

GOKHALE INSTITUTE MIMEOGRAPH SERIES NO. 41

**WORKING OF MILK PRODUCERS' CO-OPERATIVES
IN MAHARASHTRA**

DEEPAK SHAH

**AGRO ECONOMIC RESEARCH CENTRE
GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
(DEEMED TO BE A UNIVERSITY)**

PUNE 411 004

MARCH 1996

GOKHALE INSTITUTE MIMEOGRAPH SERIES NO. 41

**WORKING OF MILK PRODUCERS' CO-OPERATIVES
IN MAHARASHTRA**

DEEPAK SHAH

**AGRO ECONOMIC RESEARCH CENTRE
GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
(DEEMED TO BE A UNIVERSITY)**

PUNE 411 004

MARCH 1996

FOREWORD

The dairy industry in India has achieved significant progress over the last several years through the Operation Flood Programme which was launched in 1971. Almost all the states and most of the high potential milksheds have been covered in this programme.

An issue which is causing considerable concern is that of the economic viability of the units. In terms of the economic viability, out of 96 milk co-operatives in the State of Maharashtra, only 25 are presently economically viable. The present investigation is a comparative study of the working of the milk producers' co-operatives in the districts of Jalgaon and Kolhapur in this state.

The study reveals that the Kolhapur Milk Producers' Co-operative is more efficient and organised than the Jalgaon Milk Producers' Co-operative. Various problems faced by these milk co-operatives in their efficient functioning are discussed in the report. The issues such as milk procurement, procurement pricing, marketing of milk and the relation between the cost of production and the price of milk have also been discussed.

It is hoped that the findings of the study presented in this report will be useful to those who are interested in understanding the functioning of the milk co-operatives in Maharashtra, particularly to the policy-makers and the managers.

(1)

Gokhale Institute of
Politics and Economics,
(Deemed to be a University),
Pune 411004

D. C. Wadgaonkar
Director

February 26, 1996

PREFACE

Cooperatives as well as organised processing and marketing are relatively new to the Indian dairy economy. Until the dawn of independence, dairy production and trade were almost entirely in the household sector. In 1930 and 40s, there were isolated efforts towards forming cooperatives in many parts of India. The golden era of cooperative movement began after India had won freedom. The National Dairy Development Board was set up to make the ambitious project of dairy development a success. Besides this, the Operation Flood Project was taken up to balance the demand and supply of milk throughout the country and to help the rural people in making additional income. In Maharashtra, the Operation Flood Project was launched initially in Jalgaon and Kolhapur districts only. Subsequently, 19 more districts in the state were included for assistance. The progress of the Operation Flood Programme all over the state has been quite commendable. Before the implementation of the programme both the production as well as the per capita milk consumption was too low. The position at present has undergone a distinctive change. Apart from the increase of milk production and its per capita consumption a great number of village milk cooperative societies have come up. However, still the performance of many of the milk cooperatives in the state is dismal.

With the above background, the present study entitled 'Working of Milk Producers' Cooperatives in Maharashtra' was undertaken at the initiative of the Ministry of Agriculture, Government of India. It deals with the analysis - as to how the Operation Flood Programme i.e. replicating the ANAND model programme taken by the NDDB is achieved in the state.

The study has been divided into six chapters. The first chapter includes various national level policies and programmes on dairy development, status of dairy development in Maharashtra, rationale of the study, objectives of the investigation and methodology for the selection of the districts, villages and sample households. The second chapter examines the functioning of various milk cooperative unions in sample districts. It includes discussion on organisational growth, milk procurement and techno-economic performance of milk cooperative unions. Some background information on all the villages selected from sample districts and the primary milk cooperative societies situated therein is provided in the third chapter. As a prelude to the better understanding of the findings of the analysis of the household data, chapter four traces the major impact of milk cooperatives on beneficiary households. The fifth chapter revolves round a comparative performance of the sample cooperative milk unions and also identifies various problems faced by these unions and suggests various alternative strategies in remediation. Finally, chapter six contains summary and conclusion of the entire study.

In the conduct of the present investigation I had fruitful discussions with Shri K. D. Shah, Regional Dairy Development Officer, Pune; Dr. D. K. Toke, Manager (Animal Husbandry), JMPU; Shri P. A. Patil, Procurement Manager, KMPU; Dr. R. A. Patil, Procurement Manager, Shri Warna Sahakari Dudh Utpadak Prakriya Sangh Ltd., Kolhapur and also with the Managing Directors of the respective district level sample milk unions. I am thankful to all of them and their colleagues for their cooperation and facilities extended in the conduct of the present study. In particular, I am thankful to Shri Bangale and Shri Joshi, Dairy Development Officers of Jalgaon and Kolhapur districts, respectively for their keen interest in

the study and also to Dr. B. P. Patil, Assistant Procurement Manager, KMPU, who introduced us to the dairy officials of KMPU.

I am also grateful to the village officials of cooperative milk societies as well as farmers of the selected areas for their kind cooperation and hospitality during our field work.

I am greatly indebted to Professor D. C. Wadhwa, Director of our Institute for his keen interest in the study and providing all the necessary facilities in carrying out the present investigation. I wish to place my gratitude and indebtedness to Dr. R. S. Deshpande, Officiating Registrar of this Institute for his sincere guidance, exemplary suggestions and useful comments at all the stages of this study.

I hereby extend my hearty thanks to the field investigators, Shri S. S. Dete, Shri S. B. Kate and Shri V. G. Kasbe for their assistance during data collection and tabulation work.

It gives me great pleasure in extending my grateful thanks to all the members of the computer centre and in particular to Smt. A. A. Kher, Smt. A. A. Chandrachud and Shri M. M. Marathe who took pains in processing and analysing the data on the computer.

I will be failing in my duties if I do not express my sincere thanks to the typists, particularly to Shri S. K. Athale, Shri V. N. Inamdar, Smt. M. S. Marathe and Shri A. V. Moghe who did painstaking typing.

Gokhale Institute of
Politics and Economics,
(Deemed to be a University),
Pune 411004

Deepak Shah

February 1996

CONTENTS

	<u>Page</u>
FOREWORD	(1)
PREFACE	(11)
LIST OF TABLES	(xi)
ABBREVIATIONS	(xv)
ERRATA	(xvi)
<u>Chapter</u>	
I	
INTRODUCTION	1
1.1	2
Backdrop : Policies and Pro- grammes on Dairy Development	
1.2	6
Present Scenario of Dairy Cooperatives	
1.3	7
Anand Pattern and Functioning of the Model	
1.4	10
Dairy Development in Maharashtra	
1.5	19
Specification of the Problem	
1.6	23
Methodology	
1.6.1	23
Selection of Study Districts	
1.6.2	24
Selection of Talukas	
1.6.3	25
Selection of Villages and Milk Producers	
1.6.4	27
Reference Period and Data Requirement	
1.7	27
Status of Dairy and Livestock in the State	
1.7.1	28
Profile of the Livestock of the Districts	
II	
WORKING OF MILK PRODUCERS' COOPERATIVE UNIONS	31
2.1	31
Jalgaon District Co-operative Milk Producers' Union Limited (JMPU)	
2.1.1	32
Milk Procurement	
2.1.2	34
Extension Services	

<u>Chapter</u>		<u>Page</u>
2.1.3	Production and Marketing of Milk and Milk Products	36
2.1.4	Future Plan	39
2.1.5	The Policy Options	39
2.2	Chalisgaon Milk Scheme (CMS)	40
2.3	Kolhapur District Co-operative Milk Producers' Union Limited (KMPU)	42
2.3.1	Procurement Performance	45
2.3.2	Techno-economic Performance	46
2.3.3	Training Programme	50
2.3.4	Quality Assurance Programme	51
2.3.5	Marketing Performance	51
2.3.6	Future Plan	53
2.4	Shri. Warna Sahakari Duddh Utpadak Prakriya Sangh Ltd. (WMPU)	53
2.4.1	Stages of Development	54
2.4.2	Milk Procurement and Cattle Feed Sale	56
2.4.3	Marketing Strategy	58
2.4.4	Animal Husbandry Policy	62
2.4.5	Future Strategy	63
III	SAMPLE VILLAGES AND COOPERATIVE SOCIETIES	64
3.1	Village Profile	64
3.1.1	Neri Digar	64
3.1.2	Wakod	65
3.1.3	Pimple Khurd	66
3.1.4	Mangarul	66
3.1.5	Shedshal	67
3.1.6	Ganeshwadi	72
3.1.7	Ghotawade	74
3.1.8	Padasali	75

<u>Chapter</u>		<u>Page</u>
3.2	Milk Cooperative Societies	76
3.2.1	Sample Milk Cooperative Societies in Jalgaon District	77
3.2.1.1	Neri Digar Dudh Utpadak Sahakari Sanstha Maryadit, Neri Digar	77
3.2.1.2	Pramod Dudh Utpadak Sahakari Sanstha, Maryadit, Pimple Khurd	81
3.2.2	Sample Milk Cooperative Societies in Kolhapur District	82
3.2.2.1	Shetkari Sahakari Dudh Vyavasai Sanstha Maryadit, Shedshal	83
3.2.2.2	Shri Hanuman Sahakari Dudh Vyavasai Sanstha Maryadit, Ghotawade	87
3.2.2.3	Shri Swembhu Sahakari Dudh Vyavasai Sanstha Maryadit, Ghotawade	88
IV	IMPACT OF MILK CO-OPERATIVES ON SAMPLE PRODUCERS	91
4.1	Socio-Economic Profile of the Household	92
4.1.1	Family Size and Composition	92
4.1.2	Educational Status	93
4.1.3	Size of Land Holding and Herd Strength	95
4.1.4	Average Number of Animals Per Household	99
4.1.5	Order of Lactation	99
4.2	Productivity, Investment Pattern and Feeding Practices Followed	101
4.2.1	Average Milk Yield Per Animal	101
4.2.2	Average Milk Yield Per Milch Animal	108
4.2.3	Breeding Efficiency	109
4.2.4	Investment Pattern	111

<u>Chapter</u>		<u>Page</u>
4.2.5	Feeding Practices Followed	114
4.2.6	Farm Produced and Purchased Fodder	115
4.3	Milk Production Functions	120
4.3.1	Milk Production Functions in Jalgaon District	122
4.3.2	Milk Production Functions in Kolhapur District	125
4.4	Marketed Surplus of Milk	128
4.4.1	Market Structure	129
4.4.1.1	Price Structure for Buffalo Milk	132
4.4.1.2	Price Structure for Cow Milk	137
4.4.2	Impact of Milk Cooperatives on Production and Marketed Surplus of Milk in Summer Season	141
4.4.3	Impact of Milk Cooperatives on Production and Marketed Surplus of Milk in Rainy Season	145
4.4.4	Impact of Milk Cooperatives on Production and Marketed Surplus of Milk in Winter Season	147
4.4.5	Marketed Surplus Functions for Milk	149
4.4.5.1	Marketed Surplus Functions in Jalgaon District	150
4.4.5.2	Marketed Surplus Functions in Kolhapur District	152
4.5	Impact of Milk Co-operatives on Income and Employment Levels	155
4.5.1	Economics of Milch Animals	156
4.5.1.1	Income from Dairy Farming in Jalgaon District	156
4.5.1.2	Income from Dairy Farming in Kolhapur District	159

<u>Chapter</u>		<u>Page</u>
4.5.2	Human Labour Employment in Dairy Farming	161
4.6	Members Perception of the Working of Milk Co-operative Societies	163
4.6.1	Conditions and Reasons for Becoming a Member of the Society	164
4.6.2	Milch Animal Loans	167
4.6.3	Technical Inputs	168
4.6.4	Members' Suggestions for Smooth Functioning of the Society	170
4.6.5	Marketing of Milk	170
V	PERFORMANCE OF MILK CO-OPERATIVES AND ALTERNATIVE STRATEGIES	174
5.1	Season-wise Milk Procurement	174
5.2	Trend in Milk Procurement	178
5.3	Procurement Pricing	180
5.4	Technical Inputs	187
5.5	Growth and Instability	189
5.5.1	Growth and Instability in Milk Procurement	190
5.5.2	Growth and Instability in Certain Operational Indicators	195
5.6	Problems Faced by Milk Co-operative Societies in their Efficient Functioning	199
5.7	Obligations Towards Village Level Co-operatives	205
5.8	Obligations Towards Producer Members	206
5.9	Obligations Towards the State Federation	207
5.10	Hint for Self-Reliance	208
5.11	Performance Indicators which Need to Be Watched	209

<u>Chapter</u>		<u>Page</u>
VI	SUMMARY AND CONCLUSIONS	213
	6.1 Introduction	213
	6.2 Objectives and Methodology	215
	6.3 Working of Milk Co-operative Unions	216
	6.4 Impact of Milk Co-operatives on Sample Producers	220
	6.4.1 Family Size and Educational Status of Sample Households	220
	6.4.2 Composition of Cattle and Buffalo	220
	6.4.3 Productivity of Milch Animals	221
	6.4.4 Investment Pattern	221
	6.4.5 Feeding Practices Followed	221
	6.4.6 Milk Production Functions	222
	6.4.7 Market Structure	222
	6.4.8 Impact of Milk Co-operatives on Production and Marketed Surplus	223
	6.4.9 Impact of Milk Co-operatives on Employment	223
	6.4.10 Members Perception of the Working of Milk Co-operatives	223
	6.5 Comparative Performance of Milk Co-operatives and the Existing Lacunae in their Functioning	224
	BIBLIOGRAPHY	227

LIST OF TABLES

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
1.1	Expenditure on Animal Husbandry and Dairying under Five Year Plans	3
1.2	Achievements at the End of Phase I & II and Target for Phase III of Operation Flood Programme	5
1.3	Estimated Milk Production in Maharashtra (1985-86 to 1993-94)	11
1.4	Selected Statistics of Milk Supply Co-operative Societies	15
1.5	Regionwise Production and Procurement of Milk in Maharashtra (1991-92)	17
1.6	Livestock Population of Jalgaon and Kolhapur Districts and Maharashtra State (1987)	29
2.1	Procurement of Milk and Sale of Cattle Feed by Jalgaon District Co-operative Milk Union (1984-85 to 1993-94)	33
2.2	Progress of Jalgaon District Co-operative Milk Union Ltd. (1983-84 to 1993-94)	35
2.3	Production of Milk Products by Jalgaon District Co-operative Milk Union	37
2.4	Disposal Pattern of Fluid Milk by Jalgaon District Co-operative Milk Union (1990-91 to 1993-94)	38
2.5	Milk Procurement Under Chalisgaon Milk Scheme	41
2.6	Procurement of Milk and Production and Sale of Cattle Feed	45
2.7	Progress of Kolhapur District Co-operative Milk Union	47
2.8	Progress of Technical Inputs Supplied Through Kolhapur Milk Union	49
2.9	Personnel Trained Under Co-operative Development Programme at Kolhapur Milk Union	50
2.10	Production and Sale of Milk Products	52
2.11	Procurement of Milk and Sale of Cattle Feed	57
2.12	Quantity of Milk Sold in Various Markets	59

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
2.13	Progress of Sangh in Various Milk Products	61
3.1	Number of Households and Land Utilisation Pattern in Sample Villages of Jalgaon and Kolhapur Districts	68
3.2	Cropping Pattern in Sample Villages of Jalgaon and Kolhapur Districts (1993-94)	69
3.3	Composition of Bovines (1992 Census) in Sample Villages of Jalgaon and Kolhapur Districts	70
3.4	Selected Statistics of Sample Societies in Jalgaon District (1993-94)	80
3.5	Selected Statistics of Sample Societies in Kolhapur District (1993-94)	86
3.6	Progress of the Society from 1989-90 to 1993-94	89
4.1	Family Composition According to Sex, Age and Category of Milk Producers	94
4.2	Education Index of Head of the Household and Earning Family Members	96
4.3	Average Size of Land Holding and Total Herd Strength in Standard Animal Units (SAU)	97
4.4	Breedwise Average Number of Milch Animals Per Household in Jalgaon and Kolhapur Districts	100
4.5	Distribution of Animals According to Order of Lactation	102
4.6	Average Milk Yield Per Day Per Animal According to Breed, Season and Category - Jalgaon District	104
4.7	Average Milk Yield Per Day Per Animal According to Breed, Season and Category - Kolhapur District	106
4.8	Breeding Efficiency According to Breed and Household Category	110
4.9	Investment Pattern in Dairy Enterprise in Jalgaon and Kolhapur Districts	112
4.10	Seasonwise Average Daily Feed Intake in Jalgaon and Kolhapur Districts	116
4.11	Expenditure on Own and Purchased Fodder in Jalgaon and Kolhapur Districts	118

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
4.12	Regression Coefficients, Standard Errors and Coefficient of Multiple Determination in Milk Production for Local Buffaloes in Jalgaon District	124
4.13	Regression Coefficients, Standard Errors and Coefficient of Multiple Determination in Milk Production for Local Buffaloes in Kolhapur District	127
4.14	Percentage Share of Marketed Surplus of Milk by Different Agencies	131
4.15	Seasonwise Milk Prices Offered by Different Marketing Agencies for Buffalo Milk	134
4.16	Seasonwise Average Milk Prices Offered by Different Marketing Agencies for Cow Milk	139
4.17	Per Day Per Household Average Production and Marketed Surplus of Milk - Summer Season	143
4.18	Per Day Per Household Average Production and Marketed Surplus of Milk - Rainy Season	146
4.19	Per Day Per Household Average Production and Marketed Surplus of Milk - Winter Season	148
4.20	Marketed Surplus Functions for Milk - Jalgaon District	151
4.21	Marketed Surplus Functions for Milk - Kolhapur District	154
4.22	Annual Costs, Returns and Income According to Breed of Milch Animals - Jalgaon District	157
4.23	Annual Costs, Returns and Income According to Breed of Milch Animals - Kolhapur District	160
4.24	Seasonwise Human Labour Employment in Dairy Farming on the Sample Households	162
4.25	Family Labour Utilization in Dairy Farming on Sample Households	163
4.26	Members' Perception Regarding Conditions and Reasons for Becoming a Member of Milk Co-operative Society	165
4.27	Members' Response Regarding Milch Animal Loans and Technical Inputs Provided by the Society	167
4.28	Members' Suggestions Regarding Smooth Functioning of the Society	169
4.29	Members' Response Regarding Marketing of Milk	171

(xiv)

<u>Table No.</u>	<u>Title</u>	<u>Page No.</u>
5.1	Annual and Seasonal Milk Procurement by Jalgaon and Kolhapur District Co-operative Milk Union	176
5.2	Annual and Seasonal Variation in Milk Procurement by Jalgaon and Kolhapur District Co-operative Milk Union	179
5.3	Comparative Rates (Procurement Price) of Buffalo and Cow Milk for Jalgaon and Kolhapur District Co-operative Milk Unions	182
5.4	Annual and Seasonal Variations in Milk Prices in Jalgaon and Kolhapur Districts	184
5.5	Operational Indicators of Jalgaon and Kolhapur District Co-operative Milk Unions	188
5.6	Growth Rates and Instability Indices for Lean and Flush Season Milk Procurements by JDCMPU and KDCMPU	191
5.7	Computation of Typical Season Index for Milk Procurement - Jalgaon District Co-operative Milk Union (1986-87 to 1993-94)	193
5.8	Computation of Typical Seasonal Index for Milk Procurement - Kolhapur District Co-operative Milk Union (1986-87 to 1993-94)	194
5.9	Growth Rates and Instability Indices for Certain Operational Indicators of JDCMPU and KDCMPU	197

ABBREVIATIONS

JMPU	Jalgaon District Co-operative Milk Producers' Union
KMPU	Kolhapur District Co-operative Milk Producers' Union
CMS	Chalisgaon Milk Scheme
Sangh	Shri Warna Sahakari Dudh Utpadak Prakriya Sangh Ltd. at Warnanagar
NDDB	National Dairy Development Board
MRSDM	Maharashtra Rajya Sahakari Dudh Mahasangh Ltd.
AI	Artificial Insemination
OF	Operation Flood
FAO	Food and Agricultural Organisation
IRDP	Integrated Rural Development Programme
NPC	National Productivity Council
WB	White Butter
WMP	Whole Milk Powder
SMP	Skimmed Milk Powder
mlpd	million litres per day
AFC	Agricultural Finance Corporation
ARDC	Agricultural Refinance Development Corporation
Extension Area	Area Covered Under Milk Co-operative Infrastructure
Control Area	Area Not Covered Under Milk Co-operative Infrastructure

ERRATA

<u>Page</u>	<u>Line</u>	<u>For</u>	<u>Read</u>
7	12	operative	operation
44	4	convetional	conventional
56	6	1,47,000	14,700
120	31	breads	breeds
127	5	D ₃	D ₂
	(table heading content)		
164	17	behavious	behaviour
170	8	reluctan	reluctance
189	21	due the	due to
209	3	Agarwal (1984)	Agarwal (1994)

CHAPTER I
INTRODUCTION

Dairying is not an adjunct to the crop-mix of Indian farms but it is an integral part of the total farming system. Hence, treating dairy cattle as the backbone of the livestock wealth of our country would not be an exaggeration. However, compared to some of the exotic breeds the productivity of our livestock is still poor. Though crossbreeding programmes have brought some improvement in the productivity of our livestock, expected levels of productivity still remains a distant goal owing to the practice of traditional system of animal husbandry, which has deprived the crossbred animals the desired environment. Further, increase in the productivity through selective breeding, though safe and straight forward, is painfully slow. In contrast, crossbreeding of indigenous milch stock, with exotic breeds of cattle like Holstein-Fresian, Brown Swiss, Jersey, etc. from temperate countries, offers a much quicker process of increasing milk productivity and, thus, total milk production over a short period of time.

Our livestock is roughly half as efficient as the average milch animals in the world and probably only one-fifth as efficient as those in the advanced dairying countries. The milk grid in this country is based on the average produce of millions of small uninformed farmers who are still unaware of the modern scientific ways of dairy farming. This is perceived as a major handicap, as we are unable to attain the quality requirements to compete in the world market. Therefore, we should be looking for technologies which make our milk production system viable and sustainable to usher in an era of quality consciousness to make us compete internationally. The moot point to consider over here is, whether this is achievable with the

kind of animals and the resources that our millions of poor dairy farmers have at their disposal and how best we can ameliorate this situation.

1.1 Backdrop: Policies and Programmes on Dairy Development

The economic development of our country has been initiated through well conceived and framed economic plans. In this context, co-operatives have had a specific role. In the initial stages, these economic plans laid more emphasis on the credit aspect of co-operatives. But with the passage of time, functional areas such as Dairy, Piggery, Fishery, Marketing, Housing, etc., acquired greater significance and became more important and were accorded their rightful place in the overall scheme of cooperative movement. As such, the agro-based village level societies in India are economically weak, but it was observed that new avenues of rural income and employment could be generated by giving fillip to the concept of dairy co-operatives that not only increased milk production but also offered more remunerative price to the dairy farmers.

India's dairying scene has witnessed certain major changes in the last 15 years. Government outlay on developing the livestock sector rose dramatically from a mere Rs. 2,325 million in the Fifth Plan (1974-78) to a Sixth Plan (1980-85) total outlay of Rs. 8,025 million on animal husbandry and dairying, of which Rs. 4,363 million was meant for expenditure on dairying alone. During the Seventh Plan (1985-90), Rs. 4,935 million was earmarked out of total outlay of Rs. 11,346 million for animal husbandry and dairying (Table 1.1). Such increased allocations in plan outlays is a reflection of the importance of dairying in Government's overall policy encompassing country's agricultural economy.

The National Commission on Agriculture (1972) in their Interim Report on Milk Production recommended that benefits of

Table 1.1 : Expenditure on Animal Husbandry and Dairying under Five Year Plans

	(In million Rs.)		
	Total outlay on animal husbandry & dairying	Expenditure on dairying	Expenditure on dairying to total outlay (%)
First Plan (1951-56)	160.0	77.8	48.6
Second Plan (1956-61)	334.7	120.5	36.0
Third Plan (1961-66)	770.0	336.0	43.6
Annual Plan (1966-69)	597.0	257.0	43.1
Fourth Plan (1969-74)	1,542.6	787.5	51.1
Fifth Plan (1974-78)	2,324.6	540.3	23.2
Annual Plan (1978-79)	865.2	404.2	46.7
Annual Plan (1979-80)	1,222.5	753.7	61.7
Sixth Plan (1980-85)	8,025.1	4,362.9	54.4
Seventh Plan (1985-90)	11,346.2	4,934.5	43.5

Source : Dairy Farming in Asia, Asian Productivity Organisation Report, 1993.

increasing demand of milk in large cities, towns and industrial areas should go to small and marginal farmers and landless labourers. Efforts should be made to promote as much of milk production as possible involving this segment of rural population. The Commission suggested an integrated rural development approach based on a system of "Kaira District Cooperative Milk Producers' Union Limited", commonly known as "AMUL in ANAND" of Gujarat.¹

"Thus, in view of the several positive features in favour of cooperative sector and practical results shown by milk cooperatives, in Gujarat, it was finally decided by the

¹ Jain, M. M. (1979), "Dairy Development Through Co-operatives : A Study of Rajasthan," Indian Dairyman, Vol.31, p. 195.

