
(e) Graduation (4) .....
(f) Post graduation (5) .....

[3] Family type:

(i) Nuclear (1) .....
(ii) Joint (2) .....

[4] Family size:

(i) No. of family members .....

[5] land holding:

(a) Irrigated ..... ha.

(b) Unirrigated ..... ha.

(c) Total ..... ha.

[6] Occupation:

(a) Farming and animal husbandary (1) .....

(b) Farming along with animal husbandary and individual profession (2) .....

(c) Farming along with animal husbandary and business (3) .....

(d) Farming along with animal husbandary and service (4) .....

[7] Social participation:

Did you ever participate in any social organisation? Yes / No .....

If yes, please furnish the following information by putting tick mark (√) against appropriate column(s).

Sr. No.		Organization	Member	Office bearer	Remarks
A.	**In village :**				
	1	Gram Panchayat			
	2	Milk Cooperative Society			
	3	Service Cooperative Society			
	4	Youth Club			
	5	Farmers' Club			
	6	Others			
B.	**Out side village :**				
	1	Talukas Panchayat			
	2	District Panchayat			
	3	Farmers Union / Club			
	4	Agricultural Produce Market Committee (Marker Yard)			
	5	District milk union			
	6	Any other			
	7	Distinctive features (MLA, MP etc.)			

[8] Herd size:

Sr. No.	Kind of animal	No. of total animal	No. of milking animal	Milk (litre/day)			
				Sale to MPCs	Local sale	Home consum-ption	Total
1	Local cow						
2	Crossed cow						
3	Buffaloes						
	Total						

[9] Farm power possession:

Sr. No.	Type of farm power	Score	Tick mark (√)
1	No drought power	0	
2	One ox	1	
3	One pair of Bullock	2	
4	Power tiller	3	
5	tractor	4	

[10] Material possession:

Sr. No.	Material possession	Score	Tick mark (√)
1	Wall clock	1	
2	Wrist watch	1	
3	Bicycle	2	
4	Scooter / Motor cycle	3	
5	Radio	1	
6	Television	3	
7	VCP / VCR / VCD / DVD	2	
8	Chaff cutter	2	
9	Iron / Wooden coat	1	

[11] Mass media exposure:

You may be getting information on dairy farming through various mass media. Please, tell me how often you have utilized following sources.

Sr. No.	Mass media	Frequency of exposure		
		Regular (03)	Occasional (02)	Never (01)
1	News paper			
2	Farm magazine			
3	Leaflet			
4	Radio			
5	Television			

[12] Extension participation:

Have you participated in any of the following extension activity? If yes, give details.

Sr. No.	Activities	Frequency of participation			
		Once in a year	Twice in a year	Thrice in a year	More than this in a year
1	Clinical camp				
2	Farmer's day				
3	Farmer's meet				
4	Agricultural fair				
5	Short term training				
6	Exhibition				
7	Livestock show				
8	Motivational tour				

[13] Annual income:

Sr. No.	Source of income	Annual Income(Rs.)
1	Income from milk sale	
2	On farm income	
3	Other sources of income	
	Total	

[14] Overall modernity:

(A) Please state any one of the alternatives which you think most correct

(i) Which is the most important for the future of our country?

(a) The hard work of people (3)

(b) Good government scheme (2)

(c) God's help (1)

(d) Good luck (1)

(ii) Scientists in the Universities are studying such things as what determines whether a baby is a boy or a girl and how is it that a seed turns into a plant.

Do you think that these investigations are:

(a) All very good (4)

(b) All some what good (3)

(c) Some what harmful (2)

(d) All very harmful (1)

(iii) Which of these opinions do you agree with more?

(a) Some people say that it is necessary for a man and his wife to limit the number of children to be born. So that, they cam take better care of those they have. (2)

(b) Other say that, it is wrong for a man and his wife voluntarily to limit the number of children to be born. (1)

(iv) Which of these kinds of news you interested most?