Government of India to extend institutional support in order to industrialize and organize all the dairy efforts in entire rural India, through cooperatives."² In 1965, the National Dairy Development Board (NDDB) was set up in India. And, in 1970-71 it drew up an all encompassing programme known as "Operation Flood", to replicate the ANAND Pattern Dairy Co-operatives in 18 areas of the country with the assistance of World Food Programme (WFP), European Economic Community (EEC) countries, World Bank and other international support agencies. The main objective of the Operation Flood programme was to build a viable and self-sustaining national dairy industry on co-operative lines. Total systems approach was adopted for dairy development which encompassed production, procurement, processing and marketing of milk. The first phase of Operation Flood Programme covered the period July 1971 to March 1981; the second phase known as "Operation Flood II" covered the period April 1981 to March 1985. Currently, "Operation Flood III" programme is in operation.

Operation Flood III is based on the successful implementation of Operation Flood Phase I and Phase II programmes (Table 1.2). Phase I of the programme covered four metro cities, viz., Delhi, Bombay, Calcutta and Madras for marketing of milk by linking these metro centres with 18 hinterland milk sheds spread over 10 different provincial states.

Phase II of the programme was designed to capitalise on the good foundation provided by Operation Flood Phase I and IDA assisted dairy development programme in Karnataka, Rajasthan and Madhya Pradesh. Implementation of Phase II programme encompassed the Sixth Five Year Plan period. At the end of Phase II in March 1985, the scheme was in operation in

² Bedi, M. S. (1987), Dairy Development, Marketing and Economic Growth. New Delhi : Deep and Deep Publications, p. 10.

Table 1.2 : Achievements at the End of Phases I and II and Target for Phase III of Operation Flood Programme

Particulars	Phase I (March 1981)	Phase II (March 1985)	Phase III (March 1990)
Investment (Rs.million)	1,165.40	2,771.50	6,812.90
Village societies organised (in thousands)	13.27	34.52	50.00
Farmer families covered (lakhs)	17.50	36.30	80.00
Average milk procurement (mlpd)	2.66	7.33	12.22
Rural dairy plants mlpd-capacity	4.54	8.77	20.00
Rural dairy plants peak throughput	3.39	7.88	-
Urban milk marketing (mlpd)	2.99	4.95	12.42
Milk powder manufacturing capacity (MTD)	340.00	507.50	124.20
No. of milksheds	39.00	136.00	173.00

Note : mlpd = million litres per day

Source: Dairy Farming in Asia, Asian Productivity Organization Report, 1993.

136 milksheds of the country covering over 290 large, medium and small towns under organised milk marketing grid.

The investments made in Operation Flood Phase I and Phase II were of the order of Rs. 1,165.4 million and Rs. 2,771.7 million, respectively. As against this, the outlay proposed during the Phase III is of the order of Rs. 6,812.9 million. The achievements during the first two phases and targets for Phase III are presented in Table 1.2.

Phase III of Operation Flood, under implementation during the Seventh Five Year Plan period (1985-90), sought primarily to consolidate on the gains of extensive milk

procurement and marketing created during the Second Phase. It endeavoured to develop strong farmers' organisation controlled by member producers through their elected representatives at all the three tiers and manage their milk procurement to a peak level of 18.3 million litres collected from over 8 million milk producer families by 1990.³ Over 12 million litres of milk was proposed to be sold as fluid milk through urban markets during this Plan period. It also meant increasing the peak procurement by a whopping 132 per cent and increasing marketing of milk by about 148 per cent. Farmers were being paid Rs. 20,000 million annually for milk supplied through co-operative structure by 1990.

As marketing serves as the driving force to improve procurement and strengthen the commercial viability of the unions, greater emphasis has been placed on expanding marketing infrastructure in all the major markets linking them to milksheds through the National Milk Grid to ensure year-round stable milk supply. According to Atmaram (1988), as a part of the overall marketing strategy, the unions have to diversify and market a product mix best suited to the requirements of each market. Marketing indigenous milk products will form an important part of the overall marketing strategy to enable the cooperatives compete more effectively with the traditional trade.

1.2 Present Scenario of Dairy Cooperatives

At the end of 1993, some 65,300 Dairy Cooperative Societies (DCSs) were functioning in 170 milksheds in the country involving about 8.40 million farmer members. These cooperatives supply more than 3.5 million litres of milk every day to the four metropolitan cities and more than 5 million litres to some 500 cities in the country. The peak procurement of milk

³ Atmaram, K. (1993), "Present Status of Dairy Industry in India" Report of an Asian Productivity Organization, Tokyo, p. 249.

is 12 million litres per day during the winter season and average procurement is 9.8 million litres per day. Although the number of dairy co-operatives has risen to 65,300, many of the milk co-operatives are financially not very healthy. Many State Dairy Federations like those in Andhra Pradesh, Uttar Pradesh and Karnataka are incurring losses. In Gujarat, only 5 cooperatives out of 70 are making profit. In Maharashtra, out of 96 cooperatives only 25 are viable. To make the co-operatives efficient, economically viable and free from bureaucratic and political interference, there is a need to change the cooperative laws (Singhal, 1995).

1.3 Anand Pattern and Functioning of the Model.

The core concept behind the Operative Flood programme was the "Anand Pattern". Under the pattern, a primary cooperative society is formed at the village level based on the bye-laws which insulate the society from the undue interference of those unscrupulous elements who are not directly connected or concerned with either the development of the society or milk producers, but are out and out mainly interested in dominating the society to further their own vested ends. Anand pattern of dairy co-operatives have a unique position. They are based on six cooperative principles, viz., (1) voluntary membership, (2) democratic decision making, (3) limited interest on share capital, (4) equitable distribution of surplus, (5) cooperative education, and (6) mutual cooperation. Their functional dimensions encompass not only the economic but the social and moral obligations towards their members. A typical Anand pattern dairy cooperative structure has three tiers of well structured organization with a milk producer constituting the smallest unit of the entire business enterprise. The three tiers are : the village level dairy cooperative society federating producer members; the district level cooperative

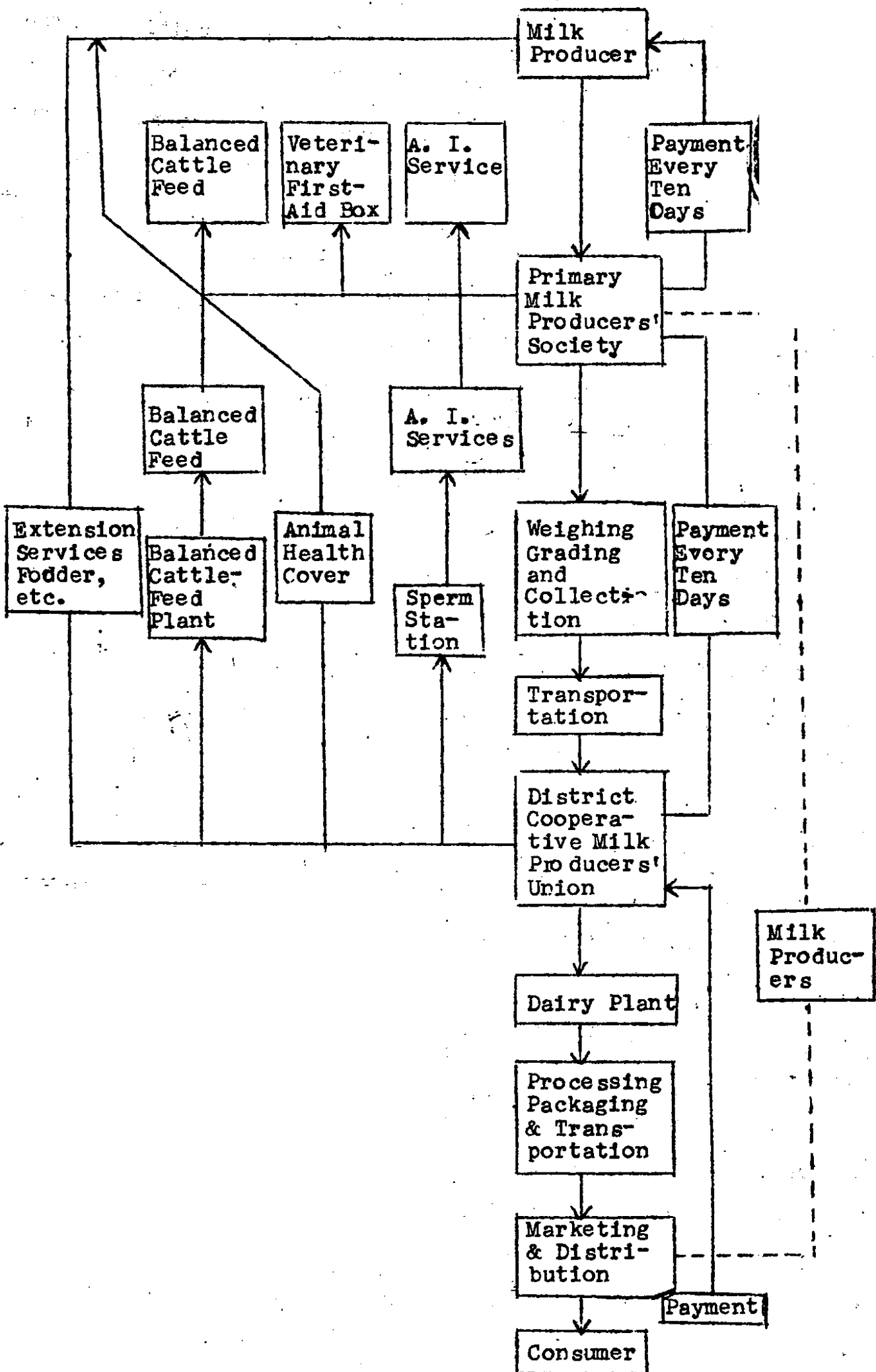
milk producers' union, federating the village societies; and the state level federation constituting of all the district level unions. Of the three tiers, the district dairy cooperative union is the most active unit because it owns the physical infrastructure required for milk procurement, processing and manufacturing of milk products and for generating inputs required for increasing milk production. The union integrates milk production, procurement and processing and undertakes marketing either independently or with the help of its apex federation. The union is the kingpin of the entire business, which should be managed in accordance with strict commercial principles, be financially viable and self-reliant.

The whole functioning of the 'Anand model' may be schematically presented by the chart (see overleaf).

A union's obligation towards its milk producer-members is to purchase entire quantity of milk they offer to sell, and for that not only to pay a guaranteed price for the milk purchased but also to pay a dividend for their shares in accordance with the bye-laws. The payment to the milk producers for milk is strictly on the basis of quality as determined by the 'Fat test'. The society in turn is paid on the basis of Fat and solids not Fat. The dairy plant owned and operated by the Union helps the Society to procure and accept the milk in flush and lean seasons, thereby providing an assured year-round remunerative market for the milk.

With a view to help the milk producers to increase milk production, the Society or Union provides technical inputs like Veterinary First-Aid, Artificial Insemination and balanced cattle feed on a no-profit-no-loss basis. Balanced cattle feed is sold to the milk producers through the village cooperatives at 20 to 30 per cent less than the market prices of conventional cattle feeds. The dissemination of the knowledge and

COOPERATIVE MILK PRODUCERS ORGANIZATION OF ANAND PATTERN



Source: Modified on the basis of Bandyopadhyay, M. K. (1994), "Dairy Co-operative and Rural Development in India", Uppal Publishing House, New Delhi.

education of improved animal husbandry practices are provided through a strong extension network.

Besides, the concurrent and continuous auditing of the primary societies and the Union constitutes one of the major factors of the overall success story of the system. The constant watch on the working of the cooperative functioning, either through the Union's supervisory staff or by the departmental audit team, helps to instil confidence in the mind of producers that the funds of their organisation are properly utilised.

1.4 Dairy Development in Maharashtra

In Maharashtra, owing to its vast employment potential, animal husbandry/livestock rearing plays a prominent role in the rural economy in supplementing the family income particularly for the low income-landless families and small and marginal farmers. According to 1987 Livestock Census, the milch bovine population which form the base for dairy development in the State of Maharashtra was 84.52 lakhs, of which 61 per cent were cattle. In the Livestock Census of 1972, the milch bovine population was 63.73 lakhs. Thus, in the fifteen years period there was an increase of 32.62 per cent in the milch bovine population in the State. A significant growth in total milk production in the State was observed during last two decades. The State's share in the national milk production increased moderately from 5 per cent in 1971-72 to 7 per cent in the year 1992-93. However, it is remarkable to note that the per capita per day milk availability showed a substantial increase from 64 gms to 142 gms during the same period, though it still remained well below the national average of 186 gms per capita per day. Further, with the advent of time the estimated milk production through all the species and breeds of animals has also undergone a marked change in Maharashtra. The total milk

production in 1970-71 according to the estimates of Department of Animal Husbandry, Government of Maharashtra was 11.86 lakh tonnes. This increased to 15.06 lakh tonnes during 1979-80. By the mid-eighties, the total milk production rose to 24.67 lakh tonnes which further increased to 42.50 lakh tonnes by 1993-94. Thus, last two decades have registered nearly four-fold increase in annual milk production in Maharashtra. The bulk of this increase is contributed by crossbred cows and buffaloes. While the share of crossbred cows in total milk production is continuously increasing (Table 1.3), a declining trend could be observed in the case of milk production through indigenous cows, buffaloes and goats. Dairy cooperative movement in the State has contributed in no small measure towards this substantial increase in milk production and there cannot be two opinions about it.

Table 1.3 : Estimated Milk Production in Maharashtra
(1985-86 to 1993-94)

Year	(In lakh tonnes)				
	Indigenous/ N.D.cows	Cross- bred cows	Buffaloes	Goats	Total
1985-86	7.26 (29.43)	3.33 (13.50)	12.58 (50.99)	1.50 (6.08)	24.67
1990-91	10.02 (26.82)	8.62 (23.07)	16.80 (44.97)	1.92 (5.14)	37.36
1993-94	10.26 (24.14)	10.87 (25.58)	19.35 (45.53)	2.02 (4.75)	42.50

Source : Directorate of Animal Husbandry, Government of Maharashtra, Pune.

Note: Figures in parentheses are percentages to total production.

The cooperative movement in Maharashtra has played a significant role in the social and economic development of the State, particularly in the rural areas. Initially, this movement was confined mainly to the field of agricultural credit. Later it rapidly spread to other fields like agro-processing,

agro-marketing, rural industries, consumer stores, agro services, etc. Dairy related cooperative movement started taking roots in Maharashtra as early as the late 1950s.

For historical reasons, the organisation of production and marketing of milk in Maharashtra is different from rest of the states of the country. In 1947, the State Government for its urban consumers of Bombay started a Milk Scheme to supply them with milk at a reasonable rate. Subsequently, demand for such organised supply of milk grew in other urban centres, too. To meet this ever-growing demand for milk and milk products, various policies and programmes were launched in the State to further accelerate milk production. The Government established a Dairy Development Department in 1958 to promote dairying as a supplementary occupation and to bring incremental income to the farmers, particularly in backward areas. Subsequently, the Primary Milk Producers' Cooperative Societies came into existence in Maharashtra. Their main objective was to provide various services to the member farmers which include, besides collection and marketing of milk, organising inputs and providing veterinary services such as cross-breeding of cows and grading local breeds of buffaloes with Mehsana breeds by Artificial Insemination (AI) and the provision of credit on concessional terms. In due course, the Government had undertaken a number of milk schemes for procurement, processing and marketing of milk. A three-tier system of dairy development based on ANAND Pattern of dairy cooperative structure was adopted in the State. It included the village societies, the Union of the village societies and the State Milk Marketing Federation. At the village level, there were Milk Cooperatives with milk producers as their members. At the taluka or district level, there ^{were} Milk Cooperative Unions with milk cooperative societies as their members. The district level Unions were federated into

Maharashtra Rajya Sahakari Dugdh Mahasangh (Mahasangh), which was established in 1967. Although it remained dormant for quite a long time, it was revived in 1983. The milk producers and their cooperatives, disillusioned by the failure of the Mahasangh to protect their interests, later formed their own forum, viz., Maharashtra Rajya Dugdh Utpadak Sangh; this came into being only a few years ago to voice their genuine concerns and to agitate on issues such as remunerative price for their produce.

An ambitious programme known as "Operation Flood (OF)" was launched in the State in 1970-71. Its main objective was to build a viable and self-sustaining dairy industry on cooperative lines. In the beginning, the 'OF-I' was launched in Jalgaon and Kolhapur districts only. However, under 'OF-II', 19 more districts in the State were selected for assistance. By August 1983, the National Dairy Development Board (NDDB) had prepared a perspective plan for dairy development in the State and could work out sub-project details for 10 Unions. The Indian Dairy Corporation (IDC) approved in April 1984 a sum of Rs. 90.67 crores for the State under 'OF-II'. It was envisaged under OF-II, among other things, (a) that Government should liquidate the Taluka Dairy Cooperatives or permit them to merge into the District Dairy Cooperatives, (b) to transfer the dairies and chilling plants under its scheme to the District Dairy Cooperatives, and (c) that the Mahasangh would market milk and milk products outside the jurisdiction of the Dairy cooperatives.

The Government, vide its Resolution dated March 6, 1986, declared its policy regarding cooperativisation. However, due to strong opposition from some of the MLAs and Trade Union activist employees of the Milk Scheme, the Government had to appoint a committee to evaluate the programme of OF in

Maharashtra. It was observed that some of the private dairies were more successful than the existing dairy cooperatives. As a matter of fact, the success or failure of a cooperative was found to be closely intertwined with the level of procurement of milk, plant utilisation, terms and conditions of finance, nearness to urban market, and the role of the Government as well as the management in running these cooperatives on efficient lines.

In Maharashtra, while some of the milk cooperative societies have shown magnificent results and are really functioning on profitable lines, there are scores of others beset with managerial problems leading to forced closures. These failures could be attributed to such economic factors as differential price structure and also to some non-economic factors like the internal politics of cooperative unions and the apathetic attitude of the management towards the members' welfare. Although around 25 per cent of milk cooperative societies are running in loss in the State, yet the societies in profit are much higher than societies in loss. Progress of the milk cooperative societies in Maharashtra in terms of some broad quantitative parameters over last three decades is provided in Table 1.4. A steady increase in total number of milk cooperative societies was observed from seventies onwards. The number of primary societies affiliated to the union has increased from 2,021 during 1970-71 to 12,969 by 1988-89, thus, registering an increase of a whopping 542 per cent during the last 20 years. Similarly, producer members have increased from about 126 thousand during 1970-71 to about 1186 thousand by 1988-89, an increase of 841 per cent which is much higher than the rate of growth in the number of primary societies. Milk procurement, milk sales, owned funds and working capital have also followed a similar trend. The proportion of societies in profit to

Table 1.4 : Selected Statistics of Milk Supply Cooperative Societies

Year	Societies (No.)	Member- ship (000)	Owned funds	Working capital	Value of milk pro- cured	Value of milk and milk pro- ducts sold	(Rs. in lakhs)	
							Percent of societies in profit	Percent of societies in loss
1960-61	431	16	12	26	67	69	36.19	30.86
1970-71	2021	126	76	314	310	841	41.22	34.19
1975-76	3722	296	209	730	3242	3539	57.17	23.24
1980-81	7819	703	598	1992	8531	9132	52.32	25.87
1988-89	12969	1186	5543	18137	50720	57227	48.12	23.38

Source : Commissioner for Cooperation and Registrar, Cooperative Societies, Government of Maharashtra, Pune.

total number of societies showed a declining trend from 1975-76 to 1988-89. On the other hand, the societies in loss remained almost constant during this period (around 23 per cent). Further, if we look into the latest development in dairy co-operative sector, the observations are quite encouraging. The total value of sale of milk and milk products being marketed by dairy societies and unions during the year 1993-94 was of the order of Rs. 536 crore and Rs. 793 crore, respectively as against Rs. 523 crore and Rs. 692 crore, respectively during 1992-93. The average daily collection of milk by Government and cooperative dairies (excluding Greater Bombay) during 1994-95 (April 1994 to December 1994) was 30.2 lakh litres which was higher than 28.46 lakh litres for the corresponding period of 1993-94. Despite these facts, there are vast regional imbalances in terms of production and procurement of milk. It is really surprising that only a couple of regions in the State are contributing to more than 50 per cent of the total milk production in the State and the procurement of milk by organised structure in these regions is more than 80 per cent of the State total. This is a reflection of the efficacy and the inefficiency of a large number of dairy cooperatives functioning in other regions of the State. As pointed out earlier poor procurement of milk is mainly due to differential price structure and mismanagement of cooperatives in most of the districts of the State. Production and procurement figures for milk during 1991-92 in various regions of the State are presented in Table 1.5.

An overall analysis in relation to comparative position of different regions discloses that the Nashik and the Pune regions of Maharashtra are far ahead of other regions, specially with respect to organisation of village milk co-operative societies, annual average milk production and procurement. These two regions produce more than 50 per cent of

Table 1.5 : Regionwise Production and Procurement of Milk in Maharashtra (1991-92)

Region	Dis- trict union	(Milk in lakh litres)				
		Annual milk produc- tion	No.of@ primary milk socie- ties	Annual milk pro- cure- ment	Procure- ment per milk society	Procure- ment to produc- tion (%)
Konkan	5	4901.22 (12.39)	477 (3.81)	64.49 (0.72)	0.14	1.32
Nashik	22	8386.70 (21.21)	3167 (25.31)	2593.21 (29.02)	0.82	30.92
Pune	22	12748.59 (32.24)	4098 (32.75)	4866.06 (54.45)	1.19	38.17
Aurangabad	16	7813.62 (19.76)	2555 (20.42)	915.19 (10.24)	0.36	11.71
Amravati	6	3210.08 (8.12)	1415 (11.31)	139.14 (1.56)	0.10	4.33
Nagpur	7	2485.03 (6.28)	801 (6.40)	358.51 (4.01)	0.45	14.43
State total	78	39545.24 (100.00)	12513 (100.00)	8936.70 (100.00)	0.71	22.60

Figures in parentheses are percentages to the State total.

@ Regionwise number of primary societies are for the period 1989-90.

Source : i) Maharashtra Dudh Viyavasaya Antarang (1992), Dairy Publication, Bombay.

ii) Directorate of Animal Husbandry, Government of Maharashtra, Pune.

total milk in the State. Around 58 per cent of primary milk cooperative societies are in these regions. However, the share of these regions in total milk procurement is more than 80 per cent. These two are the most progressive dairying regions of the State. At the same time it cannot be denied that, so far as the number of district unions, number of milk societies and total milk production are concerned, Aurangabad region is not far behind. The total milk production in Aurangabad region

is almost equal to that of Nashik region. However, annual milk procurement as well as proportion of procurement of milk in relation to production figures are very less in this region. Other regions have still a lot of catching up to do in terms of dairy-development. On the whole, the organised sector in the State handles about 23 per cent of the total milk output which is reasonably an encouraging achievement as it is much higher than the national average of around only 12 per cent.⁴

Though the average quantity of milk handled by organised sector in the State is quite appreciable, thanks mainly to the contributions of Pune and Nashik regions alone, by and large the contribution of other regions is rather dismal. It seems the unorganised sectors are more dominant than cooperative set up in rest of the regions. The success story behind these private run dairies may revolve around better management practices being followed by them. As a matter of fact, the decentralised procurement structure of private dairies based on a network of independent economic factors tied to each other through a system of formal and informal contracts gives them some critical economic and logistic advantages; for example, they do not have to worry about managing the procurement structure as the Unions have to, also they do not have to guarantee acceptance of all milk being offered by producers or vendors, they also do not bother about the quality as milk procured by them through a network of vendors is seldom tested for quality, the factory pays them only on the basis of fat and SNF tests and they are quite contented with it. Add to this the advantage of flexibility in pricing and in business policy enjoyed by private dairies, the reasons for their superiority become more

⁴ Thompkinson, D. K. (1995), "Dairy Industry in India - A Scenario", Indian Food Industry, March-April 1995, Vol. 14(2) : 18-22.

discernible. Private operators not only spend little on inputs and not only their overheads, thus, very low, their credit based tie-ups with milk supply contractors and producers are also heavily weighed in their favour and, hence, highly beneficial to them.⁵

As pointed out earlier, there are inter- and intra-regional variations in production and procurement of milk. Even within the same region, some district unions may be working nicely while others could be on the verge of collapse due to multiplicity of various interactive internal and external problems. It is too early to arrive at any concrete conclusion regarding the efficacy of dairy cooperatives unless the whole of cooperative set-up in the State is carefully studied and analysed. Such studies would provide guidelines to the State dairy cooperatives regarding better short- and long-run decisions on investment and planning. The various areas which should command attention in the functioning of cooperatives are: production, procurement and marketing of milk, disbursement of loan for the purchase of various inputs as well as milch animals to the members, price structure being followed by the cooperatives as well as the unorganised marketing agencies, etc. Further, the reasons for the predominancy of private traders in certain regions and areas should be found out. Above facts make such a study on the working of milk producers' cooperatives in Maharashtra a truly worthwhile exercise.