(a) Development / Scientific and Technological sciences. (8)

(b) District / Hometown village (7)

(c) Educational (6)

(d) Religious or festival (5)

(e) Health (4)

(f) The Nation (3)

(g) News related to the world (2)

(h) Sports (1)

(v) Do you think a man can be good without having any religion at all?

(a) Yes (1).....

(b) No (2).....

(vi) What are the major farming problems the country is facing?

(One score for each, maximum four score).

(a) Economical

(b) Educational

(c) Technological

(d) Managerial

(vii) If you were to meet a person who lives in another country a long way off. Could you like his way of thinking?

(a) Yes (1).....

(b) No (0).....

(viii) What quality should a man have to be office bearer?

(a) Coming from high family back ground (1)

(b) Devotion to the old and time honored ways (1)

(c) Being the most popular among the people (2)

(d) High education and social knowledge (3)

(B) Modern Agricultural Infrastructure Facilities:

Sr. No.	Item		Score	Yes / No
(i)	**Availability of irrigation system:**			
	(a)	Sprinkler method	(3)	
	(b)	Drip method	(2)	
	(c)	Surface irrigation method	(1)	
(ii)	**Availability of underground irrigation pipe line:**			
	(a)	No pipe line available	(0)	
	(b)	25 % pipe line available	(1)	
	(c)	50 % pipe line available	(2)	
	(d)	100 % pipe line available	(3)	
	(e)	More than 100 % pipe line available for hiring to others	(4)	

(iii)	**Electronic communication facility available**			
	(a)	No facility available	(0)	
	(b)	Telephone (public)	(1)	
	(c)	Telegram post office	(2)	
	(d)	Telephone (own)	(3)	
(iv)	**Availability of credit facility**			
	(a)	Nationalized Commercial Bank	(4)	
	(b)	Land Development Bank	(3)	
	(c)	District Cooperative Bank	(2)	
	(d)	Shroff	(1)	
	(e)	Merchant	(1)	
(v)	**Input supply service agency available**			
	(a)	Cooperative society	(1)	
	(b)	Milk producers' cooperative	(1)	
	(c)	Fertilizer depot	(1)	
	(d)	Agro-service center	(1)	
	(e)	Seed shop	(1)	
	(f)	Pesticide shop	(1)	
(vi)	**Transportation Facility available**			
	(a)	No facility available	(0)	
	(b)	Private hired vehicle	(1)	
	(c)	State Transport Bus	(2)	
	(d)	Railway / Near Railway station	(3)	
	(e)	Own vehicle (Scooter / Motor cycle)	(4)	
	(f)	Own Tractor / Trailor	(5)	
	(g)	Own Vehicle (Jeep / Tempo)	(6)	
(vii)	**Modern machinery and implements available**			
	(a)	Electric motor	(1)	
	(b)	Thresher	(1)	
	(c)	Plough	(1)	

	(d)	Cultivator	(1)	
	(e)	Sprayer	(1)	
	(f)	Duster	(1)	
	(g)	Chaff cutter	(2)	
	(h)	Indigenous hand operated chaff cutter	(1)	
	(i)	Milk can	(1)	
	(j)	Animal clinical Travis	(2)	
(viii)	**Market facility**			
	(a)	Milk cooperative	(2)	
	(b)	Private dairy	(1)	
	(c)	Local vender	(1)	

PART – II

Adoption of Improved Animal Husbandry Practices:

Sr. No.	Practice							Knowledge		Adoption	
								Yes	No	Yes	No
1	Points to be taken care of in selection of milch animals										
2	**Feeding Practices:**										
	[i] Requirement of Feed and Fodder:										
	Animal Status	Roughage		Green		Concentrate					
		Cow	Buff.	Cow	Buff.	Cow	Buff.				
	Maintenance										
	Milking Animal										
	Advanced Preg.										
	Heifer										
	[ii] Supplementation of mineral mixture										
	[iii] Supplementation of salt										
	[iv] Feeding urea treated hay										
	[v] Percentage of urea in hay										
	[vi] Feeding protected – under gradable protein										
	[vii] Proper method of hay making										
	[viii] Proper method of giving hay (as such cutting into 2-3 piece or chaffing small)										
	[ix] Feeding balanced diet										
3	**Watering**										
	[i] Reliable source of clean drinking water										
	[ii] Time of serving water										
	[iii] Requirement of water										
	Require-ment	Maintenance		Milk production (1 Liter)							
		Summer	Winter	Summer	Winter						
	Cow										
	Buffalow										
	[iv] Cleaning water trough										
	[v] Giving water even at night hours										