1.5 Specification of the Problem

Rural household in a typical village community in India exhibits great heterogeneity in socio-economic characteristics. Many interacting factors - economic, sociological and cultural -

⁵ Shah, Tushar, Vishwa Ballabh, Pratima B. and Jayesh Talati (1995), "Institutional Structures for Dairy Development: India's Post-Independence Experience," Indian Dairyman, Vol. 47(1) : 1-36.

influence the farmer's decision making process to accept a particular production system. These factors may either operate favourably or stand as a formidable constraint in the acceptance of a new technology or a system. The success of the dairy enterprise depends upon the infrastructure of milk cooperatives and successful marketing of milk and milk products by dairy cooperatives. If dairy enterprise is to achieve success at the farmer's level, it is essential to provide facilities for marketing of milk through the cooperatives. Additional inputs provided by cooperatives would induce the farmers to produce more. Increase in milk production per animal brings in its wake financial viability in cattle keeping for the dairy farmers. Thus, the socio-economic characteristics of cattle keeping have a profound influence on the decision making process and profitability of any dairy enterprise. Moreover, the knowledge of socio-economic profile and resource availability of the cattle keepers is also essential for proper planning of scarce resources available for profitable dairying.

Milk production is done largely by small unorganised farmers who have neither the knowledge nor the appreciation of the concept of production costs which might help them to assess the viability of such activities. These producers are totally unaware of the quantitative aspects of the operations or the dimensions of production economics. Whatever price the largely subsistence producers get for milk is essentially supplementary income for them. With dairying becoming an organised activity under the cooperative sector and with dairying being looked upon as a tool of economic development, the producer may now like to know whether he is getting the type of returns from the milk as can best be expected. Profits count, and though the inputs are primarily in the shape of agricultural by-products, some of them are bought so as to ensure that this activity

remains productive and remunerative. Today's farmer wants his investment on dairying to be a worthwhile exercise and, hence, is more concerned about the kinds of returns that such an investment may fetch him. Further, as the cost of milk production varies under different conditions, a close analysis and scrutiny of some of the influencing factors becomes an imperative need. Studies should, therefore, be undertaken to determine the input-output relationships in milk production so as to develop an understanding of the complex process of milk secretion as it is linked with a feed formulation constituting of roughages and coarse grains. It is also necessary to optimise the allocation of these scarce resources for their efficient use in milk production. This necessitated the study of determining the input-output relationships in milk production from different breeds of bovines as well as with respect to different categories of cattle keepers.

In today's scenario, the marketing strength of an organisation spells the difference between success and failure. In the absence of good marketing network, larger quantity of surplus milk produced in the village in a flush season is either consumed at home or is partly sold to milk vendors at unremunerative low price. Thus, there is actual shrinkage in marketed surplus due to high propensity of consuming milk at the production point. Therefore, for the development of dairy industry in the country, improvement in the marketing mechanism of milk is a must. The stranglehold and vice like grip of milk vendors and halwais (traditional sweetmeat makers) on the milk marketing should be weakened by ensuring a more profitable dairying enterprise for the farmers. In many areas and States this has been done by establishing and encouraging formation of milk producers' cooperatives, affiliated to either Government or private institutions. Further, for the process of

economic development to become viable, it is necessary that the marketed surplus increases with increasing production volumes. This inter alia lays emphasis on the need to adjust supply and demand through orderly marketing in order to avoid undue price fluctuations. And, to achieve this goal, it is necessary to ascertain the determinants of marketed surplus of milk that would help policy makers in formulating policies for increasing the marketed surplus through establishment of efficient marketing systems. There is dearth of empirical evidence on the determinants of marketed surplus of milk. The present study was, therefore, conducted to test the hypotheses that 'Organized institutions' engaged in the marketing of milk have benefited the milk producers and contributed significantly towards increasing milk supply.

Cooperatives' primary impact occurs through the powerful 'pull' they impart to transform a subsistence dairy enterprise into one with a definite market orientation by ensuring and providing stable, remunerative, year-round market for milk. However, it is to be taken note of that a large number of dairy cooperatives in India have failed to create such a strong niche impact. Merely because an enterprise is called a cooperative, it does not follow that it will produce all the desired benefits associated with cooperatives. However, when such a cooperative enterprise is managed well as private dairies are, a producer cooperative will pass on much large economic benefits to producer farmers. Thus, the present study envisages to provide suggestions and recommendations based on the author's experience and the conditions prevailing in cooperative and non-cooperative areas for avoiding unviable situations and for improving and sustaining viability.

More specifically, the present investigation was conducted keeping in view the following major objectives:

1) To study the resource structure, milk productivity and production pattern for different categories of households.

2) To estimate the contribution of various factors in milk production in cooperative and non-cooperative areas.

3) To examine the factors affecting marketed surplus of milk for different categories of households.

4) To suggest the ways and means to improve the operational efficiency of various milk cooperatives in the State.

The first part has generated the resource structure as well as production, consumption and marketed surplus of milk for various categories of milk producers. It also concerns the proportion of milk handled and the price structure followed by cooperative and non-cooperative areas. In the next part, various factors influencing the milk production and the marketed surplus have been studied. Finally, various means and procedures have been suggested for improving the operational efficiency of various milk cooperative systems operating in Maharashtra State.

1.6 Methodology

1.6.1 Selection of Study Districts

Due to time and labour constraints, it was decided to conduct and confine the investigation to only two districts of Maharashtra. The selection of districts was based on certain parameters such as productivity of foodgrains, irrigation potential, cropping intensity, livestock density, number of milk producers' cooperatives, literacy rate, etc., in each district of the State. Appropriate weights were assigned to each of the above-mentioned variables in order to arrive at and calculate standard score and after adding up all the scores, total score was calculated for each district. Thus, all the 30 districts of the State were ranked in accordance of their respective total scores. Only districts scoring high on this scale

of total scores were selected for this study. Jalgaon and Kolhapur districts showing the highest score were, thus, finally selected for investigation. Moreover, these two districts were initially covered under Operation Flood I programme in the State. The State government created dairying facilities at Jalgaon district in 1973 and at Kolhapur district in 1979. Further, Jalgaon and Kolhapur districts fall under Nashik and Pune Divisions, respectively, which are by far the most prosperous dairying divisions of the State. As mentioned earlier, these two divisions together account for more than 50 per cent of the State's total milk production as well as procurement of milk by organised sectors. This goes to reflect the increasing importance of these two divisions of the state in matter of sustainable dairying.

1.6.2 Selection of Talukas

As regards the selection of talukas, it was reported by the officials of Jalgaon Cooperative Milk Union that the Union normally classifies the talukas as eastern and western depending on whether they fall east or west of Jalgaon. Further, it was found that most of the primary milk cooperative societies of the Union in the eastern part of the district had a strong network of 'Anand' pattern of milk collection. On the other hand, in the western part of the district, such facilities were totally absent. Therefore, it was decided to select one taluka from eastern part and another from western part of the district. The procedure for the selection of talukas was similar as that of selection of the districts in the State. However, the parameters considered in the selection of talukas were a little different and encompassed variables such as area under food-grains, total livestock population, number of milk producers' cooperative societies, literacy rate and cropping intensity in each taluka of the district. Total scores were calculated after

assigning appropriate weights to the above variables and finally Jamner Taluka was selected from the eastern part and Amalner Taluka from the western part of the district. The selection of talukas in Kolhapur district also followed similar procedural lines. However, it was pertinent to observe that almost all the primary milk cooperative societies in Kolhapur district were following the 'Anand' pattern of milk collection. Using the same procedure as followed in the selection of talukas in Jalgaon district, Radhanagari Taluka from eastern part and Shirol Taluka from western part were selected for study in the Kolhapur district. Thus, two talukas each from Jalgaon and Kolhapur districts were finally selected for this investigation.

1.6.3 Selection of Villages and Milk Producers

Stratified random sampling procedure was adopted for the selection of villages and milk producers. Within each selected taluka, the villages were stratified into two strata, namely, villages covered under the umbrella of milk cooperative infrastructure encompassing the district cooperative milk union and those not covered by such organised milk marketing infrastructure. Selection of villagers within each strata formed the third stage of selection. One village falling under the purview of cooperative infrastructure and another village, not covered by it i.e. non-cooperative village, was selected randomly from each of the selected taluka. Thus, four villages were selected from each district, 2 villages under milk cooperatives with adequate market infrastructure (having marketing facilities provided by cooperative) and another 2 non-cooperative villages with inadequate market infrastructure. In all, the study covered 8 villages, 4 from Jalgaon and another 4 from Kolhapur districts.

A list of milk producer households in selected villages along with their herd size (Buffalo + Cow) was obtained from

the respective taluka level Panchayat Samity (Animal Husbandry Section)/Gram Panchayat/Milk Cooperative Society. The households were then categorised as small (1-2 milch bovines), medium (3-4 milch bovines) and large (5 and above milch bovines) milk producers based on herd strength using cumulative frequency square-root technique.⁶ Fifteen milk producers were selected from each of the selected village, keeping in view the constraint of the investigators in collecting the information from the selected household single-handedly. The households to be selected from each village were distributed to the three categories, namely, small, medium and large, in proportion to the number of households in each category, subject to the condition that minimum two households are included in each category. Further, the households selected in villages covered under milk cooperative infrastructure were those which were also members of the milk cooperative society in the village. Although the restriction of selection of a minimum two households in each category from each of the selected village was imposed, yet in Ghotawade village of Radhanagari Taluka in Kolhapur district, only one large farmer could qualify to be selected for the study. The minimum number of households to be included in each category was determined on the basis of the minimum number of observations needed for functional analysis. Thus, a sample of 30 households was selected from villages which were under the purview of milk cooperatives and another 30 households from non-cooperative villages. In all, one hundred and twenty households were covered by the study, 60 from Jalgaon and another 60 from Kolhapur districts.

⁶ For details see: T. Dalenius and Jr. J. C. Hodges (1950), "The Problem of Optimum Stratification," J. American Statistical Association, 88-101.

1.6.4 Reference Period and Data Requirement

Primary data from the sample households under study were collected for the last preceding one year by personal interview method during the period January-March, 1995.

In addition to the collection of above information, secondary data related to talukawise production of milk and procurement of milk by the district cooperative milk union, their price structure, inputs, loans and veterinary facilities provided by union/societies to their members were also collected from various offices.

1.7 Status of Dairy and Livestock in the State

The state is on an ascending path in milk production and was rated 11th in total milk production in the country as early as 1986-87. The state currently occupies a much higher position in total milk production owing to sustained and concerted efforts towards total dairy development in the state. During 1990-91, it had even crossed the milk production figures of Gujarat State. In 1986-87, when Maharashtra's position was 11th in the country in terms of milk production, Gujarat occupied 5th position in this order of merit. The state started taking quantum leaps in milk production from 1987-88 onwards when state's milk production was rated at 2.66 million tonnes. Over the last 6-7 years, the state has progressed by leaps and bounds in its milk production. The credit for this healthy scenario must surely go to the various developmental projects which have been undertaken in the state to give a fillip to agriculture and dairy development. The state's dairy federation (Maharashtra Rajya Sahakari Duddh Mahasangh) which was established in 1967, provides proper infrastructure for production, processing, marketing and distribution of milk in the state. The efforts of the state federation are further supplemented by district level milk unions. A large part of

the state is also covered under Operation Flood Programme of National Dairy Development Board which stands to increase milk production and lend marketing facilities through Anand Pattern of Milk Cooperatives. In view of the multidimensional efforts to increase production, procurement, processing and marketing of milk in the state, it was thought appropriate to undertake a study on the working of milk producers' cooperatives in Maharashtra. Jalgaon and Kolhapur being important dairying districts of the state, the study was specifically undertaken in these two districts of the state. The livestock profile of districts is presented below.

1.7.1 Profile of the Livestock of the Districts

Both the sample districts are endowed with good livestock as well as bovine wealth which is an indicator of the advanced state of dairying activity in the region. Bovine stock accounted for two thirds of the total livestock population in each of the sample districts. Buffaloes constituted the major milch animals in Kolhapur district. However, in Jalgaon district, the emphasis was more on cattle rearing. The total livestock population for the Jalgaon and Kolhapur districts was of the order of 1,470 thousand and 1,075 thousand respectively, as against a livestock population of 34,228 thousand for the state as a whole. Thus, Jalgaon and Kolhapur had 4.29 per cent and 3.14 per cent of the total livestock population of the state (Table 1.6). As regards bovine population, the respective sample districts contained 4.50 per cent and 3.45 per cent of the state's bovine population. For a dairy man breedable bovine population is more important compared to total bovine population. Thus, taking into account the female population of over 3 years and 50 per cent of the young stock (below 3 years of age) together as breedable bovine population, there were 547 thousand breedable bovines in Jalgaon and 476 thousand in

Kolhapur district as compared to a similar population of 11,612 thousand for the state. The Jalgaon and Kolhapur districts accounted for 4.71 per cent and 4.10 per cent of the total breedable bovines in the state.

Table 1.6 : Livestock Population of Jalgaon and Kolhapur Districts and Maharashtra State (1987)

Particulars	(In hundred)					
	Jalgaon district		Kolhapur district		Maharashtra State	
	Number	Percentage	Number	Percentage	Number	Percentage
<u>Cattle</u>						
Male above 3 years	2875	19.56	1506	14.01	66878	19.54
Female above 3 years	2205	15.00	749	6.97	57355	16.76
Young stock	1748	11.90	469	4.36	45538	13.30
Total cattle	6828	46.46	2724	25.34	169771	49.60
<u>Buffalo</u>						
Male above 3 years	52	0.35	332	3.09	3559	1.04
Female above 3 years	1878	12.78	3108	28.92	28084	8.21
Young stock	1026	6.98	1328	12.35	15821	4.62
Total buffalo	2956	20.11	4768	44.36	47464	13.87
Total bovine stock	9784	66.57	7492	69.70	217235	63.47
Total live-stock population	14698	100.00	10748	100.00	342285	100.00

Source : Statistical Abstract of Maharashtra State (1987-88), Directorate of Economics and Statistics, Government of Maharashtra, Bombay, pp. 334-337, (Published in 1993).

Cattle and buffaloes constituted 56.29 per cent and 43.71 per cent of the total bovine population in the Jalgaon district. The respective figures for cattle and buffaloes among breedable bovines for Kolhapur district were of the order of 20.68 per cent and 79.32 per cent of the total population. However, the state showed predominance of cattle (69.00 per cent) over buffaloes (31.00 per cent) in its breedable bovine population.

The density of bovine population was 1.21 per hectare in Jalgaon and 1.85 per hectare in Kolhapur district as against 1.21 per hectare in the state. The number of breedable bovine population was 17.16 per '100' population in Jalgaon and 15.90 per '100' population in Kolhapur district compared to 14.70 for the state as a whole.

The above statistics clearly draws us closer to the fact that milk production was one of the important income generation activities in the two sample districts surveyed in this study.

CHAPTER II

WORKING OF MILK PRODUCERS' COOPERATIVE UNIONS

The progressive farmers with positive leaning towards emerging innovative technologies and scientific farm management technique hold immense potential for boosting milk production. Today the state is witnessing an all pervasive white revolution that can go a long way in ameliorating the lot of such farmers and, thus, creating conditions for elimination of regional socio-economic disparities and imbalances. The silver lining in the emerging new technologies is that, when optimally utilised, they can truly transform the dairy sector by stepping up milk production to desired levels. Further, for the modernisation and growth of Dairying Industry in Maharashtra, it is needless to stress that there should be a well knit procurement system that can infuse enough confidence in milk producers to transfer whole of their surplus milk from rural to urban markets. The farmers' interest in the growth of modern dairies can only be sustained by providing them a fair and developed market for their produce right at their door-steps. In addition, the farmers should also be exhorted and helped towards increasing their milk production by adopting scientific livestock management practices.

Thus, the above facts prompts us to have a worthwhile overview of the functioning of various co-operative milk unions in our study districts.

2.1 Jalgaon District Co-operative Milk Producers' Union Limited (JMPU)

The Jalgaon District Co-operative Milk Producers' Union Limited, Jalgaon, was established on 23rd November, 1971 under co-operative societies Act (Regd. No. JGA - PRD

(A) 135). It is basically a milk producers' co-operative organisation and is the district level body of the primary milk producers co-operative societies. It has been organised on 'Anand' pattern with technical and financial assistance from NDDB. The overall objective of the JMPU is to increase the milk production by providing both backward and forward linkages to member producers. The objective sounds well. But, as a matter of fact, majority of its societies are not functioning very efficiently. Though on paper they had been exactly organised on 'Anand Pattern', in practice their functioning is far away from that standard.

2.1.1 Milk Procurement

The JMPU has modern machinery and facilities for chilling, pasturisation and manufacture of by-products like butter, ghee and milk powder. At present, the JMPU has 1174 registered primary milk producers' co-operative societies; of which 50 societies are under liquidation and 494 societies are dormant and only 530 societies are working. Although efforts were made in the past to reactivate dormant societies, these efforts have remained largely unfruitful. Further, due to decreasing flow of milk and thereby increasing overheads, the JMPU is incurring heavy losses. The accumulated losses as on 31-3-1994 amounted to Rs. 1.74 crores. Although the chilling plant capacity of the union is 3.26 lakh litres, the average daily milk collection during 1989-90 was only 1.22 lakh litres. The past trend of the JMPU in terms of its total milk procurement, sale of cattle feed and veterinary and AI facilities is not very encouraging and shows a decelerating trend. During last ten year, the average daily milk collection has drastically declined from 1.68 lakh litres during 1984-85 to 0.71 lakh litres by 1993-94. The JMPU is producing balanced cattle feed under its brand name 'Vikas Cattle Feed'. Due to inefficiency and as a result of

closure of most of the primary milk producers co-operative societies of the JMPU, the cattle feed sale also stand affected. The sale of cattle feed, which was 9865 metric tonnes during 1986-87, declined to 4458 metric tonnes by 1993-94, i.e., a loss of 55 per cent in sale of cattle feed during last 8 years. Table 2.1 presents the annual and average daily collection of milk alongwith sale of cattle feed by the union during the last ten years.

Table 2.1 : Procurement of Milk and Sale of Cattle Feed by Jalgaon District Co-operative Milk Union (1984-85 to 1993-94)

Year	Annual Milk Collection (Crore Litres)	Daily Average Milk Collection (Lakh Litres)	Cattle Feed Sale (Metric Tonnes)
1984-85	5.99	1.64	7473
1985-86	5.33	1.96	6614
1986-87	4.16	1.14	9865
1987-88	2.89	0.79	9591
1988-89	3.62	0.99	7394
1989-90	4.12	1.13	8181
1990-91	3.69	1.01	9505
1991-92	2.30	0.63	6910
1992-93	2.90	0.79	8711
1993-94	2.58	0.71	4458

The reasons for the downward trend in collection of milk by the JMFU can be many. The main reason is that, the private traders are offering a little higher price to the producers and, therefore, the producers are tempted to sell their milk produce only to these private traders. Secondly, due to tie-up arrangements, recovery of bank loan from the producers is effected from sale of their proceeds, if milk is

sold to the society. To avoid this, there is a tendency among producers to sell their milk to private traders. Third reason that strikes one is the efficient management of these societies. Thus, with lower collection, the handling capacity of the JMPU also remains underutilised. Therefore, unless steps are taken to increase milk collection, the JMPU is unlikely to meet its running expenses and wipe out the overall accumulated losses.

It is estimated that about six lakh litres of milk is produced every day in the district. Out of this, about one lakh litre is collected by the JMPU. This milk is sold by JMPU within the district as well as in Bombay under its own brand name 'Vikas'.

2.1.2 Extension Services

The JMPU is also providing multifarious extension services to producer members and milk co-operative societies. These include imparting training for Secretaries of societies, training for animal husbandry workers, AI training, primary aid training, veterinary services including AI facilities and supply of seeds for fodder production. During 1992-93, the JMPU also produced frozen semen doses. Out of total production of 1.78 lakh frozen semen doses, 1.45 lakh doses were provided to 8 other district unions and 18,764 to milk co-operative societies within the district. Steps were also initiated to help the milk producers to improve the quality of their animals.

Progress of the JMPU in terms of broad quantitative as well as qualitative parameters is provided in Table 2.2.

The number of registered societies affiliated to the JMPU has shown an increase from 814 during 1983-84 to 891 by 1993-94, an increase of 9 percent over the last ten years. Similarly, share capital has also increased from Rs.79.85 lakhs during 1983-84 to Rs. 180.0 lakhs by 1993-94, an increase of

Table 2.2 : Progress of Jalgaon District Co-operative Milk Union Ltd. (1983-84 to 1993-94)

Perticulars	1983-84	1993-94	Change in 1993-94 over 1983-84(%)
No.of Societies	814	891	+ 9.46
Share Capital (in lakh rupees)	79.86	180.0	+125.39
Annual Milk Procurement (in lakh litres)	5.20	2.58	- 50.38
Average daily milk procurement (in lakh litres)	1.43	0.70	- 51.05
No.of societies benefitted by mobile vety. hospitals	527	-	-
First aid Centres	113	-	-
Frozen Semen Centres/AI Centres	113	-	-
No.of Cows artificially inseminated	16477	9753	- 40.81
No.of Buffaloes artificially inseminated	5614	6689	+ 19.15
Total no.of bovines artificially inseminated	22091	16442	- 25.57
No.of Improved cows born	3438	4575	+ 33.07
No.of Improved buffaloes born	821	2152	+162.12
Total no.of improved bovines born	4259	6727	+ 57.95
Cattle feed sold (in metric tonnes)	7365	4459	- 39.46

125 percent which is many fold higher than the growth in number of primary milk societies. Though the number of registered societies has increased over this period as is evidenced from Table 2.2, the share of working societies is much lower than the registered ones. Further, the procurement of milk by the JMPU has declined by about 50 per cent during the last ten years. Due to increasing overheads, the JMPU has completely stopped extending facilities like mobile veterinary hospitals, first aid centres and AI centres to its

member societies from 1992-93. This is a matter of serious concern. Veterinary services are very much essential for the continuous health of milching animals and under no circumstance they should be stopped. In fact, the imperative need is to further bolster and accentuate these veterinary services to improve the breeding efficiency of animals.

2.1.3 Production and Marketing of Milk and Milk Products

The problem of utilising surplus milk during flush season due to seasonal fluctuations in milk production paved the way for the Union to convert the surplus milk into products that could be preserved for a long time and extended into the lean periods. The JMPU has its own milk powder making plant. The major milk products manufactured and sold by the JMPU are WB, SMP and ghee. For maintaining and fully utilising the existing processing facilities and conversion of milk into products, the JMPU utilises not only milk procured by it but also that provided by other Government and State level Unions. The range of various milk products manufactured by the JMPU during the last four years is summarised in Table 2.3.

The total production of WB and SMP showed an increasing trend over the last four years. However, the production of ghee witnessed a small decline of 26 per cent from 1990-91 to 1993-94 after registering an increase of as much as 78 per cent during 1992-93. On the other hand, if JMPU's own production is taken into account there seems to be a down fall in almost all the products manufactured by the JMPU.

Further, in addition to activities outlined above, the JMPU is also supplying milk to Mahananda Dairy, managed by MRSDM, Bombay, Sri Vinayak Distributors, and other cities and towns in Maharashtra. The disposal pattern of fluid milk by the JMPU is presented in Table 2.4.

Table 2.3 : Production of Milk Products by Jalgaon District Co-operative Milk Union

(in metric tonnes)

Products	1990-91	1991-92	1992-93	1993-94
<u>Own Production*</u>				
White Butter	346.37	865.24	978.15	574.96
Skimmed Milk Powder	180.07	988.26	848.98	487.04
Ghee	272.12	135.03	437.14	200.73
Whole Milk Powder	133.12	-	-	-
<u>Govt. and Others**</u>				
White Butter	580.37	198.90	868.97	1663.23
Skimmed Milk Powder	1067.13	439.67	1564.92	2964.05
Ghee	-	1.04	48.39	0.45
Cream	-	2.70	-	-
<u>Total Production</u>				
White Butter	926.74	1064.14	1847.12	2238.19
Skimmed Milk Powder	1247.20	1427.93	2413.90	3451.09
Ghee	272.12	136.07	485.53	200.73
Whole Milk Powder	138.12	-	-	-
Cream	-	2.70	-	-

- * Production through Union's Own Milk Procurement
 ** Production through milk procured from Government, Gujarat State Co-operative Milk Union and Other Unions.

The ratio of sale to procurement has increased substantially during last four years. According to milk sale details, nearly 68 per cent of total quantity of milk procured was sold during 1990-91 which increased substantially to 94 per cent by 1993-94. One of the basic reasons for the lower quantity of milk products manufactured by the JMPU during 1993-94 can be attributed to the higher volume of liquid milk sold by the JMPU during this year. The JMPU normally disposes off nearly one third of the total quantity of milk procured by it in the local markets within the city while around 20 per cent is sold in the whole sale market; the rest is largely sold to Mahananda Dairy, Sri. Vinayak Distributors and in the local markets of Bombay in attractive polythene packs. Due to high demand from consumers, the sale of buffalo milk in the

local market is substantially higher. Sweetened milk is distributed under Government's school feeding programme in Jalgaon, Bhusawal, Arandol and ^{Amalner} / municipal corporation school.

Table 2.4 : Disposal Pattern of Fluid Milk by Jalgaon District Co-operative Milk Union (1990-91 to 1993-94)

(in lakh litres)

Milk Sale Details	Buffalo Milk	Cow Milk	Toned Milk	Sweet Milk	Total Sale
<u>1990-91</u>					
Mahanand Dairy	6.52	109.09	-	-	115.61 (46.31)
Whole Sale	68.21	1.87	-	-	70.08 (23.07)
Local Sale	63.23	0.75	-	-	63.98 (25.62)
Sri Vinayak Distributors	-	-	-	-	-
Bombay	-	-	-	-	-
Total	137.96	111.71	-	-	249.67 (67.66)*
<u>1991-92</u>					
Mahanand Dairy	-	21.99	-	-	21.99 (19.82)
Whole Sale	26.68	6.63	-	-	33.31 (30.02)
Local Sale	39.32	0.23	10.39	-	49.94 (45.01)
Sri Vinayak Distributors	3.84	1.87	-	-	5.71 (5.15)
Bombay	-	-	-	-	-
Total	69.84	30.72	10.39	-	110.95 (48.24)*
<u>1992-93</u>					
Mahanand Dairy	4.94	63.22	-	-	68.16 (37.81)
Whole Sale	36.82	1.24	-	-	38.06 (21.11)
Local Sale	49.89	0.04	18.22	0.03	68.18 (37.82)
Sri Vinayak Distributors	0.10	3.10	-	-	3.20 (1.77)
Bombay	-	1.76	0.93	-	2.69 (1.49)
Total	91.75	69.36	19.15	0.03	180.29 (62.17)*
<u>1993-94</u>					
Mahanand Dairy	-	65.50	-	-	65.50 (27.07)
Whole Sale	46.39	5.38	0.29	-	52.06 (21.52)
Local Sale	46.81	24.25	1.34	3.13	75.53 (31.21)
Sri Vinayak Distributors	-	-	-	-	-
Bombay	1.24	15.07	32.57	-	48.88 (20.20)
Total	94.44	110.20	34.20	3.13	241.97 (93.79)*

Figures in parentheses are proportion of sale to total sale by the Union

* Figures represent proportion of sale to total procurement by the Union.

2.1.4 Future Plan

Now, the JMFU proposes to open four veterinary centres at Parola, Rajora (Yawal block), Pachora and Chopda. With cluster approach, the facilities will be provided to 10 adjoining villages around each centre. Although the JMFU has ambitious future plans, yet due to mismanagement of JMFU at various levels and fronts and due to internal squabbles and politics, the union is incurring heavy losses. It is disquieting to note that, within a decade or so, the number of working societies has come down drastically. The need of the hour is to reactivate the closed societies and, thereby, increase the total procurement of milk so that the JMFU attain self sufficiency and is able to work its way towards wiping out the current accumulated losses.

2.1.5 The Policy Options

In the context of the JMFU's strategy on procurement of milk and manufacture of products, it is essential to point out that ideally the interests of the JMFU would be better served if the total liquid milk procured by it is disposed off after processing and packing. This will surely strengthen economic viability of the JMFU and ensure adequate fluidity of cash. Trading in shelf stable products is often fraught with the risk of glut in the market, economic depression, expiry of shelf life, pilferage, manufacturing and/or quality faults and quite importantly, the lacunae of operating within the realms of a remotely controlled gigantic infrastructure. Trading in skimmed or toned milk will be a better strategy. Skimmed milk or double toned milk get ready buyers among the economically deprivileged sections and among the middle rung of the society. By products generated from tonning of milk usually compensate for the procurement costs in such a strategy. Besides, it would also mean saving on interest on

the money blocked in the market owing to trading in shelf stable products where immediate monetary realisation is seldom the case. This will also help bring down running expenses and, thereby, reduce recurring losses. Thus, trading in liquid milk, whole or toned, is not only going to meet social needs but will also provide a financial sheet-anchor to the union. It is to be realised that while liquid milk brings in its wake instant cash, by products made out of it seldom ensure this. Thus, trading in liquid milk is always going to be more profitable compared to that of its by-products. Higher the sale of liquid milk compared to the procurement quantum, the better will be the financial health of the JMPU.

2.2 Chalisgaon Milk Scheme (CMS)

The major objective behind the establishment of 'Chalisgaon Milk Scheme' was rooted in checking the increasing predominance of private traders and in the overall failure of the JMPU in Chalisgaon taluka. The purview of this scheme is limited to Chalisgaon taluka only. There are around 50 societies under this scheme. The express function of such societies is to collect the milk from the producer member and send it to Chalisgaon from where this milk is usually transported to Nashik district. This scheme does not extend any additional facilities to the members like supply of cattle feed, veterinary and health care facilities, etc., except procurement of milk at reasonably fair price. Thus, the function of the CMS is restricted to the collection and distribution of milk of the producer members. Annual and daily average milk procurement figures under CMS are presented in Table 2.5.

The increasing predominance of private traders can be seen from the declining trend in procurement of milk under this scheme from 1986-87 to 1988-89. Thereafter, the procurement of milk under the scheme remained almost constant

Table 2.5 : Milk Procurement under Chalisgaon Milk Scheme

Year	Annual Collection (in lakh litres)			Daily Average Collection (in litres)		
	Buffalo	Cow	Total	Buffalo	Cow	Total
1986-87	3.86	47.54	51.40	1058	13,025	14,083
1987-88	1.01	35.83	36.84	277	9,816	10,093
1988-89	0.81	33.95	34.76	222	9,301	9,523
1989-90	0.65	41.79	42.44	178	11,449	11,627
1990-91	0.55	40.03	40.58	151	10,957	11,118
1991-92	0.31	39.23	39.62	85	10,748	10,833
1992-93	0.39	44.24	44.63	107	12,121	12,228
1993-94	0.25	57.27	57.52	68	15,690	15,758

for three years. However, from 1992-93 onwards, it has started showing an upward trend. At present the daily average procurement of milk under this scheme is around 15,000 litres. A substantially higher procurement of cow milk is a reflection on the relatively high density of cows in Chalisgaon taluka.

Though the CMS is procuring more than 10 percent of total milk produced in the taluka, the quantity of milk cornered by private traders is many fold higher than what is procured by this scheme. As a matter of fact, the whole Chalisgaon taluka is under the grip of private traders. They have their own members. Some private traders also have chilling, pasturisation and other facilities. They are running parallel to co-operative societies in other talukas of the district. Milk collected by such private traders is also sent to Bombay market. This constitutes a flourishing business for the private sector dairies of Chalisgaon taluka in Jalgaon district. In Chalisgaon taluka, small contractors operate milk collection and transport system to encompass a small, specified number of villages to form part of a larger procurement network being operated upon by a big contractor. The latter often buys milk from small contractors on the basis of fat and SNF test and but for a fixed price he leaves it to

the small contractors to decide his terms of business with farmers. Private operators in organised as well as unorganised sectors build and gain competitive advantages by : making timely cash payment to producers, by linking milk supply with advances provided by big contractors to small ones who in turn have long term tied contracts with milk producers, offering higher price than the co-operative in summer and a lower price in winter, and by operating an efficient and tight collection and transport system. As private traders have no commitment towards making investments in technical inputs to farmers, they are usually in a stronger and advantageous position in offering a more attractive produce price. But higher price for liquid milk cannot satisfy all the dairy-related needs of a producer farmer. They also require additional facilities in the form of inputs and other services. A well managed co-operative can provide all such facilities needed by the producer member to boost his milk production and thereby, ensure higher returns through higher milk production. However, such inferences can be a little removed from the actual reality. The working of CMS and that of private traders in Chalisgaon would require a separate thorough study of Chalisgaon taluka in order to arrive at any concrete conclusion.

2.3 Kolhapur District Co-operative Milk Producers' Union Limited (KMPU)

The Kolhapur district Co-operative Milk Producers' Union Ltd., Kolhapur, established on 16th March, 1963 under co-operative societies Act (Regd. No. KPR-PRD(A)102), made a moderate beginning by collecting 700 litres of milk per day from 22 societies. During the formative years, the basic function of the Sangh was to procure milk and supply it to the government dairy at Tarabai park, Kolhapur. This modus operandi continued for many years. In 1978, the NDDB included Kolhapur

district under Operation Flood Programme and, thus, started the beginning of a new era for the Dudh Sangh. The project was financed by NDDB. On a turnkey basis, the NDDB established a milk plant of two lakh litres per day capacity at Gokul-Shirgaon. Subsequently, with the assistance of NDDB, chilling centres of 75,000 and 50,000 litres/day capacity were also established at Gadhinglaj and Bidri. The Dairy was commissioned towards the end of 1985. Meanwhile, with the efforts of the NDDB, the Government Milk Scheme in Kolhapur was handed over to the Kolhapur Dudh Sangh in mid 1985. As a result of the commissioning of a new dairy at Gokul Shirgaon, the Government Dairy became defunct.

As a matter of fact, the union has shown excellent results on every front of development. Perhaps, Kolhapur Milk Union is one of the best Unions in Maharashtra state. The area of operation of the union extends to all the twelve talukas of the district. However, 41 villages from Hatkanangle and Panhala talukas are affiliated to Warna Milk Producers' Union. The KMPU has quite ambitious objectives. The specific objectives are to:

- a) Undertake activities of procuring clean and quality milk from dairy farmers through their village dairy co-operatives and regularly pay remunerative price on quality basis;
- b) Process and convert milk into products, take up commercial production and marketing of milk products such as milk powder, ghee, white butter, table butter and shrikhand (sweet-curd);
- c) Supply surplus milk to Mahananda Dairy, managed by Maharashtra Rajya Sahakari Dudh Mahasangh Limited (M.RSDM), Bombay, Goa Union and other cities and towns;
- d) Manufacture balanced cattle feed in order to

supply to co-operative societies in the milkshed and to the adjoining milk unions at reasonable price;

- e) Convert conventional dairy co-operatives into the Anand pattern and regularly monitor their functioning through extension services wing of procurement and Input Department.
- f) Undertake activities for development of dairying, through dairy co-operative, such as first aid training, provide services through mobile veterinary clinics, attending emergency veterinary calls, take up vaccination and artificial insemination programmes, organisation of Secretary training and management committee training and testing programmes, and
- g) Encourage fodder production activities on a large scale by making available seeds to the dairy farmers at subsidised rates and to take up silvipasture and de-centralised nurseries for development of wasteland.

Thus, the basic functions of the KMPU are organising milk producers into co-operatives, eliminating middle-men, collecting milk in the village itself, making prompt payments for the milk supplied by them after testing its quality in a manner which leaves no room for dispute, arranging for transport of the liquid milk after pasturisation to major urban consuming centres, ^{converting} surplus milk in the flush season into skimmed milk powder which could be recombined into liquid milk during the lean season, thus ensuring a good uniform prices to the producers all through the year, providing veterinary care to the cattle, help increase their milk yield by improving the production of fodder and supply of feed as well as by providing facilities for crossbreeding

and improved buffalo breeding through AI.

2.3.1 Procurement Performance

The KMPU has fulfilled its objectives to a great extent. Within a decade or so, there is a four fold increase in total milk procurement by the KMPU. Number of producer members have increased substantially during the last ten years. The procurement figures have increased to such an extent that the KMPU now proposes to establish two more chilling centres at Gogave (Shahuwadi taluka) and Tawarewadi (Chandgad taluka) with 50 thousand and one lakh litres per day capacity, respectively. The trend in procurement of milk as well as cattle feed production and distribution by the KMPU since 1981-82 is presented in Table 2.6.

Table 2.6 : Procurement of Milk and Production and Sale of Cattle Feed

Year	Annual Milk Procurement (in lakh litres)			Daily Average Milk Procurement (in '000 litres)	Cattle Feed (in '000 MT)	
	Buffalo	Cow	Total		Pro-duced	Sold
1981-82	202.28	102.49	304.77	83.50	2.69	2.58
1982-83	226.58	99.92	326.50	89.45	9.35	9.36
1983-84	295.50	85.63	381.13	104.42	13.87	13.23
1984-85	336.79	82.36	419.15	114.84	16.35	16.51
1985-86	336.79	90.82	427.61	117.15	19.86	19.86
1986-87	429.45	122.73	552.18	151.28	25.13	24.77
1987-88	431.65	149.98	581.63	159.35	25.16	24.46
1988-89	523.73	180.62	704.35	192.97	29.51	28.74
1989-90	450.99	156.59	607.58	166.46	25.51	25.63
1990-91	587.99	233.58	821.57	225.09	33.32	33.68
1991-92	712.59	290.66	1003.25	274.86	32.45	31.93
1992-93	862.89	312.25	1175.14	321.96	38.41	39.33
1993-94	977.71	384.00	1361.71	373.07	48.79	49.10

The KMPU's average daily milk procurement, which stood at 83.50 thousand litres during 1981-82, increased substantially to 373.07 thousand litres by 1993-94, thus, registering an increase of 347 percent during last 13 years. The trend in the ratio of buffalo to total milk procurement over the last 13 years remained practically unaltered (Table 2.6) and this

proportion stood at around 70 per cent. The cow milk procurement, however, showed a decline from 1981-82 to 1984-85 and picked up from 1985-86 onwards and increased rapidly, thereafter. The reason for substantial increase in cow milk procurement from 1985-86 could be traced in the commissioning of a new dairy at Gokul Shirgaon towards the end of 1985. In fact, buffalo milk procurement also showed a substantial increase only after 1985-86.

2.3.2 Techno-economic Performance

The KMPU also manufactures and sells cattle feed under the brand name of 'Mahalaxmi cattle feed'. The KMPU constructed a 100 metric tonnes per day capacity cattle feed plant at Gadnudshingi with funding support from NDDB, the capacity of which was expanded to 200 metric tonnes by October, 1992. From November, 1992, the production was completely switched over to by-pass feed. The KMPU's cattle feed plant has had the distinction of receiving a prestigious NPC award for the year 1992-93. As can be seen from Table 2.9, the KMPU registered a quantum jump in the production and sale of cattle feed in a matter of just one year after the commissioning of its cattle feed plant in January, 1982 as can be seen from the figures for the year 1981-82 and 1982-83 and this trend has been continuing unabated ever thereafter.

At present, the KMPU has 1437 'A' class members and 80 'C' class members. It has an authorised capital of Rs. 50 crore with Rs. 11.56 crores as paid up share capital; deposits and investments for the KMPU stand at Rs. 10.17 crores, and borrowings at Rs. 10.05 crores. As on 31-3-1994, the total profit for the KMPU amounted to Rs. 1.46 crores. The total capital expenditure of the KMPU stood at about Rs. 12 crores. The Government of Maharashtra stand as guarantor to the KMPU for the funds released from NDDB. The MRSDM

is the implementing agency for the KMPU which monitors the NDDB sponsored programme, especially under OF-II. The products of the KMPU are sold under the brand name of 'Gokul'.

The achievements of the KMPU in terms of broad quantitative parameters are provided in Table 2.7.

Table 2.7 : Progress of Kolhapur District Co-operative Milk Union

Particulars	1981-82	1985-86	1989-90	1993-94	Change (in 1993-94 over 1981-82 (%)
1 Functional Societies	627	817	1017	1601	+ 155
2 Anand Patter Societies	420	751	916	1498	+ 257
3 Producer Members (in '000')	53.27	140.25	139.58	291.72	+ 448
4 Share Capital (Rs. in lakhs)	57.43	127.55	202.80	1155.73	+1912
5 Annual Milk Procurement (lakh Litres)	304.77	427.61	607.58	1361.71	+ 347
6 Average Milk Procurement (in '000' litres per day)	83.50	117.15	166.46	373.07	+ 347
7 Marketing of Milk (in lakh litres)					
a) Local Sale	45.87	45.36	75.86	192.13	+ 319
b) Sale to Maharashtra State Dairy Federation	-	152.82	66.65	73.90	
c) Sales to Government Dairy	257.52	136.86	-	-	
d) Others*	-	81.36	338.99	795.68	
Total Sales	303.39 (99.55)	416.40 (97.38)	481.58 (79.26)	1061.71 (77.97)	+ 250
8 Reserve and Other Funds (Rs. in lakhs)	25.75	341.68	401.64	504.42	+1859
9 Turnover** (Rs. in lakhs)	NA	3503.59	4470.47	18064.23	+ 416

** Proportionate change in turnover in 1993-94 has been worked out over 1985-86.

* It includes (a) quantity sold in whole sale market (bulk sale for parties, marriage ceremonies, etc.), (b) Sales in the local markets of Bombay, Pune and other cities and towns, (c) Sales to various distributors. Figures in Parentheses are ratios of sales to procurement.

The KMFU showed remarkable progress in terms of all the parameters taken into account under Table 2.7. It is interesting to note that around 94 percent of functional societies are based on 'Anand' pattern of milk collection. The overall success story of KMFU owes it largely to this high proportion of its societies working under the Umbrella of 'Anand Model'. The producer members for the KMFU have shown manifold increase over the years. The increase in the number of producer members is more than proportionate to increase in procurement of milk by the KMFU during the last 13 years. Another interesting feature of the KMFU is that the ratio of quantity of liquid milk sale to total milk procurement is continuously coming down. This can be attributed to substantial increase in the manufacture of wide range of products by the KMFU over this period. In 1981-82, the KMFU sold almost the whole quantity of milk in liquid form in the local markets and to the government dairy. However, the KMFU completely stopped supplying milk to government dairy from 1987-88. If we compare the proportion of milk sale in the local market to total sale between JMPU and KMFU, the proportion is very less for KMFU (Around 20 percent only) compared to its counterpart in Jalgaon district.

The KMFU took an initiative to sell liquid milk in the local markets of Bombay in 1987 and in that year initial daily average sale was around 16,000 litres. As a result of increasing demand of milk from the consumers of Bombay, the KMFU has now increased the supply to the tune of 2,50,000 litres per day. The KMFU has also started marketing milk in Pune and the present daily average sale stands at around 27,000 litres. The KMFU's liquid milk plant got the second NPC award in 1991-92 and the third NPC award came its way in 1992-93. All this points to the distinguished functioning of the KMFU.

In addition to procuring clean and quality milk from its member producers, the KMPU is also providing various inputs and services to its producer members. It is this provision of technical inputs that is contributing largely to its consistent higher productivity and helping the KMPU achieve its major objectives and targets. Backward linkages provided by the KMPU in the form of various technical inputs are largely instrumental for the success of animal husbandry programmes in the region. The range of these technical inputs include : coverage of villages under animal husbandry programme, setting up of first aid centres, frozen semen centres and centres for artificial insemination, animals' treatment, fodder seeds distribution, training of people in dairying, organisation of film shows to improve knowledge on dairying and animal husbandry. A window to the profile of progress on these inputs is provided in Table 2.8.

Table 2.8 : Progress of Technical Inputs Supplied Through Kolhapur Milk Union

Technical Inpute	1981-82	1985-86	1989-90	1993-94
1 Dairy Co-operative Societies covered under animal husbandry programme	241	548	850	1305
2 Mobile veterinary routes	6	.8	12	23
3 F.M.D. Vaccinations	3242	55212	42503	41597
4 Animal husbandry first-aid centres	NILL	259	317	356
5 Frozen Semen Centres	7	68	116	204
6 Artificial insemination done	4392	23060	43227	110323
7 Animals treated (in '000')	37.10	44.00	53.36	211.79
8 Fodder seeds distributed (in MT)				
a) Kharif	0.68	4.28	9.19	26.46
b) Rabi	1.55	1.95	14.90	25.60
c) Summer	-	0.61	4.11	20.55
Total	2.23	6.84	28.20	72.61
9 People trained*	NILL	93	603	476
10 Film shows conducted	25	32	38	11

* It includes (a) Society workers trained for AI, (b) first aid training (c) refresher courses in artificial insemination and first aid (d) workers training for the use of milk testers, (e) Secretaries and (f) Management Committee Members.

It is very clear from Table 2.8 that supply of all the inputs have considerably increased during the period under mention. The KMPU has a procurement and inputs department which provide all the extension services. For improving the growth of milk production in the area, this department has laid stress on scientific breeding feeding, animal health care programmes and management practices. Though quality semen is in short supply, through embryo transfer technology the KMPU is trying hard to improve milk productivity in the area.

2.3.3 Training Programme

In order to create awareness and encourage women farmer members, a separate cell called 'Co-operative Development (CD)' cell, was introduced in 1990 with the assistance of NDDB. The achievements of CD cell are summarised in Table 2.9. There is a substantial increase in the people trained under the CD programmes.

Table 2.9 : Personnel Trained Under Co-operative Development Programme at Kolhapur Milk Union

Programmes	1990-91	1991-92	1992-93	1993-94
1 Women education programme	3398	3430	5425	8023
2 Member education programme	2935	2830	4951	7887
3 Management Committee member (MCM) training	336	194	326	1138
4 Chairman Seminar	20	21	-	-
5 Secretary training	-	59	58	85
6 Follow-up of women education programme	1302	126	186	3001
7 Follow-up of member education programme	977	-	229	3487
8 Follow-up of MCM programme	-	-	18	295
9 Women Club	-	-	-	1776
10 Youth forum	-	-	-	1446
11 Leadership Development Programme	-	-	-	591

The programmes launched under CD were meant for women members, staff of the dairy co-operative society, members of the management committee, and to oversee the follow up of the

above. As a result of these CD related educational programmes, many tangible benefits have accrued to the KMPU. As a result of these programmes, the quality of milk supplied has improved considerably as the message has gone down the producers that it is only the consistent supply of quality milk rather than quantity which can ensure them a remunerative price for their produce. Women education programmes have also helped in producing clean milk which in turn has helped in preventing economic losses to the dairy societies on this account. Further, with the increase in awareness, the member producers are demanding more inputs and better facilities from the KMPU; this has also helped in increasing milk production. The recent directives of the Government to have 30 percent representation for women on the Management Committee of the societies is a further step in the right direction of instilling faith in favour of the co-operative dairying.