Sr. No.	Practice	Knowledge		Adoption	
		Yes	No	Yes	No
4	**Managemental Practices**				
	[i] Providing cheap but well ventilated, clean and comfortable house				
	[ii] Cleaning shed or house twice daily				
	[iii] Providing pucca manger in the house itself				
	[iv] Providing water trough in the house itself				
	[v] Disinfections of shed at regular interval (Dusting, spraying or fumigation)				
	[vi] Proper drainage system in the house				
	[vii] Proper disposal of dung and urine and foliage				
	[viii] Causes of foreign body and measures to control it				
	[ix] Grooming, its advantages				
	[x] Giving bath to animal twice or once in summer				
	[xi] Deworming milking animals				
	[xii] Milking animals at regular interval				
	[xiii] Not beating or freighting the animals during milking				
	[xiv] Feeding concentrate at the time of milking				
	[xv] Completing milking in 6 – 7 minutes				
	[xvi] Maintaining records of all kinds				
5	**Breeding Practices**				
	[i] Signs of estrous				
	[ii] Artificial insemination method				
	[iii] Proper time of insemination				
	[iv] Length of estrous cycle				
	[v] Ideal service period				
	[vi] Ideal dry period				
	[vii] Inter calving period				
	[viii] Lactation length				
	[ix] Proper time of pregnancy diagnosis				
	[x] Gestation period of cow and buffalo				
	[xi] Everyday watching cow and buffalo for estrous				
	[xii] Keeping records of breeding				

Sr. No.	Practice	Knowledge		Adoption	
		Yes	No	Yes	No
6	**Health Care**				
	[i] Identification of weak and sick animals				
	[ii] Isolation of weak and sick animals				
	[iii] First aid for common disease like tympany, milk fever, acidosis mild prolapse, diarrhea, indigestion, injury etc.				
	[iv] Timely treatment of weak and sick animals				
	[v] Use of locally available common medicines				
	[vi] Vaccination for FMD, H.S., BQ., Theileriosis, Anthrax etc.				
	[vii] Testing animals for T.B., J.D., Brucellosis				
	[viii] Control of ecto and endo parasites				
7	**Mastitis Control**				
	[i] Keeping animal in clean dry place				
	[ii] Milking animal in clean, dry, well ventilated place				
	[iii] Washing hand of milkers before milking				
	[iv] Washing udder with luke warm water or antiseptic solution before milking				
	[v] After washing, cleaning it with dry cloth				
	[vi] Milking with full hand method				
	[vii] Washing udder after milking				
	[viii] Testing milk for sub-clinical mastitis				
	[ix] Timely treatment for mastitis				
	[x] Proper disposal of mastitis milk				
	[xi] Proper drying off milking animals				
8	**Calf Rearing**				
	[i] Cleaning calf after birth				
	[ii] Cleaning udder and perineum of mother with warm water				
	[iii] Partially milking the animal				

	[iv] Time of feeding colostrums after birth				
	[v] Quantity of colostrums to be fed				
	[vi] Cutting nevel cord				
	[vii] Deworming calf (what it is, why, when to give, and when to repeat)				
	[viii] Feeding concentrate to calf (when, how to, how much etc)				
	[ix] Feeding green fodder to calf (when, how to, how much, etc.)				
	[x] Control of calf scoure				

PART – III

[1] **Attitude of members towards Milk Producers' Cooperative Society.** (Please, indicate your response to each statement by putting tick mark (√) in appropriate column).