2.3.4 Quality Assurance Programme

The management of Gokul Dairy conducted a Dairy Plant Management (DPM) study in the year 1991 with the help of NDDB under the guidance of an FAO Adviser, Mr. R.G.Martin, for the improvement of its production efficiency. Based on the recommendations of DPM study and quality assurance programme, the dairy has adopted a total documentation system beginning right from reception of milk and concluding with the finished product entering the market. The implementation of the system is monitored and ensured with the help of quality assurance team and team for internal and external audits. The quality assurance programme has improved the product quality a great deal.

2.3.5 Marketing Performance

The KMPU manufactures and sells a wide range of milk products, viz., cream, WB, Ghee, Shrikhand, table butter and MP. Table 2.10 accounts for KMPU's progress in terms of

production and sale of various milk products.

Table 2.10 : Production and Sale of Milk Products

(in M.T.)

Products/Years	1985-86	1990-91	1991-92	1992-93	1993-94
<u>Production</u>					
Cream	602.374	1066.50	1265.64	3737.15	3572.19
White Butter	256.961	573.09	600.32	1936.05	1715.50
Ghee	181.000	132.01	162.01	393.05	268.99
S.M.P.	374.275	687.72	808.53	2192.95	2047.19
Shrikhand	-	78.86	98.09	101.14	90.96
Table Butter	-	10.62	43.56	13.28	24.78
W.M.P.	-	16.10	26.25	19.28	17.78
<u>Sale</u>					
Cream	-	4.05	-	17.78	50.67
White Butter	258.49	149.37	451.48	1094.74	1906.04
Ghee	158.99	132.20	163.73	397.56	787.10
S.M.F.	-	941.08	749.20	1066.53	1649.92
Shrikhand	-	76.08	91.42	107.58	107.12
Table Butter	-	9.77	43.82	17.90	18.66
W.M.P.	-	11.45	13.50	-	6.95

The KMPU started manufacturing various milk products from 1985-86. Initially, the KMPU confined its processing activities to the production of only cream, WB, ghee and SMF. Later, it gradually increased its product range to shrikhand, table butter and WMP also. The KMPU started producing and selling shrikhand from 1986-87. Table butter and WMP were included in the list of KMPU's various milk products during 1988-89 and 1990-91, respectively. Thus, KMPU keeps its plant capacity fully utilised by manufacturing various types of milk products. It is worthwhile to note that the production and sale of WB, ghee and SMP are the major preoccupations on the product manufacturing front for the KMPU. The KMPU's 10 metric tonne per day capacity powder plant, which originally envisaged to handle 2 lakh litres of milk for powder preparation, is now handling upto a maximum of 4,65,000 litres of milk per day. The KMPU has also undertaken Q.A.T. programme under the guidance of NDDB and the results are quite

encouraging. One of the KMPU's remarkable achievement is that it has now entered the international trade in SMP. It has now started exporting extra grade (IS-13334-part II) milk powder to neighbouring countries like Sri Lanka. This is indeed quite worthy of appreciation and a laudatory achievement.

2.3.6 Future Plan

The KMPU has a very ambitious future plan to expand the installed capacity of the Gokul plant from the existing 2 lakh litres per day to 7 lakh litres a day. It is also planning to expand the capacity of the cattle ^{feed} plant and that of two of its existing milk chilling centres and also to construct two more chilling centres in the district. Total capital requirement for this expansion programme is estimated at around Rs. 50.41 crores. Works on some of the above projects have already been started and the KMPU is expecting that these would be completed within 5 years. In brief, it can be said that the KMPU is quite successful in the implementation of both 'OF-I' and 'OF-II' programme. It is climbing up on the ladder of success in every sphere of dairy-co-operative development- a heartening feature indeed.

2.4 Shri Warna Sahakari Dudh Utpadak Prakriya Sangh Ltd. (WMPU)

Shri Warna Sahakari Dudh Utpadak Prakriya Sangh Ltd., Warnanagar, near town Kodoli, is situated at a distance of about 30 kms. to the North-west of Kolhapur in Kolhapur district. In view of the abundant natural resources in the region in the form of river banks and pastures, suitable soil and climatic conditions and rainfall and prevailing agricultural practices and cropping pattern which provided ample fodder for raising milch cattle, the local leaders, who were instrumental in establishing a co-operative sugar factory, decided to take up a co-operative dairy project on the model of 'Anand'. As a result of their untiring efforts, Shri Warna

Sahakari Duddh Utpadak Prakriya Sangh Ltd., Warnanagar, was instituted on 20th July 1968 under the Co-operative Societies Act (Regd. No. KPR-PRD(A) 1) of Maharashtra State.

The Sangh started a pilot scheme for the collection of milk in January 1970 and proceeded to formulate an integrated programme of dairy development. In September 1970, it acquired 50 acres of land from Warna Kombadi Sahakari Sangh on 99 years' lease. Subsequently, additional 35 acres of land was acquired for future expansion of the Sangh. The main dairy building, ice plant to produce 10 tonnes of ice per day and, most importantly, the staff quarters came into being in 1975.

2.4.1 Stages of Development

The Warna Dairy Project envisaged an intensive and integrated approach for dairy development under its area of operation which included various schemes such as crossbreeding of cows, upgrading of buffaloes, veterinary services fodder production, etc. The technical and economic feasibility report of 'Warna Dairy Project' was appraised and approved by the Agricultural Finance Corporation (AFC) in 1972, and the factory licence was issued by the Central Government in 1973-74. Though the technical feasibility of the project was approved by the government, the financial aid or subsidy in the form of share capital was not sanctioned by the state government. The state government even refused to serve as a guarantor for the loan. Initially, the Sangh had collected around Rs. 9 lakhs as share capital from its producer members. Due to financial crunch, the Sangh approached AFC and Bank of India for sanctioning loan. As the commercial banks required 25 per cent as margin money and the guarantee of state government, the loan sanction could not materialise. However, with a view to alround development in Warna complex, AFC finally came forward to finance the Dairy Project subject to various conditions.

In April 1975, a loan amount of Rs. 1.24 crores with 15 per cent of margin money was sanctioned by Bank of India. This was conditional loan. The condition was that the margin would be raised to 25 per cent within a year of the establishment of the Dairy. At that time, the Sangh had collected only Rs. 9.50 lakhs as share capital which was only 6.5 per cent of the project cost. In spite of very low share capital of Sangh, Bank of India financed the project as a special case treating it as a part and parcel of their activities. As the project was financed by a Nationalised bank, the Sangh was required to pay interest rate of 14.75 per cent. Later, this project was approved for refinance by Agricultural Refinance Development Corporation (ARDC) and the rate of interest was brought down to 11 per cent. The higher rate of interest and non-availability of Share capital and any subsidy from state government had escalated the project cost.

Till 1978-79, the Sangh's entire production of SMP, ghee as well as buffalo milk was supplied to the Government of Maharashtra. In return, the Government was paying only provisional bills for the products which were supplied under Greater Bombay Milk Scheme. As a result, the amount of pending bills with the government rose to more than one crore. This was a stage when the Sangh might have been collapsed had the management not taken a decision in favour of entering into the open market for sale of its milk and milk products. The Sangh has immensely benefited from the concerted advertisement campaigns it launched in 1980-81 to market its products in Bombay and other nearby cities and towns. The picture was not so rosy before 1980-81. Upto 1979, while the share capital was less than Rs. 12 lakhs, the accumulated losses for the Sangh were more than Rs. 45 lakhs. It took nearly 4 to 5 years for the Sangh to have a turnaround and wipe out the accumulated losses. It became a profitable

venture in 1983-84 and there was no looking back thereafter. After 1983-84, the Sangh has shown remarkable achievements in literally every sphere of dairy co-operative movement and development.

2.4.2 Milk Procurement and Cattle Feed Sale

At present, the Sangh has 133 milk producers' cooperative societies with 1,47,000 producer members. And, the area of jurisdiction of the Sangh is confined to only 44 villages of Hatkanangle and Panhala talukas of Kolhapur district. However, the Sangh is also collecting milk from Karnataka and Sangli and other nearby districts of Maharashtra. The Sangh initially made a moderate beginning by collecting 1,950 litres of milk per day which substantially increased to 18,027 litres by 1974-75 and to 52,118 litres by 1979-80. Thus, the procurement figures leap frogged and increased by many folds in a matter of ten years. The trend in the procurement of milk from Kolhapur district as well as from Karnataka, Sangli and other districts of Maharashtra along with cattle feed sale by the Sangh since 1980-81 has been presented in Table 2.11.

It is very clear from the Table that the Sangh mainly procures buffalo milk. The ratio of buffalo milk to total procurement for the Sangh is around 70 per cent. However, if the procurement figures for its command area in Kolhapur district are taken into account, the ratio works out at around 60 per cent. The Sangh is unable to collect the estimated quantity of milk from its command area in Kolhapur district alone and is dependent on other institutions in Maharashtra and Karnataka for about 40 per cent of its total milk collections. It is understood that the Karnataka Government is contemplating setting up its own dairying chain in the region from where the Sangh recoups some of its milk procurement requirements. If this milk scheme of the

Table 2.11 : Procurement of Milk and Sale of Cattlefeed

Year	Procurement from Kolhapur District			Procurement from Karnataka and others			Total Procurement (in LL)	Daily Average Procurement (in TL)	Cattle feed Sale (in TMT)
	Buffalo Milk (in LL)	Cow Milk (in LL)	Total (in LL)	Buffalo Milk (in LL)	Cow Milk (in LL)	Total (in LL)			
1980-81	53.76	71.10	124.86	43.36	10.57	53.93	178.79	48.98	1.13
1981-82	51.25	65.65	116.90	54.07	14.48	68.55	185.45	50.81	2.19
1982-83	55.02	61.28	116.30	85.01	12.54	97.55	213.85	53.59	2.39
1983-84	71.38	57.01	128.39	67.70	8.08	75.78	204.17	55.94	3.11
1984-85	80.81	65.86	146.67	109.89	11.65	121.54	268.21	73.48	3.82
1985-86	101.17	88.93	190.10	114.83	6.82	121.70	311.80	85.42	5.64
1986-87	124.66	112.12	236.78	140.49	7.98	148.47	385.25	105.55	10.83
1987-88	142.24	119.72	261.96	185.19	15.48	200.67	462.63	126.75	12.08
1988-89	135.34	94.20	229.54	224.98	15.56	240.54	470.08	123.79	10.62
1989-90	170.53	126.02	305.55	225.41	36.13	261.60	557.15	155.38	15.76
1990-91	187.75	129.43	317.18	237.23	39.48	276.71	593.89	162.71	13.51
1991-92	193.17	121.01	314.18	225.54	77.38	302.92	617.10	169.07	12.30
1992-93	200.23	113.42	313.70	217.37	82.17	299.54	613.24	168.01	11.28
1993-94	225.64	127.28	352.92	215.83	47.40	263.23	616.15	163.81	13.91

-LL = Lakh Litres; TL = Thousand Litres; TMT = Thousand Metric Tonne

Karnataka Government is implemented, the supply of milk from outside agencies may substantially dry up and the Sangh may be hard put to meet and fulfil its estimated procurement requirements. At present the Sangh is collecting around 65,000 litre of milk per day from Karnataka which constitutes 40 per cent of its total milk procurement. Implementation of Karnataka milk scheme will, therefore, amount to a steep 40 per cent cut in the total milk procurement. This is bound to affect the normal functioning of the Sangh and the Sangh has got to do a lot of tight rope walking in order to tap newer sources of milk procurement.

The Sangh has established an independent cattle feed mixing plant with a manufacturing capacity of 100 tonnes. The cattle feed is sold under its brand name of 'Warna cattle feed'. The Sangh has ensured that a good quality cattle feed is distributed at reasonable price at the door steps of the farmers. During 1981-82, it sold around 2 thousand metric tonnes of cattle feed, the sale of which had escalated to around 6 thousand metric tonnes by 1985-86. At present, the Sangh is producing and selling about 14 thousand metric tonnes of cattle feed.

2.4.3 Marketing Strategy

In 1979-80, the Sangh started marketing milk and milk products in the nearby cities and in Bombay markets. The initial response for the Sangh's milk and milk products was very poor. The initial daily average sale of milk in nearby cities like Ichalkaranji, Jaysingpur, etc., was only 125 litres and that for Bombay, it was 1,200 litres. The Sangh was incurring heavy losses in the sale of milk because of higher transportation cost and less quantity of milk being sold in the market. On the other hand, the Sangh was also faced, with delayed clearance of instalments on bank loans and, thus, was under lot of pressure owing to piling up of

the interests on such bank advances. Accumulated interests itself worked out at a whopping 95 lakhs. To top it all, there was simmering discontent among workers due to their poor salaries. In spite of all these seemingly insurmountable hurdles, the Sangh continued its relentless march towards self sufficiency and further fortified efforts to market its milk and milk products with even increasing zeal. In due course of time, the Sangh conquered the hearts of its customers because of the sustained good quality of milk provided by it, a reasonable price tag for its products, and prompt and timely deliveries. As a consequence of this, the Sangh's milk sales figures have kept continuously zooming. The milk sales details for the Sangh for the last five years are presented in Table 2.12.

Table 2.12 : Quantity of Milk Sold in Various Markets

(in lakh litres)

Markets	1989-90	1990-91	1991-92	1992-93	1993-94
1. Chalkaranji	21.85	24.65	23.60	25.58	31.33
2. Kolhapur	5.68	7.10	5.31	5.16	5.99
3. Jaysinghpur/Shirol	2.30	3.27	2.27	2.36	3.40
4. Sangli/Miraj	9.03	9.57	10.03	9.73	11.01
5. Vashi New Bombay	350.79	357.03	378.51	338.28	367.12
6. Head Office	101.77	1.26	0.61	1.97	15.62
7. Induri Dairy, Pune	-	117.88	109.84	114.05	40.51
8. Warnanagar/Amrutnagar	1.56	1.70	1.55	1.63	1.79
9. Ratnagiri	-	-	-	0.36	2.48
	492.93	522.51	531.72	499.12	479.25
	(86.92)	(87.93)	(86.16)	(81.39)	(77.78)

Note: 1. The quantity of milk sold in various markets include buffalo milk, cow milk, standard milk and skimmed milk.

2. Figures in parentheses represent ratio of sale to total procurement.

If we look into the sales performance of the Sangh in terms of liquid milk during last five years, it shows first an increasing and then a declining trend. Liquid milk sale

registered an increase of 8 per cent from 1989-90 to 1991-92 but, thereafter, it declined by 6 per cent in 1992-93 and by 4 per cent in 1993-94. The ratio of sales to total procurement remained, however, constant at 87 per cent for three consecutive years declining only in 1993-94 to 78 per cent. The reason for decline in liquid milk sales was mainly due to increased diversion of milk for product manufacture. It can be seen from the table that Bombay alone accounts for nearly three-fourths of its total liquid milk sales. Though, the initial sale of milk in Bombay was only 1,200 litres per day, it has now touched an average daily sale figure of around 95,000 to 1,00,000 litres. The Sangh started diverting its milk sales through head quarters to Induri Dairy of Pune in 1990-91. It also started selling liquid milk in the local markets of Ratnagiri from 1992-93.

In addition to fluid milk sale, the Sangh has achieved an excellence in the manufacture of a wide range of milk products. Around 20 per cent of the total milk procured by the Sangh is used for conversion into various types of products having varying degrees of shelf stability. The major products manufactured by the Sangh are ghee, skimmed milk powder, Shrikhand and whole milk powder. As a matter of fact, the Sangh is popular in the whole of Maharashtra State for its excellent, tasty, good quality and mouth watering Shrikhand. Due to its high demand in the market, the annual production and sale of Shrikhand has exceeded one thousand metric tonnes. In the beginning, the sale of Shrikhand was only 50 kgs. per day, but now its sale has gone upto 3 tonnes per day. This is indeed an enviable and magnificent achievement for the Sangh. The progress of Sangh in terms of production and sale of various milk products, over the last 5 years has been highlighted in Table 2.13.

Table 2.13 : Progress of Sangh in Various Milk Products
(in metric tonns)

Products/Years	1989-90	1990-91	1991-92	1992-93	1993-94
<u>Production</u>					
Ghee	540.80	449.96	425.32	515.23	538.39
Shrikhand	844.00	960.91	1023.09	1129.46	1213.16
S.M.P.	641.30	524.56	611.45	885.73	1046.25
Lassi (200 ml.packs)	653680	1231495	729305	993791	1582516
Warna Spray(Powder)	13.70	13.12	-	-	-
Whole Milk Powder	-	-	139.29	20.73	7.83
Butter	-	-	-	-	-
<u>Sale</u>					
Ghee	459.55	443.14	431.57	509.70	545.80
Shrikhand	816.61	940.99	1029.76	1140.72	1167.82
S.M.P.	645.01	499.64	604.56	589.56	825.87
Lassi (200 ml.packs)	624357	1185538	728173	945000	1521618
Warna Spray(Powder)	14.62	-	-	-	-
Whole Milk Powder	-	-	102.53	13.28	-
Butter	-	-	-	-	347.42

The performance of the Sangh in terms of production and sale of various products over last 5 years reveals that the Sangh has a cutting edge over Gokul Dairy in the manufacture and sale of milk products like Shrikhand and ghee. The trend reveals that the quantity of Shrikhand produced and sold by the Sangh is nearly 10 times more than the Gokul Dairy. Similarly, the figures for ghee production and sale are almost double. The Sangh's various milk products are sold in the local markets of Ichalkaranji, Kolhapur, Jaysingpur, Sangli, Vashi - New Bombay, Warnanagar, Amrutnagar and also through head office and various other agents. The Sangh has also started selling ghee and Shrikhand to its employees at concessional rates. Due to lower demand in the market, the Sangh has stopped manufacturing 'Warna Spray Powder' from 1991-92 and that of Whole Milk Powder from 1993-94. It is evident from Table 2.13 that the Sangh's 'Lassi' is ^{as} popular as Shrikhand. The present production and sale of Lassi is of

the order of 16 lakh 200 ml packs. The ball has been set truly rolling by the Sangh for attaining hitherto unknown heights with the introduction of continuous line for Shrikhand and Lassi manufacture and such a trend is expected to gain further momentum in times to come.

2.4.4 Animal Husbandry Policy

Having achieved success in marketing of milk and milk products, the Sangh is now concentrating on dairy extension activities by providing multifarious facilities to its member producers. The Sangh is providing 30 per cent subsidy to the producers on the purchase of milch animals with a ceiling of Rs. 3,000. The annual expenditure on this activity alone amounts to around Rs. 25 to 30 lakhs. Recently, the Sangh has started a very innovative and unique scheme, named 'Jivit Suraksha Yojana'. Under this scheme, the legal heir of a deceased producer farmer is provided with an ex-gratia of Rs. 1,000 to Rs. 6,000 immediately after his or her death to tide over the loss.

Sangh is rendering free veterinary services to its milk producers through mobile veterinary clinics by visiting every village once in a week for treatment, operation and artificial insemination of milch animals. In addition, round the clock emergency veterinary services are also provided to the needy. In order to conduct such activities, the Sangh has employed seven veterinary doctors and spends around 12 to 13 lakhs annually. Apart from this, fodder seeds are distributed by the Sangh at 50 per cent subsidy and cropped dry fodder at 25 per cent subsidy among the member producer. At the society level, 25 per cent subsidy is provided for the construction of milk society building, 50 per cent for the purchase of electronic milk tester for fat analysis and 75 per cent for the purchase of siren for ontime milk collection.

As women are the main force in the management of animals, the Sangh arranges to conduct rural 'Ladies Seminars' in order to provide scientific information regarding day to day management of animals, their feeding and to topics related to marketing, etc.

2.4.5 Future Strategy

The Sangh has ambitious future plans which include manufacture of Yoghurt and export of Shrikhand and other products. Increase in the capacity of its powder plant, ghee manufacturing plant and condensed milk production plant also constitute its futuristic goals. Establishment of artificial insemination centres in big villages, construction of silo pits at village levels for preservation of green fodder and manufacture of co-extruded polythene film and corrugated boxes through ladies co-operative societies are envisaged too in future by the Sangh. The goals set forth by the Sangh for its growth are truly worth emulating.

CHAPTER III

SAMPLE VILLAGES AND COOPERATIVE SOCIETIES

This chapter deals with some background information about all the villages selected from our sample districts; as also the primary milk cooperative societies situated therein. Information regarding the number of households, family size, total geographical area and land utilisation pattern in each of the selected villages in both the districts is provided in Table 3.1. There are wide agro-climatic differences in our study districts. Even within the district, different regions have different agro-climatic conditions. Some areas are classified under wet regions while others are included in dry regions. The type of crops grown in a particular area depends on the soil type and agro-climatic conditions. As such, the cropping pattern followed in each of the selected villages is presented in Table 3.2. In view of the fact that bovine wealth plays an important role next to agriculture, species and breedwise composition of bovine population in the selected villages is shown in Table 3.3. Villagewise information regarding the above aspects are delineated hereunder.

3.1 Village Profile

3.1.1 Neri Digar

Neri Digar is situated to the east of Jalgaon, off the Jalgaon-Aurangabad road. The total population of this village, as per 1991 Census, is 3815 and the total number of households are 745 giving an average family size of 5.12. Most of the farmers in this village are either landless or marginal as the average size of holding is about 0.66 ha. Of the total reported area of 592.36 ha., about 4 per cent is classified as barren

and uncultivated land, 5 per cent as current and other fallow land, about 7 per cent as permanent pastures and grazing land. Substantially high proportion of area under cotton and jowar is a healthy sign for the growth of livestock in this village. (Table 3.2).

Cattle rearing is predominant occupation of this village. The proportion of cattle to total bovine population is 72 per cent (Table 3.3). However, most of the breeds of cattle are indigenous and there are only 42 crossbred cows in this village. The availability of gross cropped area per bovine head is worked out to 0.47 hectare. At the same time, the number of bovine heads per 100 human population is around 28.

3.1.2 Wakod

Wakod is also situated on the Jalgaon-Aurangabad road. As per 1991 Census, the total population of this village is 4350 with 793 families giving an average family size of 5.49. The average size of holding is 2.68 ha. indicating that the majority of the farmers fall under medium category. Of the total geographical area, around 96 per cent is cultivated area (Table 3.1). The remaining is classified as barren and uncultivated land, current and other fallow land and permanent pastures and grazing land.

This is one of the important pulse growing villages in the area. The main crops grown in this village are Jowar, Bajra, Cotton, Groundnut, Sesamum and various pulse crops. As revealed by cropping pattern, green fodder and concentrate availability seems to be substantially high in this village.

The total bovine heads in this village are 1592. The concentration of indigenous breeds of cattle is substantially high, accounting for nearly two-thirds of total bovine population. The remaining one-third is of buffaloes. This village possesses only 29 crossbred cows. On an average, the average spread of bovine head per household is around two.

This village is dominated by indigenous breeds of cattle and buffalo. Since the village has ample green fodder, dry fodder, and concentrate availability, the rearing of superior breeds of animals could prove to be a useful proposition.

3.1.3 Pimple Khurd

Pimple Khurd is located to the west of Jalgaon. Though this village has very low concentration of bovine heads, however, it is covered under milk cooperative infrastructure. Nearly 93 per cent of total reported area of the village is cultivated and the remaining is classified as barren and uncultivated land, current and other fallow land and land put to non-agricultural uses (Table 3.1). The account of grazing land to total geographical area is negligible (only 0.44 per cent).

Jowar, bajra and cotton are the main crops grown in this village, accounting for nearly two-thirds of the gross cropped area.

Nearly two-thirds of bovine heads are indigenous breeds of cattle and the remaining are buffaloes in this village. The concentration of bovine heads is very low as compared to other study villages like Neri Digar and Wakod. The average spread of bovine head per household is hardly one in this village. However, the availability of gross cropped area per bovine head is higher than Neri Digar village which also falls under milk cooperative infrastructure.

3.1.4 Mangarul

Mangarul is situated at a distance of only 6 km from Amalner. The number of households and total population of the village are 767 and 4037, respectively, and thus giving an average family size of 5.26. Compared to other three sample villages of Jalgaon district, this village has very high proportion of barren and uncultivated area which is of the order of nearly 15 per cent of total geographical area. Nearly 3

per cent of total geographical area of this village is classified as current and other fallow land, land used for non-agricultural purposes and permanent pastures and grazing land. The remaining 82 per cent of the area is cultivable land.

Of the gross cropped area, the maximum area is under jowar (35 per cent) followed by bajra (22 per cent), cotton (19 per cent), sesamum (6 per cent) and groundnut (4 per cent).

The concentration of bovine head is very high in this village. On an average, a household keeps more than three animals. However, most of the animals are indigenous breeds of cattle, accounting for nearly 87 per cent of total bovine population. Although this village is not covered under milk cooperatives, yet it is an important village in terms of dairy activity. This village is predominated by private milk traders. As the village is situated near Amalner town, the producers have lot of marketing outlets for sale of their milk. One of the reasons for the non-existence of milk cooperative society in this village can be traced in the increasing influence of private traders who not only give higher price to milk producers but also lend them advance money at moderate rates of interest for the purchase of animals.

3.1.5 Shedshal

This village is situated at a distance of about 12 km from Shirol town and 6 km from Kurundvad town. / Krishna river which is a source of irrigation and drinking water. There are 700 households in the village and its total population is 4311. The average size of land holding is around one hectare indicating the predominance of small and marginal farmers. Out of total geographical area of 803.84 hectares, about 96 per cent is cultivable land and the remaining is classified as barren and uncultivated land, land put to non-agricultural uses and permanent pastures and grazing land.

Table 3.1 : Number of Households (1991 Census) and Land Utilisation Pattern (1993-94) in Sample Villages of Jalgaon and Kolhapur Districts.

Particulars	Jalgaon District				Kolhapur District			
	Jamner Taluka		Amalner Taluka		Shirol Taluka		Radhanagari Taluka	
	Neri Digar	Wakod	Pimple Khurd	Mangarui	Shedshal	Ganeshwadi	Ghote-wade	Padsali
1. Number of Households (1991 Census)	745	793	489	767	700	986	355	181
2. Village Population	3815	4350	3104	4037	4311	5008	2565	1051
3. Total Geographical Area (ha.)	592.36	2209.00	238.60	1274.00	803.84	376.44	307.61	1348.09
4. Barren and Uncultivated Land (ha.)	24.71	31.57	7.80	190.00	12.79	2.08	9.17	331.17
5. Current and other fallow land (ha.)	27.46	25.28	4.71	10.00	1.86	2.89	14.05	1152.67
6. Permanent Pastures and Grazing Land	39.00	18.00	1.64	16.00	8.50	1.73	6.13	1.34
7. Total Cultivated Land	492.34 (83.11)	2127.15 (96.29)	221.50 (92.83)	1050.00 (82.42)	772.15 (96.06)	351.18 (93.29)	273.58 (88.94)	349.00 (18.88)

Figures in parentheses are percentage to total geographical area.

Table 3.2 : Cropping Pattern in Sample Villages of Jalgaon and Kolhapur Districts (1993-94)
(in hectares)

Crops	Jalgaon District				Kolhapur District			
	Jamner Taluka		Amalner Taluka		Shirdi Taluka		Radhanagari Taluka	
	Neri Digar*	Wakod	Pimple Khurd*	Mangarui	Shedshal*	Ganeshwadi	Ghotewade*	Padisali
Jowar	119.00	405.03	60.64	379.00	173.00	-	-	-
Bajra	6.00	290.00	48.20	239.00	-	-	-	-
Wheat	-	7.00	-	10.00	24.00	43.00	-	-
Paddy	1.00	2.00	-	-	-	-	70.00	148.48
Groundnut	3.23	90.00	19.89	41.00	-	-	7.00	-
Cotton	204.15	513.00	37.62	203.00	-	-	-	-
Sugarcane	-	-	-	-	288.15	103.00	105.00	12.43
Sesamum	59.03	115.20	22.42	66.00	-	-	-	16.72
Sunflower	2.39	-	0.07	26.00	-	-	-	-
Tur	2.50	27.00	7.23	7.00	-	-	-	-
Soyabean	-	-	-	-	423.00	144.00	-	-
Safflower	-	-	0.87	-	-	-	-	-
Chilli	-	22.00	8.80	31.00	16.00	6.00	-	-
Pulses	50.50	660.05	7.84	18.00	14.00	40.00	-	-
Fruits	1.40	11.00	-	1.00	2.00	10.00	10.00	14.20
Vegetables	12.00	6.00	7.92	3.00	-	9.18	10.58	-
Other Cereals, n.e.s.	-	-	-	-	-	-	62.00	162.17
Other Crops	37.14	1.10	-	50.00	47.00	76.00	9.00	-

* Village under dairy cooperatives.

n.e.s. = Not elsewhere specified.

Table 3.3 : Composition of Bovines (1992 Census) in Sample Villages of Jalgaon and Kolhapur Districts

Particulars (1)	Jalgaon District				Kolhapur District			
	Jamner Taluka		Amalner Taluka		Shirol Taluka		Radhanagari Taluka	
	Neri Digar (2)	Wakod (3)	Pimple Khurd (4)	Mangarul (5)	Shed-shal (6)	Ganesh-wadi (7)	Ghote-wade (8)	Padsali (9)
Cattle								
1. Crossbred Cattle								
a) Male - Young stock	12	4	-	-	7	-	3	-
Adult	4	4	-	-	3	-	1	-
b) Female - Young Stock	17	6	3	-	25	-	52	-
Adult	9	15	5	-	35	9	124	-
i) In Milk	6	7	3	-	22	6	109	-
ii) Dry	3	8	2	-	6	2	2	-
iii) Not calved Even Once	-	-	-	-	7	1	13	-
Total	42 (4.00)	29 (1.83)	8 (2.41)	-	70 (4.35)	9 (1.45)	180 (24.09)	-
2. Indigenous Cattle :								
a) Male - Young Stock	82	127	7	497	15	-	-	62
- Adult	360	506	175	890	150	54	109	96
b) Female - Young Stock	98	135	7	4929	21	2	-	71
- Adult	173	232	25	515	74	1	1	199
i) In Milk	89	105	12	237	24	6	1	80
ii) Dry	78	120	13	275	34	-	-	110
iii) Not calved Even Once	0	7	-	3	10	-	-	9
Total	713 (6.5)	1000 (6.5)	192	2321 (16.15)	260 (16.15)	62 (10.02)	110 (14.73)	428 (59.03)

Table 3.3 (contd.)

	1	2	3	4	5	6	7	8	9
<u>Buffalo</u>									
a) Male - Young Stock		24	44	14	33	98	18	39	26
- Adult		4	4	-	9	2	-	-	170
b) Female - Young Stock		82	134	27	67	422	144	60	27
- Adult		185	381	70	244	758	386	358	74
i) In Milk		167	132	27	128	509	293	329	27
ii) Dry		13	239	42	92	105	86	18	31
iii) Not Calved Even Once		5	10	1	24	144	7	11	16
Total		295 (28.10)	563 (35.36)	111 (33.33)	353 (13.15)	1280 (79.50)	548 (18.53)	457 (61.18)	297 (40.97)
Total Bovine Population		1050	1592	333	2684	1610	619	747	725

Figures in parentheses are percentages to total bovine population.

In fact, the village falls under sugarcane and soyabean growing tract of Kolhapur district. These two crops together account for 72 per cent of gross cropped area. The other important crop grown in this village is jowar which accounts for nearly 18 per cent of gross cropped area. While on one hand, jowar and sugarcane tops serve as important source of green fodder for the animals, on the other hand, wheat bhusa is used as dry fodder. The cropping pattern clearly demonstrates that feeds and fodder availability is quite high in the village which is essential for the continuous health and growth of animals.

Buffaloes are the major milch animals in the village accounting for 80 per cent of total bovine population. The proportion of indigenous breeds of cattle is around 16 per cent and the remaining are crossbred cows. The availability of superior breeds of both cows and buffaloes is high in this village compared to sample villages of Jalgaon district. On an average, a household keeps two bovine heads. Next to agriculture, dairying is an important activity of this village. This village came under milk cooperative infrastructure only during 1993. Before 1993, the producers used to sell their milk to middlemen and private dairies in nearby towns. In order to wean away the producers from the clutches of these private agencies, a milk cooperative society was established on 15th April 1993 by Kolhapur District Cooperative Milk Union. Though the influence of private traders is still on this village, however, the major marketed surplus is cornered by the primary milk cooperative society.

3.1.6 Ganeshwadi

Ganeshwadi is situated on the Kurundvad-Kagvad road, at a distance of about 3 km from Shedshal village. The total number of households are 986 and the average size of land

holding is much below one hectare. The bovine population is also very low in this village. The average spread of bovine per household is only one. However, the availability of gross cropped area per bovine head is higher (0.70 hectare) compared to Shedshal village (0.61 hectare). Nearly 93 per cent of total geographical area of this village is used for cultivation.

Most of the crops are grown under unirrigated conditions. The proportion of irrigated and unirrigated area to gross cropped area is 26 per cent and 74 per cent, respectively. Well and river water are the main sources of irrigation. Because of these irrigation facilities, sugarcane is cultivated on about 24 per cent of gross cropped area. However, soyabean is the main crop of this village accounting for one-third of the gross cropped area.

The concentration of buffaloes is very high in this village, accounting for nearly 98 per cent of total bovine population. Table 3.3 reveals that there are only 9 cross-bred cows and 62 indigenous breeds of cattle. Most of the indigenous breeds of cattle are used for draught purposes. It is interesting to note that the population of she-buffaloes is substantially high in the village. This goes to reflect the increasing importance of dairy business in the village. The farmers used to maintain these milch animals to supplement their farm income. Since this village does not fall under cooperative infrastructure, the farmers used to sell their milk milk/to local milk traders/agents. Normally, the private dairies used to employ middlemen to collect milk from dairy farmers. The middleman in return is paid daily wages as well as a little quantity of milk collected by him for his family consumption. At present, there are three private dairies in this village.

3.1.7 Ghotawade

Ghotawade lies in the high rainfall zone. This village is most densely populated. The total population of the village is 2565 with 355 households giving an average family size of 7.22. Of the total geographical area of 307.61 hectares, about 3 per cent is classified as barren and uncultivated land, 5 per cent as current and other fallow land, about 2 per cent as permanent pastures and grazing land and only 1.5 per cent is meant for non-agricultural uses which also include village area. The remaining 89 per cent area is used for cultivation.

Crops are grown under both irrigated and unirrigated conditions. Nearly 23 per cent of the gross cropped area of the village is under other cereals which include ragi, nachani, etc. The other crops grown in the village are groundnut, fruits and vegetables. Groundnut leaves and sugarcane tops are used as green fodder for the animals.

Both buffalo and cattle rearing is predominant occupation of this village. Compared to the other sample villages of Kolhapur as well as Jalgaon districts, the concentration of crossbred cows is very high in this village. The proportion of crossbred cows to total bovine population is around 25 per cent. The indigenous breeds of cattle are used only for draught purposes. The number of bovine head per 100 human population is around 24 implying that on an average, about 4 persons lay claim on an animal. In other words, the average spread of bovine per household is 2 in the village. Dairying is a subsidiary occupation in the village. This village is under milk cooperative infrastructure for more than 15 years. As the literacy rate is quite high in this village, the farmers are aware of the importance of superior breeds of animals. Because of high concentration of crossbred cows and improved breeds of buffaloes and increasing milk production, this

village is considered as one of the important dairying villages in the area. There are two primary milk cooperative societies in the village. Both are functioning very well from the very beginning of their establishment. Though there are only 355 households in the village, however, on an average, three persons from each household are members of these milk cooperative societies. Because of these two well established milk cooperative societies, the private traders are unable to influence the milk producers by way of higher milk prices and other facilities which are usually observed in non-cooperative villages.

3.1.8 Padasali

This village is also situated to the west of Kolhapur, off the Kolhapur-Panaji highway, at a distance of 60 km from Kolhapur and 25 km from Radhanagari town. This village falls under high rainfall zone and the average annual rainfall in the area is about 2750 mm. The population of the village is very low compared to other sample villages. There are only 191 households in the village and the average family size is 5.50. The average size of land holding is around 2 hectares in the village. The proportion of cultivated area to total geographical area is very low for this village. Of the total geographical area, only 19 per cent is cultivable land. The area classified as barren and uncultivated land and current and other fallow land is as high as 80 per cent. The remaining 1 per cent includes forest area, land used for non-agricultural purposes and permanent pastures and grazing land.

Most of the crops are grown under rainfed conditions. However, 12.43 hectares are irrigated by river water. Paddy is the major crop grown in the village, accounting for nearly 41 per cent of gross cropped area. The other important crops grown in the village are Nachani and Ragi. These two crops

together account for 46 per cent of gross cropped area. Ragi and Nachani are included under other cereals in Table 3.2. Because of high rainfall in the area and other irrigation facilities, sugarcane is cultivated on 12.43 hectares. Sesamum occupies about 5 per cent of gross cropped area.

Though the total bovine population of this village is almost equal to Ghotawade village, however, the number of households are very less in this village. As such, the average spread of bovine per household is around 4. However, most of the bovine heads are indigenous breeds of cattle. The ratio of cows and buffaloes to total bovine population is 60 per cent and 40 per cent, respectively. Though the concentration of bovine head is quite high, a milk cooperative society could not be established in the village as it is located in remote area. The milk producers in this village either convert milk into products like Ghee or sell the liquid milk at a very low price to the middlemen. It is observed that most of the milk producers prefer to convert milk into Ghee which is sold by them at reasonable price in the nearby town. This practice is very common in the village.

3.2 Milk Cooperative Societies

The basic unit for the collection of milk is the village level primary milk producers' cooperative society. It collects milk, makes payment and provides facilities to its member producers. The society provides technical inputs like veterinary first-aid, artificial insemination, balanced cattle-feed, fodder seeds and indirect loans to its producers members. As per the policy enunciated by the National Dairy Development Board, each milk union is supposed to organise all the co-operative milk producers' societies on the model of 'Anand Pattern' under which all the functions of dairying such as milk production, procurement, processing and marketing are

controlled by the milk producers themselves. In addition to this, all the facilities for the improvement of milk production and procurement are provided at farmers' doorsteps. It is obvious that interest of milk producers is more secured under the cooperatives organised under the Anand Pattern. But the conditions prevalent in Jalgaon district are altogether different from that of other districts of Maharashtra. Only about 150 societies of district level milk union are following Anand Pattern of milk collection, accounting for nearly 30 per cent of total working societies of the union. Most of these Anand Pattern societies are in the eastern part of the district. On the other hand, the Kolhapur District Cooperative Milk Union has organised more than 90 per cent of functional societies on 'Anand Pattern'. These facts highlight the differences in the functioning of societies in different districts.

A brief outline of the working of these sample primary milk producers' cooperative societies in each of the study districts is presented separately hereunder.

3.2.1 Sample Milk Cooperative Societies in Jalgaon District

Both the sample villages in Jalgaon district had only one primary milk cooperative society. Information regarding the year of establishment, number of members, paid-up share capital, reserve and other funds, collection and distribution of milk along with sale of cattlefeed to the members and the net profit accrued to the society during 1993-94 are presented in Table 3.4 for each of the sample society of Jalgaon district.

3.2.1.1 Neri Digar Dudh Utpadak Sahakari Sanstha Maryadit, Neri Digar

The milk cooperative society in Neri Digar was established on 25th January 1977 under Cooperative Societies Act (Regd. No. JGA/PRD/A-260/77). As on 31st March 1994, it had 288 members. The paid-up share capital of the society

during 1993-94 was Rs. 83,670. Of the total fund of Rs.89,412 available with the society, 33 per cent was reserve fund, 42 per cent building fund, about 10 per cent livestock improvement fund and the remaining 15 per cent was meant for other emergency purposes. The society collected 72,950 litres of milk during 1993-94 which included collection from members as well as non-members of the society. The total value of milk collected was Rs. 5,57,949. This indicated that the average collection price was Rs. 7.65 per litre. This society procured only buffalo milk during 1993-94. The society disposed off nearly 60 per cent of total milk procured during 1993-94 to the union; 37 per cent was sold in the local market and about 3 per cent was supplied to the municipal corporation school within the village. The society sells milk to the corporation school below the procurement price. The society sold milk to the school at an average price of Rs. 6.97 per litre.

The society sold cattle feed worth Rs. 6,787 during 1993-94. The union manufactures balanced cattle feed under the brand name of 'Vikas' and distributes it to the individual societies affiliated to the union. The society pays Rs.233.80 to the union for each bag containing 65 kg of compounded cattle feed which is sold at the rate of Rs. 240.00 per 65 kg bag. The society incurs Re.1.00 as labour charge for unloading each bag. Thus, it makes profit worth Rs. 5.20 per bag of cattle feed.

The society provides indirect loan to its members. In order to provide loan to its members for the purchase of animals, the society takes loan from the Jalgaon District Central Cooperative Bank Ltd., which has one of its branches at the village. The society takes loan at the rate of interest of 7.5 per cent per annum which is disbursed to its members at the rate of 10.5 per cent. The loan is sanctioned for 30

months. A producer can avail loan upto Rs. 6,000 for the purchase of one animal. Out of this loan money, 10 per cent is kept by the society as share capital. The society recovers the loan money by deducting every month Rs. 300 from the payment of the member. As soon as 50 per cent of loan money is recovered by the society from the payment of members, the member becomes entitled for taking loan for another animal. However, for the second animal, the society keeps only 5 per cent of loan money as share capital. At the most, a member can avail loan for two animals.

The society also procures milk from non-members. However, the non-members are paid Re.0.10 per litre less than the member. This helps the society to increase its total profit. The society makes payment after every 10 days to its members in the form of cheque. However, 3 paise per litre is deducted by the society as share capital from the payment.

The veterinary facilities were provided by the society till 1992. For last two years the union has completely stopped extending such facilities. Now this facility is provided by the Animal Husbandry Department of Zilla Parishad.

In the end of each year, the society distributes the net annual profit to its members. The total profit for the society during 1993-94 was Rs. 3,577. If we work out net annual profit per member, it comes out to only Rs. 12 per member. Though the society is not running in loss, however, the profit per member is very low. The reason for lower profit during 1993-94 can be traced in higher expenditure made by the society during 1993-94. The major components of the expenditure are wages and salaries paid to the staff and other administrative expenses. The administrative expenses exceeded the wages and salaries paid to the staff during 1993-94.

Table 3.4 : Selected Statistics of Sample Societies in Jalgaon District (1993-94)

	Name of Village			
	Neri Digar	Pimple Khurd		
Name of Primary Milk Co-operative Society	Neri Digar Dudh Utpadak Sahakari Sanstha, Mydt.	Pramod Dudh Utpadak Sahakari Sanstha, Mydt.		
Registration No. with date	JGA/PRD/A-260/77 25-1-1977	JGA/PRD/A-648/71 31-3-1971		
Number of Members	268	210		
Paid-up share capital as on, 31-3-1994	83,670	42,330		
<u>Available Funds (Rs.)</u>				
a) Reserve Fund	29,222	8,713		
b) Building Fund	37,823	39,266		
c) Livestock Improvement Fund	8,738	-		
d) Other Fund	13,629	3,704		
Total Fund	89,412	51,683		
sale of Cattlefeed (Rs.)	6,787	15,748		
net profit during 1993-94	3,577	8,714		
Milk Collection	Quantity (ltrs)	Value (Rs.)	Quantity (ltrs)	Value (Rs.)
a) Buffalo	72,950	5,57,949	44,895	3,54,510
b) Cow	-	-	18,746	1,10,522
Total	72,950	5,57,949	63,551	3,65,032
<u>Sale/Distribution of Milk (%)</u>				
a) Union	59.62	52.43	44.96	36.19
b) Local Market	36.80	44.48	48.34	57.99
c) School	3.58	3.09	6.70	5.82

Source : Annual Report of Village Society, 1993-94.

3.2.1.2 Pramod Dudh Utpadak Sahakari
Sanstha Maryadit, Pimple Khurd

This is one of the oldest societies of the union. It was registered on 31st March 1971 under the Cooperative Societies Act (Regd.No. JGA/PRD/A-648/71). As on 31st March 1994, the number of members were 210 which is quite large in view of the fact that the number of households in the village were only 489. This goes to reflect that almost every bovine keeping household in the village is a member of the society. As on 31st March 1994, the society had Rs. 42,330 as share capital and Rs. 51,683 as reserve, building and other funds. It is interesting to note that the total procurement as well as value of milk procured is very low for this society compared to its counterpart in Neri Digar. However, the net annual profit is much higher. This is mainly because of lower administrative expenses incurred by the society during 1993-94. The wages and salaries paid to the staff members and other administrative expenses were Rs. 16,080 and Rs. 8,707, respectively, during 1993-94. On the other hand, these expenses were Rs. 24,720 and Rs. 35,540, respectively, in the case of society in Neri Digar. This clearly demonstrates the reason for lower profit for the society in Neri Digar and higher for this society. It can also be observed from the table that the average procurement price for this society is much below the procurement price found in the society in Neri Digar. The average procurement price per litre was Rs. 5.74 for this society during 1993-94. The lower procurement price is due to the absence of proper fat testing equipment with the society. The society procures both buffalo as well as cow milk. The proportion of buffalo and cow milk to total milk procurement was 70 per cent and 30 per cent, respectively, during 1993-94. The major portion of the milk procured by the society during 1993-94 was sold in the nearby local markets.

at an average sale price of Rs. 8.73 per litre. The quantity of milk sold to the municipal corporation school was much higher than what was observed in the case of society in Neri Digar. In fact, the society sells milk to the corporation school higher than the procurement price. During 1993-94, it sold 4,261 litres of milk to the corporation schools at an average price of Rs. 6.32 per litre.

The society sold cattle feed worth Rs. 15,748 during 1993-94. Though the number of members of this society are much lower than the society in Neri Digar village, however, the cattle feed sale is substantially high by this society. It is really surprising that though Pimple Khurd has one-third of the bovine population of Neri Digar, yet the cattle feed sale by the society is more than double compared to the society in Neri Digar. It seems that the producers in Neri Digar village prefer home-made concentrate mix instead of the union's compounded cattle feed.

This society also provides loan to its member producers for the purchase of milch animals and the procedure for loan advancement is similar as it is found in the case of society in Neri Digar. This society also procures milk from non-members and pays Re.0.10 per litre less than the member. The society earned Rs. 8,714 as profit during 1993-94 which gives a profit of Rs. 41 per member. Thus, though this society is not covered under Anand Pattern of milk collection and that its procurement price is much below the procurement price of well-equipped societies, yet the annual profit for this society is much higher.

3.2.2 Sample Milk Cooperative Societies in Kolhapur District

At present two milk cooperative unions are functioning in Kolhapur. They are Kolhapur District Cooperative Milk Union and Shri Warna Sahakari Dudh Utpadak Prakriya Sangh Ltd..

While on one hand Kolhapur District Cooperative Milk Union covers all the talukas of the district, on the other hand, the area of operation of Warna Dudh Sangh is confined to only two talukas, namely, Panhala and Hatkanangale. For our study, sample villages were selected only from the area which came under the umbrella of district level milk union. An interesting feature of the functioning of milk cooperative societies in Kolhapur district was that in Kolhapur most of the villages covered under district level milk union had 2 to 3 milk societies. This type of practice was totally absent in Jalgaon district. The root cause for the establishment of 2 to 3 milk societies in each village was to corner maximum marketed surplus of milk from the village.

In our sample villages, there were 3 milk cooperative societies, one in Shedshall village and two in Ghotawade village. Information regarding the year of establishment of the society, its membership, share capital, reserve and other funds; collection and distribution of milk, sale of cattle feed during 1993-94 is brought out in Table 3.5. Societywise information on the above aspects is delineated hereunder.

3.2.2.1 Shetkari Sahakari Dudh Vyavasai Sanstha Maryadit, Shedshall

This society was established only two years back. It was registered on 15th April 1993 under Cooperative Societies Act. (Regd.No. KPR/SRL/AGR(0)549). Before establishment of this society, the producers used to sell milk in Ganeshwadi village which is very near to this village. At present there are three private dairies in Ganeshwadi village. In fact, Ganeshwadi has also been selected by us as a non-cooperative village. Even after the establishment of cooperative society in Shedshall, some producers prefer to sell milk to these private dairies in Ganeshwadi village. Some of the producers still find it difficult to come out of the clutches of these

private traders. These private traders provide facilities such as loan advancement for the purchase of milch animals, advance payment for the milk and they even provide veterinary and health care facilities. They normally provide such producer-friendly services to ensure a steady supply of milk to their dairy. The establishment of cooperative society in Shedshall village has affected the business of these private traders to a considerable extent.