Sr. No.	Attitudinal statements	Response				
1	Getting the Milk Producers' Cooperative society (MPC) registered is a easy process.	SA	A	UD	DA	SDA
2	MPCs leads to friction and conflicts in the status of farmers.					
3	Unhealthy tactics are used while electing the members of managing committee of the MPCs.					
4	Due to MPCs, the economic condition of farmers have improved.					
5	MPCs helps to provides veterinary services.					
6	Office bearers of the MPCs put hindrance in getting veterinary services.					
7	MPCs has helped the farmers to increase their knowledge regarding animal husbandry practices.					
8	Favouratism and nepotism in fat assessment is not followed in the MPCs.					
9	Office bearers of the MPCs put hindrance in getting Artificial Insemination services.					
10	MPCs help all the members irrespective of post and position.					
11	The president generally appoints their relatives as office bearers.					
12	Only relatives and friends of office bearers have benefited by MPCs.					
13	The charges for veterinary services are reasonable.					
14	MPCs are careless to procure more milk therefore private dairy owners take advantages.					
15	MPCs staff behave properly with the members.					
16	Women do not have any voice in MPCs.					
17	MPCs are only interested in procurement of milk.					

18	The A. I. services provided by MPCs has improved the animal breed .					
19	Feed provided by MPCs is of poor quality					
20	Cost of concentrate feed provided by MPCs is higher than market rates.					

SA = Strongly Agree A = Agree UD = Undecided DA = Disagree SDA = Strongly disagree

[2] **Farmer's attitude towards improved dairy farming technology:** (Please, indicate your response to each statement by putting tick mark (√) in appropriate column).

Sr. No.	Attitudinal statements	Response				
1	Economic return from dairy farming is high.	SA	A	UD	DA	SDA
2	Dairy farming is the solution to remove poverty.					
3	Natural service is better than artificial insemination.					
4	If given a choice, I would rather grow crop than raise livestock.					
5	Big farmers can only adopt the dairy farming technology.					
6	All types Farmers people can adopt the dairy farming technology.					
7	Daily work of dairy farming has make it difficult for women to take care of their children.					
8	Dairy farming provides social security to rural women.					
9	Trying new methods in dairy farming involves no risk.					
10	No matter, however new technology of dairy farming may be tried, milk yield will not increase.					
11	Dairy farming is more relevant to the needs of most of the farmers.					
12	Dairy farming increase the employment opportunity in rural area.					
13	Special training programme on dairy farming will not make any difference.					
14	Dairy farming is nothing but wastage of money, time and labour.					

15	Improved dairy farming is costly affairs for small and marginal farmers.					
16	It is dairy farming which has restricted the industrial development.					
17	Dairy farming is the main cause of air and water pollution in villages and towns.					
18	Dairy farming is at all helpful in improving economic condition of village people.					
19	Dairy farming has improved the status of farm women in family and society.					
20	New technology of dairy farming gives better results then old methods.					

SA = Strongly Agree A = Agree UD = Undecided DA = Disagree SDA = Strongly disagree

PART – IV

Factors influencing the performance of MPCs.

(Please, indicate your response to each statement by putting tick mark (√) in appropriate column).

Sr. No.	Factors	Response		
		Highly affecting	Moderately affecting	Not affecting
1	Number of households in the operational area of MPC			
2	Location distance (km) of MPC from milk union or chilling centre			
3	Years of registration of MPC			
4	Types of office building of MPC			
5	Market competition for milk in village			
6	Digital fat testing equipment and computer for daily accounting			
7	A. I. services / Bull services			
8	Animal health services			

PART – V

Constraints experienced by farmers in effective functioning of MPCs.

Sr. No.	Constraints	Tick (√) Mark
1	Agro climatic condition is not suitable for dairying.	
2	High price of milking animals.	
3	Low milk price to the producers.	
4	Lack of adequate knowledge about improved animal husbandry practices.	
5	Ineffectiveness of dairy extension services.	
6	Lack of coordination among concerned line departments.	
7	Unfavourable milk pricing policy for producers.	
8	Difficulty to get compensation from insurance company.	
9	High insurance premium.	
10	Less availability of animal insurance in the village.	
11	Scarcity of green fodder.	
12	Unavailability and / or high costs of improved forage / fodder seeds.	
13	A.I. services are not available timely.	
14	Non-availability of veterinary services at the place and in time.	
15	High rate of dairy veterinary services than private practioners.	
16	Milk holidays during flush season.	
17	Poor quality of cattle feed supplied by cooperatives.	
18	High rate of concentrate feed supplied by the district milk union.	
19	Young generation is not interested in dairying.	
20	Lack of subsidized credit facility.	

APPENDIX – I

Attitude of members towards Milk Producers' Cooperative Society.
(Please, indicate your response to each statement by putting tick mark (√) in appropriate column).

Sr. No.	Attitudinal statements	Response				
1	Getting the Milk Producers' Cooperative society (MPC) registered is a easy process.	SA	A	UD	DA	SDA
2	MPCs leads to friction and conflicts in the status of farmers.					
3	Unhealthy tactics are used while electing the members of managing committee of the MPCs.					
4	Due to MPCs, the economic condition of farmers have improved.					
5	MPCs helps to provides veterinary services.					
6	Office bearers of the MPCs put hindrance in getting veterinary services.					
7	MPCs has helped the farmers to increase their knowledge regarding animal husbandry practices.					
8	Favouratism and nepotism in fat assessment is not followed in the MPCs.					
9	Office bearers of the MPCs put hindrance in getting Artificial Insemination services.					
10	MPCs help all the members irrespective of post and position.					
11	The president generally appoints their relatives as office bearers.					
12	Only relatives and friends of office bearers have benefited by MPCs.					
13	The charges for veterinary services are reasonable.					
14	MPCs are careless to procure more milk therefore private dairy owners take advantages.					
15	MPCs staff behave properly with the members.					
16	Women do not have any voice in MPCs.					
17	MPCs are only interested in procurement of milk.					
18	The A. I. services provided by MPCs has improved the animal breed .					
19	Feed provided by MPCs is of poor quality					
20	Cost of concentrate feed provided by MPCs is higher than market rates.					

SA = Strongly Agree A = Agree UD = Undecided DA = Disagree SDA = Strongly disagree

APPENDIX – II

Farmer's attitude towards improved dairy farming technology:
(Please, indicate your response to each statement by putting tick mark (√) in appropriate column).

Sr. No.	Attitudinal statements	Response				
1	Economic return from dairy farming is high.	SA	A	UD	DA	SDA
2	Dairy farming is the solution to remove poverty.					
3	Natural service is better than artificial insemination.					
4	If given a choice, I would rather grow crop than raise livestock.					
5	Big farmers can only adopt the dairy farming technology.					
6	All types Farmers people can adopt the dairy farming technology.					
7	Daily work of dairy farming has make it difficult for women to take care of their children.					
8	Dairy farming provides social security to rural women.					
9	Trying new methods in dairy farming involves no risk.					
10	No matter, however new technology of dairy farming may be tried, milk yield will not increase.					
11	Dairy farming is more relevant to the needs of most of the farmers.					
12	Dairy farming increase the employment opportunity in rural area.					
13	Special training programme on dairy farming will not make any difference.					
14	Dairy farming is nothing but wastage of money, time and labour.					
15	Improved dairy farming is costly affairs for small and marginal farmers.					
16	It is dairy farming which has restricted the industrial development.					
17	Dairy farming is the main cause of air and water pollution in villages and towns.					
18	Dairy farming is at all helpful in improving economic condition of village people.					
19	Dairy farming has improved the status of farm women in family and society.					
20	New technology of dairy farming gives better results then old methods.					

SA = Strongly Agree A = Agree UD = Undecided DA = Disagree SDA = Strongly disagree

CERTIFICATE

This is to certify that, I have no objection for supplying to any scientist only one copy of any part of this thesis at a time through reprographic process, if necessary for rendering reference service in a library or documentation center.

[V. B. PATEL]

Place : SARDARKRUSHINAGAR
Date : 6th JUNE, 2007

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Place : SARDARKRUSHINAGAR **[V. B. PATEL]**
Date : 2nd June, 2007