At present the milk cooperative society in Shedshall village has 311 members with Rs. 25,200 as share capital, Rs. 159 as reserve fund and Rs. 723 as building fund. The society collected 72,472 litres of milk during 1993-94 at an average procurement price of Rs. 7.21 per litre. Out of milk procured by the society during 1993-94, nearly 96 per cent was collected by the milk union to which the society is affiliated. The remaining quantity was sold by the society in the local market, municipal corporation school and to other agents. Normally, the society sells 5 to 6 litres of milk per day within the village. This milk is sold to the non-producers of milk at an average per litre price of Rs. 11.50.

The society accepts milk from members as well as non-members. However, non-members cannot claim share in profit which accrues to the society. Further, the society gives same rate for milk to the non-members as given to members. The morning milk is collected from 6 a.m. to 7 a.m. and the evening milk from 5 p.m. to 6 p.m. The quantity of milk procured in the morning is more than 60 per cent of the total daily milk procurement by the society.

The society sells compounded cattle feed which is manufactured by the milk union under the brand name of 'Mahalaxmi Pashukhadya'. During 1993-94, Rs. 68,698 worth of cattle feed was sold by the society to its members.

The society also provides loan to its members for the purchase of milch animals. However, such loan facilities are provided to only those members who are also beneficiaries of I.R.D.P. In order to provide loan to its members, the society takes loan from the Kolhapur District Central Cooperative Bank at the rate of interest of 8.75 per cent per annum which is disbursed to its members at 12.0 per cent rate of interest. Each member can avail loan upto Rs. 6,000 for the purchase of one animal. The loan is provided in accordance with the bank norms. Out of the loan amount sanctioned to the member, 10 per cent is kept by the society as share capital and Rs. 372 as insurance money. In order to recover the loan money, it uses a unique method. It does not make payment for the morning milk which is delivered by the producer member and treats it as a part of repayment amount for the loan until and unless the whole amount is recovered. However, the member gets full payment for the evening milk provided he has not purchased cattle feed from the society on credit. In case cattle feed is purchased on credit, the society will again deduct a fixed amount from the payment of evening milk. Thus, the society does not face any problem in terms of recovery of loan and cattle feed which is, normally, sold to the member on credit.

In order to check fat and SNF, the society purchased a milk tester for Rs. 21,500. However, a subsidy of Rs. 3,000 was provided by the Union for the purchase of this equipment. This society also provides fodder seeds to the members. Veterinary facilities are provided once in a week to the members of the society through milk union. These services are provided free of cost.

The wages and salaries of the employees of the society are given from the profit which accrues to the society. The net profit earned by the society during 1993-94 was Rs. 22,283

Table 3.5 : Selected Statistics of Sample Societies in Kolhapur District (1993-94)

	Name of Village		
	Shedshal	Ghotawade	
		Society I	Society 2
Name of Primary Milk Cooperative Society	Shetkari Sahakari Dudh Vyavasai Sanstha Maryadit	Shri Hanuman Sahakari Dudh Vyavasai Sanstha, Maryadit	Shri Swembhu Sahakari Dudh Vyavasa Sanstha, Maryadit
Registration No. with Date	KPR/SRL/AGR (O)549 15-4-1993	KPR/PRD(A) 552/72 24-8-1972	KPR/AGC(D) 1136 31-8-1979
Number of Members	311	576	348
Paid-up share capital as on 31-3-1994	25,200	1,25,800	27,330
Available Funds (Rs.)			
a) Reserve Fund	159	1,98,377	56,941
b) Building Fund	7,234	3,75,274	65,119
c) Livestock Improvement Fund	-	23,950	9,547
d) Other Fund	-	82,444	4,466
Total Fund	7,393	6,80,045	1,36,073
Sale of Cattle Feed (Rs.)	68,698	6,83,679	2,16,364
Milk Collection			
a) Quantity (ltrs)	72,472	2,54,660	74,555
b) Value (Rs.)	5,22,522	18,64,064	5,47,290
Sale/Distribution of Milk (%)			
a) Union	96.10	75.44	86.39
b) Local Market	0.46	15.79	11.99
c) School/Others	3.44	8.77	1.62
Net Profit During 1993-94	22,283	55,740	75,932

Source : Annual Report of Village Society, 1993-94

indicating a profit of Rs. 72 per member during 1993-94. This profit may be considered substantial as this is the beginning of the society.

3.2.2.2 Shri Hanuman Sahakari Dudh Vyavasai
Sanstha Maryadit, Ghotawade

This is considered one of the best and progressive societies of the union. It was established on 24th August 1972 under the Cooperative Societies Act (Regd.No. KPR/PRD(A) 552/72). It had 576 members as on 31st March 1994. Though the total number of households in the village are only 355, as per 1991 Census, however, 2 to 3 persons from each bovine keeping households are members of this society. Its share capital is 5 times more than the share capital of the society in Shedshall village. Of the total fund of Rs. 6,83,679 available with the society, 55 per cent is building fund, 29 per cent reserve fund and the remaining fund is meant for the improvement of live-stock and for other emergency purposes. During 1993-94, the society sold Rs.6,83,679 worth of cattle feed and earned a profit margin of Rs. 5,582 through cattle feed sale alone. The quantity of milk procured during 1993-94 was 2,54,660 litres which gave an average daily procurement of about 700 litres. This is a noteworthy achievement for the society. The average procurement price was Rs. 7.32 per litre during 1993-94. The society procures both buffalo as well as cow milk. The proportion of buffalo and cow milk to total milk procurement was observed to be equal during 1993-94. One of the distinguishing features of this society is that it does not accept non-members' milk. Out of total milk procured by the society during 1993-94, about 75 per cent was collected by the union. The society also sells milk in the local market. On an average, it sells about 100 litres of milk in a day in the local nearby markets at an average sale price of Rs. 10 per litre.

Before 1993-94, the society used to deduct 5 paise per litre as share capital from the payment of the member. However, from 1993-94, it has completely stopped this practice. The society also deducts 30 paise per litre as provident fund which is disbursed to the member after 5 years.

The society has quite ambitious schemes. The maximum contributor of milk during a year is provided Rs. 5,000 as a reward. In addition to this, the society also gives reward to the member whose overall fat percentage is maximum during a year. It also conducts milking competitions and the winner is suitably rewarded.

The profit which accrues to the society is disbursed to the member in the form of dividend in accordance with his share money. The dividend is 12 per cent of share money. The society's net profit during 1993-94 was Rs. 55,740. However, it was less than half of the profit which it earned during 1992-93. Its profit during 1992-93 was Rs. 1,32,036. This indicates that the profit declined by 58 per cent in 1993-94 over 1992-93. Still, compared to other societies of the union, its profit is quite high.

3.2.2.3 Shri Swembhu Sahakari Dudh Vyavasai Sanstha Maryadit, Ghotawade

Normally, the State Government does not register two or more milk cooperative societies in one village. However, at Ghotawade, perhaps in view of the large quantity of milk produced in the village, it permitted the Swembhu Co-operative to be established on 31st August 1979. The rapid progress of this cooperative should be appreciated if we look into the statistics for last 5 years (Table 3.6).

Although membership has declined over last 5 years, yet total milk collection as well as net annual profit has increased substantially. Majority of the members of this

Table 3.6 : Progress of the Society from 1989-90 to 1993-94

Year	No. of members	Milk collection (litres)	Net profit (Rs.)	Dividend (%)	Audit category
1989-90	392	47,876	11,911	6.0	C
1990-91	392	46,574	25,243	9.0	B
1991-92	418	44,472	23,822	9.0	A
1992-93	281	85,416	72,690	9.0	A
1993-94	348	74,556	75,933	9.0	A

society are also members of Hanuman Cooperative. The annual milk collection of the society declined from 47,876 litres during 1989-90 to 44,472 litres by 1991-92, but it increased to 85,416 litres by 1992-93. The society showed rapid progress in terms of net annual profit which increased many-fold over last 5 years. Its profit was only Rs. 11,911 during 1989-90. However, by 1993-94, it increased to Rs. 75,933, an increase of 538 per cent. This seems to be a commendable achievement for the society. In fact, a rapid increase in net profit was observed from 1992-93 and onwards.

As on 31st March 1994, the society had Rs. 27,330 as share capital and Rs. 1,36,073 as reserve, building, livestock improvement and other funds. The society procured 74,555 litres of milk during 1993-94 at an average procurement price of Rs. 7.34 per litre. Out of this milk, about 86 per cent was collected by the Milk Union and the remaining quantity was sold in the local market and municipal corporation school within the village. The average daily quantity of milk distributed in corporation school was only around 3 to 4 litres. On an average, the society sells 25 litres of milk within the village at an average sale price of Rs. 10 per litre. The society has

also showed remarkable progress in its cattle feed sale. The sale of cattle feed had increased from Rs. 77,091 during 1991-92 to Rs. 2,16,364 by 1993-94, an increase of 181 per cent over preceding two years.

The society provides similar kind of facilities to its members as observed in the case of Hanuman Milk Cooperative which is working parallel to this society in Ghotawade village. Since most of the members of these two cooperatives are common and that both the societies belong to the same union, the business of these two societies is not at all affected and there is no professional rivalries between these two societies.

CHAPTER IV

IMPACT OF MILK CO-OPERATIVES ON SAMPLE PRODUCERS

With the background of the functioning of various milk co-operative unions and sample primary milk co-operative societies in our study districts, we are now in a position to study the wholesome impact of these milk co-operatives on the sample producers. Thus, commensurate with the objectives set forth for the study, the results are presented in this chapter under six different sections. The first and second sections deal with the socio-economic profile of sample cattle keepers. Encompassing in these sections is information on such important aspects as the breeding efficiency of bovines and the productivity of different breeds of bovines owned by the sample households, investment pattern on milch animals, cattle shed and dairy equipment and the feeding practices followed by the sample households. The third section entails an empirical analysis of input-output relationships in milk production for different herd size categories of households. The market structure prevailing in different sample areas alongwith the actual quantities of milk marketed by our sample households during different seasons are brought out in the fourth section. The analysis related to pattern of labour employment and comparative economics of milk production for different breeds of milch animals is presented in the fifth section. The sixth section seeks to analyse producer's response and attitude towards becoming a member of a milk cooperative

society and the benefits that might accrue to him from such an action. This analysis encompasses various types of those facilities that are normally provided to producers to help them streamline their dairy related activity such as providing various inputs in terms of loans for milch animals, the extent of subsidy on such loans, veterinary and health care services. This section also places onus on analysing the various problems that are usually faced by the producers in availing such input and extension facilities through the medium of co-operatives.

4.1 Socio-Economic Profile of the Household

The socio-economic characteristics of cattle keepers have a profound influence on the decision making process and profitability of dairy enterprise. The data collected from 120 cattle keepers spread over two areas, extension and control, and three herd size categories represent a cross-section of milk producers in Jalgaon and Kolhapur districts who have been extensively surveyed in this study. An effort has been made in this section to compare and contrast the resource endowments of different categories of cattle keepers in both the sample packets of the districts. The information relating to family size and composition, education, size of operational holding along with herd size in standard animal units, distribution of animals in different categories of households has been analysed and discussed in the sub-sections that follow.

4.1.1 Family Size and Composition

Running a dairy enterprise on traditional lines is a labour intensive operation where the composition and size of the family of a milk producer are important considerations.

The viability of a dairy enterprise at village level often depends on such important factors. Information on the average size of producer family(ies) and their sex-wise and age-wise break-up is presented in Table 4.1. The average size of a family consisted of 5 persons in both extension and control areas and it held true for both Jalgaon and Kolhapur districts. On a facile view, the number of members in the family increased with the increase in the age group, the number of those above 15 years age group being predominantly more. The number of male members was significantly higher than females in all categories of households for both the districts, except in the case of large farmers in control area of Jalgaon district where number of females outnumbered males. The average number of females was slightly higher in control group than in extension group. The number of members in more than 15 years age category, both among males and females, was higher in all categories of households. This substantiates the foregoing that a higher workforce is usually required to run a traditional dairy enterprise. The availability of a higher workforce was more in extension area compared to control area.

4.1.2 Educational Status

The standard of education has a definite bearing on a dairy farmer's response to improved technology and extension services. A responsive and enlightened farmer only acts to improve technology and market performance because of his higher motivation that helps him to take effective managerial decisions to supply milk, to diversify his farm business and thereby, to earn more. Such motivated responsive farmers are very much needed to run professional dairy enterprises that warrant quality managerial inputs. In a village set up, the decision maker of a family is usually either its head or any other elderly economically active person of this family. All decisions regarding primary and secondary occupations that

Table 4.1 : Family Composition According to Sex, Age and Category of Milk Producers

Household category	No. of house- holds	Male				Female				Overall average family size	Sex ratio
		Less than 5 years	5-15 years	More than 15 years	Total	Less than 5 years	5-15 years	More than 15 years	Total		
<u>Jalgaon District</u>											
<u>Cooperative (Extension)</u>											
Small	16	0.35	0.65	2.18	3.18	0.35	0.47	1.53	2.35	5.53	739
Medium	10	0.13	0.62	2.00	2.75	-	0.88	1.75	2.63	5.38	956
Large	4	0.20	0.60	2.00	2.80	-	0.20	2.20	2.40	5.00	857
Overall	30	0.27	0.63	2.10	3.00	0.20	0.53	1.70	2.43	5.43	810
<u>Non-cooperative (Control)</u>											
Small	16	0.13	0.62	2.00	2.75	0.06	0.63	1.44	2.13	4.88	775
Medium	8	0.56	0.33	2.34	3.23	0.22	0.67	1.89	2.78	6.01	861
Large	6	0.20	0.60	1.80	2.60	1.00	0.60	1.60	3.20	5.80	1231
Overall	30	0.27	0.53	2.07	2.87	0.26	0.64	1.60	2.50	5.37	871
<u>Kolhapur District</u>											
<u>Cooperative (Extension)</u>											
Small	23	0.13	0.61	2.09	2.83	0.26	0.39	1.48	2.13	4.76	753
Medium	4	0.25	0.25	2.50	3.00	0.75	-	1.75	2.50	5.50	833
Large	3	-	0.33	3.34	3.67	-	0.33	2.34	2.67	6.34	728
Overall	30	0.13	0.53	2.27	2.93	0.30	0.33	1.60	2.23	5.16	761
<u>Non-cooperative (Control)</u>											
Small	18	0.44	0.39	1.83	2.66	0.39	0.72	1.44	2.55	5.21	959
Medium	8	0.63	0.13	2.12	2.83	0.50	-	1.88	2.38	5.26	826
Large	4	1.50	-	2.50	4.00	0.25	0.25	1.75	2.25	6.25	563
Overall	30	0.63	0.27	2.00	2.90	0.40	0.47	1.60	2.47	5.37	852

should be practiced by a family are taken by such a person. Since such decision makers have important roles in determining the health of a dairy enterprise, it was thought prudent and desirable to ascertain the educational status of such a member in case of a producer family.

As the managerial decisions are influenced by the educational level of the head of a household as well as the earning family members, the average number of years of schooling of head of the household and its all other earning family members was taken as a measure of family education index. The information on educational indices concerning head of the household and other earning family members encompassing the Extension and Control areas and all three categories of cattle keepers is presented in Table 4.2. The head of the household had an education index of 8 years and 6 years in terms of number of years of schooling undergone for the extension and control areas, respectively in Jalgaon district and these indices for the extension and control areas of Kolhapur district were 7 years and 5 years, respectively. Both the sample districts showed a much better education index for the other earning family members compared to the head of the household. The family education index increased with increase in herd size category and was observed to be more in extension areas than in control ones. On the whole, cattle keepers in the medium and large herd size categories attained higher education level and appeared to be better equipped to take effective managerial decisions than cattle keepers in small category.

4.1.3 Size of Land Holding and Herd Strength

Land is the main resource base of the farmers in the production process. The economic and social progress of the households largely depends on the size of their operational holdings. Keeping in view the significance of land resources,

Table 4.2 : Education Index of Head of the Household and Earning Family Members

Household category	Head of household		Earning family members	
	Mean	SE	Mean	SE
<u>Jalgaon District</u>				
<u>Extension</u>				
Small	7.25	0.5830	7.96	0.4168
Medium	7.80	1.2791	8.58	0.9812
Large	7.75	1.4737	10.68	1.0869
Overall	7.50	0.9338	8.53	0.6943
<u>Control</u>				
Small	5.50	1.2469	5.87	0.6166
Medium	6.00	0.8101	8.12	0.8012
Large	5.00	1.6833	9.23	0.9729
Overall	5.53	1.2177	7.14	0.7371
<u>Kolhapur District</u>				
<u>Extension</u>				
Small	7.13	0.8024	8.10	0.7812
Medium	6.75	2.1615	8.71	1.2134
Large	9.00	2.0548	11.03	0.9181
Overall	7.27	1.1039	8.47	0.8525
<u>Control</u>				
Small	3.83	0.7254	5.97	0.4962
Medium	9.50	2.1287	6.14	1.2162
Large	3.25	1.6346	9.27	1.1113
Overall	5.34	1.2208	6.46	0.7702

SE : Standard Error

the distribution of average size of operational holdings for different herd size categories is presented in Table 4.3.

It was observed that in Jalgaon district the overall average size of operational holding was higher in extension area compared to that in control area. The scenario in Kolhapur district in contrast was entirely different with the average size of land holdings being much higher in case of beneficiaries compared to non-beneficiaries. Not only this, the average size of land holding in Kolhapur district was less than one third of the land holding size of the farmers

in extension area of Jalgaon district. In control area too, it was lower in Kolhapur compared to Jalgaon district. The fact that operational holdings increased with increase in herd size category for both extension and control areas was the only point of commonality between the two districts. And, this showed that a positive association existed between the herd size category and the operational land holding.

Table 4.3 : Average Size of Land Holding and Total Herd Strength in Standard Animal Units (SAU)

Household category	Jalgaon District			Kolhapur District		
	Operational Holding (OH)(ha)	Standard Animal Units	OH/SAU	Operational Holding (OH)(ha)	Standard Animal Units	OH/SAU
<u>Extension</u>						
Small	2.86 (0.73)	4.08 (0.25) (2.53)*	0.70	0.97 (0.19)	3.65 (0.17) (2.34)*	0.27
Medium	4.62 (1.25)	6.53 (0.33) (4.31)*	0.71	2.23 (0.34)	5.73 (0.17) (3.96)*	0.39
Large	7.29 (1.01)	9.15 (0.93) (5.51)*	0.80	2.97 (1.76)	8.03 (0.33) (5.70)*	0.37
Overall	4.04 (0.94)	5.57 (0.37) (3.61)*	0.73	1.34 (0.37)	4.37 (0.19) (2.89)*	0.31
<u>Control</u>						
Small	2.57 (0.60)	3.76 (0.26) (2.26)*	0.68	2.44 (0.70)	3.62 (0.23) (2.29)*	0.67
Medium	2.02 (0.37)	5.51 (0.38) (3.36)*	0.37	2.44 (0.85)	4.63 (0.14) (3.18)*	0.53
Large	6.09 (1.78)	7.83 (0.24) (5.01)*	0.75	2.63 (1.74)	6.55 (0.20) (4.72)*	0.40
Overall	3.13 (0.77)	5.04 (0.29) (3.10)*	0.62	2.47 (0.88)	4.28 (0.20) (2.85)*	0.58

Figures in parentheses are standard errors.
Figures in parentheses with asterisk are number of milch animals in SAU.

As a matter of fact, each individual sample household maintained different species, breeds and types of animals. Therefore, a comparison of number of animals held by each household does not strictly hold good. In order to have a valid comparison, different categories of animals maintained in a household were converted into Standard Animal Units (SAU) using the conversion factor suggested by Kumbhare et al (1983) and the same is presented in Table 4.3. Both the sample areas in the two districts had similar number of animals maintained in terms of SAU as is easily discernible from Table 4.3. In the same vein the number of milch animal units maintained by individual cattle keepers was also the same for both the areas. However, the number of animals maintained under SAU increased with the increase in herd size category. On an average, the number of animals in SAU was 6 in extension and 5 in control area of Jalgaon district. In Kolhapur district, the households maintained about 4 animals in SAU. Further, as the land holding size of large category of household was very high, the land-animal ratio was also high for this category; it held true for both extension and control areas of Jalgaon district. However, in Kolhapur district, a similar trend could not be observed vis-a-vis the land animal ratio and the latter was found higher for medium category in the extension area and for small category in control area. The land-animal ratio, in fact, showed a consistent decline with increase in herd size category in the control area of Kolhapur district. It is not very difficult to discern a reason for this. As the operational holding remained almost constant for different categories of households, the increase in the number of animals under SAU with increasing herd size category caused a decline in the land-animal ratio.

4.1.4 Average Number of Animals Per Household

The number of animals of different species and breeds on the household indicates the economic status of the owner. A frontal emphasis on breedwise composition of the cattle heads is necessary to bring home the preference, if not indifference, of cattle keepers to specify dairy animal breeds as dictated by the production condition milieu. The different types of animals maintained by milk producing household were classified into four categories, namely, local buffalo, Murrah or Graded Murrah buffalo, local cow and crossbred cow. Table 4.4 gives the average number of milch stock in each breed category per household for both Extension and Control areas and of Jalgaon and Kolhapur districts.

The breed composition of various animals maintained by different households revealed that buffaloes were the major milch animals in the study area. Nearly 85 percent of the animals maintained were buffaloes in extension and 75 percent in control area of Jalgaon district. The remaining were cattle. In Kolhapur district, the ratio was 75 percent and 86 percent in respective areas. Among the buffaloes in Jalgaon district, in the extension area nearly 99 percent were local breeds of buffaloes and only 1 percent were superior breeds of buffaloes; while it was 94 per cent and 6 per cent respectively in control area. In Kolhapur district, the ratio was 84 percent and 16 percent in extension area and 92 per cent and 8 per cent in control area. Among cattle, the percentage of crossbred cattle was more in extension area; while local cattle were more in control area and this trend was common to both the sample districts. In general, households in extension area possessed better breeds of buffaloes compared to control area.

4.1.5 Order of Lactation

The milk production potential of animals increases with increase in their physical maturity which is normally attained

Table 4.4 : Breedwise Average Number of Milch Animals Per Household in Jalgaon and Kolhapur Districts

Household category	Jalgaon District					Kolhapur District				
	Local buffalo	Murrah buffalo	Local cow	Cross-bred cow	Total	Local buffalo	Murrah buffalo	Local cow	Cross-bred cow	Total
<u>Extension</u>										
Small	1.69 (84.50)	-	0.06 (3.00)	0.25 (12.50)	2.00	1.43 (71.86)	0.04 (2.01)	0.22 (11.06)	0.30 (15.07)	1.99
Medium	2.70 (97.47)	-	0.01 (0.36)	0.06 (2.17)	2.77	1.75 (50.00)	0.50 (14.29)	0.25 (7.14)	1.00 (28.57)	3.50
Large	3.50 (60.87)	0.25 (4.35)	1.25 (21.74)	0.75 (13.04)	5.75	2.33 (46.60)	2.00 (40.00)	0.67 (13.40)	-	5.00
Overall	2.27 (82.56)	0.03 (1.09)	0.20 (7.27)	0.25 (9.09)	2.75	1.56 (62.65)	0.30 (12.05)	0.27 (10.84)	0.36 (14.46)	2.49
<u>Control</u>										
Small	1.75 (87.50)	-	0.25 (12.50)	-	2.00	1.88 (94.00)	0.06 (3.00)	0.06 (3.00)	-	2.00
Medium	2.50 (73.96)	-	0.88 (26.04)	-	3.38	2.88 (88.34)	0.13 (3.99)	0.25 (7.67)	-	3.26
Large	3.17 (54.28)	0.67 (11.47)	1.50 (25.69)	0.50 (8.56)	5.84	2.00 (40.00)	1.00 (20.00)	2.00 (40.00)	-	5.00
Overall	2.23 (71.25)	0.13 (4.15)	0.67 (21.41)	0.10 (3.19)	3.13	2.16 (79.12)	0.20 (7.33)	0.37 (13.55)	-	2.73

Note: Figures in parentheses are percentage of total number of milch animals.

between the age of 8 and 9 years. The order of lactation which is highly correlated with age, therefore, yields an indirect effect on milk yield of dairy cattle. It has been observed that milk yield of an animal increases from first lactation to third/fourth lactation and, thereafter, it shows a declining trend. Animals in first four lactations are said to be in the increasing phase and animals from fifth lactation onwards are said to be in the declining phase of productive life. A distribution of animals according to the order of lactation in the selected households gives us the composition of the herd according to the productive ability of the animals (Table 4.5). It was observed that more than 80 percent of the animals were in the first four order of lactation and hardly 10 to 12 percent of the animals were in fifth or higher lactation. Thus, almost all the milch animals in the selected households were in the increasing phase of lactation in extension as well as control areas of our study districts. The milk producers in the study area preferred to maintain their animals in the increasing productive phase only. This further reflects their economic and management acumen in efficiently running their milk production enterprise.

4.2 Productivity, Investment, Pattern and Feeding Practices Followed

4.2.1 Average Milk Yield per Animal

Milk yield is the main output of economic significance in the milk production cycle since it is the milk yield that ultimately brings in returns to the cattle keepers in a dairy enterprise. The yield potential depends upon a number of factors like breed, stage and order of lactation, quality and quantity of feeds, seasons and the management. The reliable estimation of milk yield in murrh buffaloes and crossbred cows was constrained by the small number of

Table 4.5 : Distribution of Animals According to Order of Lactation

Category/ Breed	Order of lactation							To- tal
	1	2	3	4	5	6	7 and more	
<u>Jalgaon District</u>								
<u>Extension</u>								
LB	12 (17.65)	16 (23.53)	16 (23.53)	12 (17.65)	9 (13.23)	-	3 (4.41)	68
MB	-	-	1 (100.00)	-	-	-	-	1
LC	-	3 (42.86)	3 (42.86)	1 (14.28)	-	-	-	7
CBC	2 (18.19)	3 (27.27)	1 (9.09)	3 (27.27)	1 (9.09)	1 (9.09)	-	11
<u>Control</u>								
LB	4 (5.97)	21 (31.34)	16 (23.88)	16 (23.88)	9 (13.43)	-	1 (1.50)	67
MB	1 (25.00)	2 (50.00)	-	1 (25.00)	-	-	-	4
LC	4 (19.05)	8 (38.10)	3 (14.29)	2 (9.52)	2 (9.52)	1 (4.76)	1 (4.76)	21
CBC	2 (66.67)	1 (33.33)	-	-	-	-	-	3
<u>Kolhapur District</u>								
<u>Extension</u>								
LB	2 (4.08)	12 (24.49)	13 (26.53)	12 (24.49)	6 (12.24)	1 (2.04)	3 (6.13)	49
MB	-	4 (50.00)	4 (50.00)	-	-	-	-	8
LC	1 (33.33)	2 (66.67)	-	-	-	-	-	3
CBC	-	5 (33.33)	5 (33.33)	2 (13.33)	2 (13.34)	-	1 (6.67)	15
<u>Control</u>								
LB	6 (8.45)	26 (36.62)	25 (35.21)	12 (16.90)	2 (2.82)	-	-	71
MB	-	1 (100.00)	-	-	-	-	-	1
LC	-	6 (60.00)	2 (20.00)	2 (20.00)	-	-	-	10
CBC	-	-	-	-	-	-	-	-

Note: LB = Local buffalo; MB = Murrah buffalo; LC = Local cow; CBC = Crossbred cow.

observations, particularly in different category of milk producers. The average milk yield per day per lactating animal for different seasons and breeds of animals maintained by different herd size category of milk producer households in extension and control areas of our study districts are cited in Tables 4.6 and 4.7.

The overall average milk yield per animal in milk per day was 6.20 litres for local buffaloes, 8.00 litres for murrah buffaloes, 4.07 litres for local cows and 7.66 litres for crossbred cows in the extension area of Jalgaon district (Table 4.6). The corresponding figures in control area of this district were 5.24, 8.11, 3.52 and 7.00 litres, respectively. Thus, the milk yield per animal per day in Jalgaon district was higher in extension than in control area. In Kolhapur district too, the milk of various breeds of animals was much higher in extension compared to control area. The higher productivity of animals observed in extension area could be due to better feeding, breeding and management practices followed by the farmers in this area; it may also be due to various inputs and health care facilities extended by the co-operative societies to its members in these areas. The milk yield was found to be the highest in the winter season followed by rainy and summer seasons for all breeds of animals in both the sample areas of the two districts. In general, animals maintained by small and medium category of sample cattle keepers of Jalgaon district yielded more milk. On the other hand, in Kolhapur district, the milk yield of all breeds of animals decreased with the decrease in the herd size category for both the sample areas.

The milk yield of crossbred cows was marginally higher than murrah buffaloes in the extension area of both the districts and substantially higher in the control area of Jalgaon district. However, it was significantly higher than

Table 4.6 : Average Milk Yield Per Day Per Animal According to Breed, Season and Category -
Jalgaon District (in litres)

Household Category	Local Buffalo				Murrah Buffalo			
	Summer	Rainy	Winter	Overall	Summer	Rainy	Winter	Overall
<u>Extension</u>								
Small	5.55 (4.11)	5.37 (2.98)	7.14 (5.55)	6.10 (4.22)	-	-	-	-
Medium	5.44 (3.63)	6.61 (4.41)	7.58 (5.33)	6.56 (4.46)	-	-	-	-
Large	5.00 (2.14)	5.75 (3.29)	5.92 (5.07)	5.66 (3.50)	6.00 (6.00)	-	10.00 (10.00)	8.00 (8.00)
Overall	5.43 (3.51)	5.99 (3.61)	7.01 (5.36)	6.20 (4.16)	6.00 (6.00)	-	10.00 (10.00)	8.00 (8.00)
<u>Control</u>								
Small	5.17 (3.32)	5.94 (3.61)	5.87 (4.82)	5.67 (3.96)	-	-	-	-
Medium	5.15 (3.35)	5.69 (3.70)	6.72 (6.05)	5.95 (4.36)	-	-	-	-
Large	4.29 (3.16)	4.92 (3.37)	6.33 (4.00)	5.13 (3.51)	8.67 (6.50)	6.00 (3.00)	8.75 (8.75)	8.11 (6.08)
Overall	4.89 (3.33)	5.56 (3.62)	6.26 (5.03)	5.24 (3.77)	8.67 (6.50)	6.00 (3.00)	8.75 (8.75)	8.11 (6.08)

(Continued)

Table 4.6 : (Continued)

(in litres)

Household Category	Local Cow				Crossbred Cow			
	Summer	Rainy	Winter	Overall	Summer	Rainy	Winter	Overall
<u>Extension</u>								
Small	4.00 (4.00)	3.00 (3.00)	6.00 (6.00)	4.33 (4.33)	6.33 (4.75)	8.00 (3.00)	12.67 (9.50)	8.90 (7.42)
Medium	5.00 (5.00)	3.00 (3.00)	-	4.00 (4.00)	6.60 (5.50)	6.40 (5.33)	6.25 (4.17)	6.43 (5.00)
Large	3.67 (2.20)	4.00 (2.40)	4.25 (3.40)	4.00 (2.67)	-	10.00 (10.00)	10.00 (10.00)	10.00 (6.67)
Overall	4.00 (2.36)	3.60 (2.57)	4.60 (3.22)	4.07 (2.90)	6.50 (4.73)	7.40 (6.73)	9.13 (6.64)	7.66 (6.03)
<u>Control</u>								
Small	4.00 (3.00)	3.00 (3.00)	3.50 (1.75)	3.44 (2.58)	-	-	-	-
Medium	3.00 (2.57)	3.00 (1.29)	3.40 (2.43)	3.14 (2.10)	-	-	-	-
Large	2.86 (2.22)	3.50 (1.56)	5.00 (3.89)	3.83 (2.56)	6.00 (2.00)	6.00 (4.00)	10.00 (3.33)	7.00 (3.11)
Overall	3.18 (2.70)	3.18 (1.75)	4.21 (2.95)	3.52 (2.43)	6.00 (2.00)	6.00 (4.00)	10.00 (3.33)	7.00 (3.11)

Figures in parentheses indicate average daily milk yield per milch animal.

Table 4.7 : Average Milk Yield Per Day Per Animal According to Breed, Season and Category -
Kolhapur District

(in litres)

Household Category	Local Buffalo				Murrah Buffalo			
	Summer	Rainy	Winter	Overall	Summer	Rainy	Winter	Overall
<u>Extension</u>								
Small	6.96 (5.69)	5.85 (4.61)	6.33 (6.00)	6.56 (5.44)	6.00 (6.00)	-	8.00 (3.00)	7.00 (4.67)
Medium	5.86 (5.36)	7.00 (4.00)	6.00 (5.14)	6.18 (5.00)	8.00 (4.00)	7.50 (7.50)	10.00 (10.00)	8.60 (7.17)
Large	8.40 (6.00)	5.42 (4.82)	7.50 (6.43)	7.03 (5.69)	8.56 (8.56)	8.90 (7.42)	11.67 (5.84)	9.35 (7.27)
Overall	6.95 (5.77)	5.91 (4.52)	6.81 (5.94)	6.58 (5.41)	8.25 (7.33)	8.50 (6.61)	10.50 (7.00)	8.98 (6.98)
<u>Control</u>								
Small	3.65 (2.47)	4.31 (2.28)	4.54 (3.74)	4.18 (2.83)	4.00 (4.00)	5.00 (6.00)	5.00 (5.00)	5.33 (5.33)
Medium	5.07 (4.63)	4.83 (2.52)	5.26 (4.35)	5.08 (3.83)	3.00 (3.00)	5.00 (6.00)	-	7.00 (4.67)
Large	4.81 (4.31)	4.25 (3.19)	6.33 (4.75)	5.10 (4.25)	7.33 (5.50)	6.83 (5.12)	7.50 (3.70)	7.19 (4.79)
Overall	4.40 (3.52)	4.47 (2.48)	5.00 (4.08)	4.64 (3.36)	5.80 (5.67)	6.50 (5.42)	7.00 (3.50)	6.73 (4.35)

(Continued)

Table 4.7 (Continued)

Household Category	Local Cow				Crossbred Cow			
	Summer	Rainy	Winter	Overall	Summer	Rainy	Winter	Overall
<u>Extension</u>								
Small	4.75 (3.30)	4.67 (2.80)	4.33 (2.60)	4.60 (3.07)	6.86 (6.86)	7.50 (6.43)	9.43 (9.43)	8.45 (8.05)
Medium	-	4.00 (4.00)	5.50 (5.50)	4.75 (3.17)	12.00 (12.00)	11.33 (8.50)	12.25 (12.25)	11.91 (10.92)
Large	5.00 (5.00)	4.50 (4.50)	4.50 (4.50)	4.67 (4.67)	-	-	-	-
Overall	4.83 (3.63)	4.50 (3.38)	4.58 (3.44)	4.64 (3.48)	8.73 (8.73)	8.78 (7.18)	10.46 (10.46)	9.36 (8.79)
<u>Control</u>								
Small	2.00 (2.00)	3.00 (3.00)	-	2.50 (1.67)	-	-	-	-
Medium	2.50 (2.50)	2.00 (1.00)	3.50 (3.50)	2.80 (2.33)	-	-	-	-
Large	5.40 (3.38)	4.00 (3.00)	5.33 (4.00)	4.88 (3.46)	-	-	-	-
Overall	4.25 (3.09)	3.63 (2.64)	4.87 (4.54)	4.25 (3.09)	-	-	-	-

Figures in parentheses indicate average daily milk yield per milch animal.

that of local cows and local buffaloes in absolute terms. The fat percentage of buffaloes being higher, strict comparison of milk yield of crossbred cows and buffaloes may not be valid.

The productivity of murrah buffaloes was found to be higher than what has been estimated by other workers (Sardiwal and Kalla, 1975, Singh and Singh 1986, Shah and Sharma, 1994). The milk yield of local cows in this study was also found to be higher compared to other reports (Gangadharan, 1978; Achrya and Pawar, 1980; Singh, 1980; Dhaka, 1981; Rao, 1981; Shivtar Singh et al 1986).

4.2.2 Average Milk Yield per Milch Animal

The trend in the milk yield per day per milch animal was similar to the average milk yield for lactating animals discussed in the previous section. However, the magnitude decreased due to the inclusion of dry animals also in calculating the average. In Jalgaon district, the average milk yield of crossbred cows per milch animal turned out to be even lower than that of local buffaloes when the dry animals were also included in the control area for calculation purposes.

The average milk yield per milch animal of a herd depends upon the number of animals in milk and those in dry spells. In other words, the percentage of animals in milk directly affects the overall average milk yield per milch animal. The larger the proportion of animals in milk in a particular breed, higher would be the average milk yield per milch animal. The higher per milch animal milk yield of various breeds of animals in our sample areas indicated higher proportion of animals in milk in a particular breed. The seasonwise productivity per milch animal also followed the same trend as that of average milk yield per milking animal.

4.2.3 Breeding Efficiency

In order to make a dairy enterprise economically successful it is imperative to have high yielding animals that calve regularly. Breeding efficiency is a measure of reproductive performance which is based on calving interval. The breeding efficiency was estimated by the method described by Tomar (1965). The breeding efficiency was observed to fluctuate to a considerable extent for various breeds of milch animals possessed by cattle keepers in both the extension and control areas. The efficiency was substantially high for superior breeds of animals in both the sample areas of our study districts (Table 4.8). This is perhaps due to differences in feeding and management practices followed by our sample households in rearing various types of milch animals. The shorter inter-calving period and lower age at first calving have contributed greatly towards higher breeding efficiency of superior breeds of both cows and buffaloes on our sample farms. Age at first calving had a significant influence on the extent of breeding efficiency. Breeding efficiency was maximum when the age at first calving was minimum. With every increase in age at first calving, the breeding efficiency decreased. Except for local cows in Jalgaon district and, local cows and Murrah buffaloes in Kolhapur district, the efficiency of all the breeds of animals reared by our sample producers was higher in extension than that in control area. The higher efficiency of local breeds of cows maintained by non-beneficiary compared to beneficiary households gives an indication of better feeding and management practices followed by non-beneficiary households for this particular breed of milch animal. Further, though the breeding efficiency of Murrah buffalo in control area of Kolhapur district was higher than extension area, no concrete conclusion can be drawn regarding the lower efficiency of this breed of milch animal in

Table 4.8 : Breeding Efficiency According to Breed and Household Category

Household category	(in per cent)							
	Extension				Control			
	Local Buffalo	Murrah Buffalo	Local Cow	Crossbred Cow	Local Buffalo	Murrah Buffalo	Local Cow	Crossbred Cow
<u>Jalgaon District</u>								
Small	72.34	-	82.78	96.97	69.29	-	68.08	-
Medium	69.71	-	69.32	93.15	69.08	-	74.14	-
Large	68.26	90.56	68.89	94.40	68.30	87.15	73.15	79.41
Overall	70.44	90.56	70.50	94.92	69.03	87.15	72.88	79.41
<u>Kolhapur District</u>								
Small	80.16	83.59	67.73	100.00	78.09	91.95	-	-
Medium	73.19	90.66	76.96	94.80	77.75	-	78.56	-
Large	80.18	80.83	-	89.98	78.54	-	73.13	-
Overall	78.93	82.25	70.65	95.65	77.86	91.95	74.30	-

$$\text{B.E. \%} = \frac{(n(365) + 1040) \times 100}{\text{AC} + \text{CI}}$$

where, n = number of calving intervals
 365 = Desired calving interval in days
 1040 = Desired age at first calving in days
 AC = Actual age at first calving in days
 CI = Sum of the actual calving intervals studied (in days)

extension area as there was only one Murrah buffalo with our non-beneficiary sample household in Kolhapur district. More or less, the breeding efficiency of all the breeds of animals in extension as well as control areas was quite high for both the study districts.

4.2.4 Investment Pattern

The pattern of investment in fixed assets in a dairy enterprise is an indicator of income generating capacity of cattle keepers. Information pertaining to the total investment on milch animals, cattle sheds and stores and other dairy equipment by the cattle keepers according to herd size category as well as the investment per standard adult animal unit is presented in Table 4.9. The total investment increased with the increase in herd size category in both the sample areas in our study districts. In general, nearly three-fourth of the investment was on milch animals, around 20 per cent on cattle shed and the balance was on dairy equipment for all the herd size categories in both extension and control areas of the two study districts.

Since investment depends upon the number of animals of different types maintained in a household, comparison of investment per animal is possible only in terms of Standard Animal Units (SAU). The total investment was, therefore, divided by total number of animals in standard units to arrive at investment per SAU. On an average, Rs. 5,233 was invested per SAU by beneficiaries and Rs. 4,686 by non-beneficiaries in Jalgaon district. The total investment made on each animal in SAU by our sample households of Kolhapur district was Rs. 5,047 in extension and Rs. 4,423 in control area. Thus, the investment per SAU was much higher in extension than that in control area in both the study districts. In general, the investments of the cattle keepers of Jalgaon district were more than that of Kolhapur district.

Table 4.9 : Investment Pattern in Dairy Enterprise in Jalgaon and Kolhapur Districts (in rupees)

	Extension				Control			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
<u>Total Investment Per Household (Jalgaon District)</u>								
Milch Animals	12250 (63.13)	25297 (72.41)	37753 (70.40)	19999 (68.62)	11969 (80.80)	20688 (69.92)	30200 (77.16)	17940 (75.96)
Cattle shed	6466 (33.32)	8764 (25.08)	12850 (23.96)	8083 (27.73)	2113 (14.26)	8113 (27.42)	7725 (19.74)	4835 (20.47)
Dairy equipment	689 (3.55)	875 (2.51)	3022 (5.64)	1662 (3.65)	731 (4.94)	786 (2.66)	1213 (3.10)	842 (3.57)
Total Investment	19405	34936	53625	29144	14813	29587	39138	23617
<u>Investment Per Standard Adult Animal Unit (Jalgaon District)</u>								
Milch animals	3002	3874	4126	3590	3183	3755	3857	3560
Cattle shed	1585	1342	1404	1452	562	1472	987	959
Dairy equipment	169	134	330	191	194	143	155	167
Total Investment	4756	5350	5860	5233	3939	5770	4999	4686

(continued)

Table 4.9 (continued)

(in rupees)

	Extension				Control			
	Small	Medium	Large	Overall	Small	Medium	Large	Overall
<u>Total Investment Per Household (Kolhapur District)</u>								
Milch animals	14190 (80.11)	24648 (84.98)	31400 (68.23)	17310 (78.49)	9528 (71.06)	20188 (83.11)	26625 (80.54)	14650 (77.39)
Cattle shed	2943 (16.61)	3675 (12.67)	13567 (29.48)	4103 (18.60)	3428 (25.56)	3438 (14.15)	5600 (16.94)	3720 (19.65)
Dairy equipment	581 (3.28)	683 (2.35)	1057 (2.29)	642 (2.91)	453 (3.38)	664 (2.74)	833 (2.52)	560 (2.96)
Total Investment	17720	29006	46024	22055	13409	24290	33058	18930
<u>Investment Per Standard Adult Animal Unit (Kolhapur District)</u>								
Milch animals	3889	4302	3910	3961	2632	4360	4065	3423
Cattle shed	806	641	1690	939	947	743	855	860
Dairy equipment	159	119	132	147	125	143	127	131
Total Investment	4854	5062	5732	5047	3704	5246	5047	4423

Figures in parentheses are percentages to the total investment.

The investment per SAU increased with the increase in the herd size category in both the sample areas of Jalgaon and Kolhapur districts. The investment on milch animals also showed a similar trend in both the areas of Jalgaon district. However, in Kolhapur district, medium category of households invested more on milch animals in both the sample pockets. No discernible trend was observed in terms of investment on cattle shed and dairy equipment. The higher investment in extension compared to control area suggests that the resource endowment for investment in dairying was more in extension area than in control area. It is but natural to expect that the resource endowment for investment in dairy enterprise decreased with the decrease in herd size category. The beneficiaries invested more with a view to receive higher returns through their subsidiary occupation, that is, dairying.

4.2.5 Feeding Practices Followed

In order to tap the full genetic potential of the animal, it is essential that each animal should be fed a balanced ration. The feeding regime mainly depends upon the availability of various types of fodders and feeds in different seasons. In our study districts the milk producers were feeding green fodder, dry fodder and concentrates in different seasons depending upon their availability. Green fodders fed to the cattle in our sample households in different seasons were mainly Jowar, Maiza, Sugarcane tops, Lucerne and Groundnut leaves. The dry fodders fed were wheat bhoosa, paddy straw, Jowar kadba and Bajra fodder depending upon the availability.

Both compounded cattle feed and home made concentrate mix were fed to milch animals. Among the compounded cattle feed supplied by our sample households, the brand names popular were 'Vikas Cattle Feed' in Jalgaon and 'Mahalaxmi Cattle Feed' in Kolhapur district. Both these brands of cattle feed

were manufactured by the respective district Cooperative Milk Unions of our study districts. In the preparation of home made concentrate mix, different ingredients were used in different proportions in different seasons depending upon their availability. Oil cake was the common ingredient ranging from 20 to 40 per cent in the mix. The next major ingredient was maize grain or bajra grain. This constituent also ranged from 20 to 40 per cent. Wheat bran, gram husk or rice polish were the other ingredients in the concentrate mix, the percentage of which ranged from 10 to 15 percent.

The average daily feed intake per lactating animal in the two sample areas under our study districts are presented in table 4.10. It was observed that the average daily feed basket per individual animal in different seasons was in conformity with the milk production. Murrah buffaloes and crossbred cows were fed higher quantities of feeds and fodder in all the three seasons. Due to scarcity of green fodder availability in summer season, the quantity fed was observed to be the lowest in this season for all the breeds of animals possessed by our sample households. However, dry fodder feeding was substantially high in summer season for all the breeds. This indicated the fact that the scarcity of green fodder in summer season was compensated by higher doses of dry fodder to the animals. Feeding of green fodder and concentrate was observed to be relatively more in winter season compared to rainy season in both extension and control areas of Jalgaon and Kolhapur district. The sample households in extension area supplied more quantities of feeds and fodder to their milch animals than those in control area. This was more so in Kolhapur district compared to Jalgaon district.

4.2.6 Farm Produced and Purchased Fodder

Having considered the average quantities of feeds and fodder supplied by our sample milk producers in different

Table 4.10 : Seasonwise Average Daily Feed Intake in Jalgaon and Kolhapur Districts

	(in kgs.)											
	Summer				Rainy				Winter			
	LB	MB	LC	CBC	LB	MB	LC	CBC	LB	MB	LC	CBC
<u>Jalgaon District</u>												
<u>Extension</u>												
Green fodder	14.60	16.67	13.33	16.27	23.28	-	20.20	27.52	24.72	26.00	22.80	31.00
Dry fodder	8.73	7.50	6.35	8.31	4.71	-	1.80	2.16	6.27	3.00	5.50	5.00
Concentrate	1.18	1.34	0.65	1.32	0.91	-	0.27	0.97	1.23	3.00	0.66	2.07
<u>Control</u>												
Green fodder	11.17	15.23	5.44	15.00	22.24	18.33	20.56	27.00	21.83	32.69	18.72	32.00
Dry fodder	8.15	9.00	5.29	7.78	4.36	2.00	1.23	3.44	4.60	2.59	3.57	3.75
Concentrate	0.89	1.82	0.31	1.15	0.92	1.45	0.09	0.80	1.19	2.25	0.40	2.00
<u>Kolhapur District</u>												
<u>Extension</u>												
Green fodder	21.37	19.94	13.80	24.03	25.49	36.56	14.84	37.20	22.57	38.16	14.64	31.08
Dry fodder	6.64	6.18	5.29	6.12	4.41	5.79	3.96	3.58	4.27	4.33	4.02	4.46
Concentrate	1.99	1.95	0.96	1.54	1.87	2.05	0.58	1.95	1.68	2.26	0.67	1.87
<u>Control</u>												
Green fodder	19.77	17.71	10.52	-	25.92	27.76	16.28	-	17.97	22.00	14.88	-
Dry fodder	5.00	4.66	5.86	-	4.12	3.00	4.84	-	3.83	3.67	2.50	-
Concentrate	0.73	1.53	0.38	-	0.83	1.04	0.31	-	0.75	1.47	0.32	-

LB = Local Buffalo; MB = Murrah Buffalo; LC = Local Cow; CBC = Crossbred Cow.

seasons in extension and control areas of our study districts, let us now consider the extent of expenditure that the producers make on farm produced and purchased fodder in order to rear various types of animals in the herd. Information on farm produced and purchased fodder were sought from our producer farmers with a view to ascertain their extent of dependence on such purchased fodders. The resultant relevant data are presented in Table 4.11. It can be seen from Table 4.11 that the farmers' dependence on farm produced fodder is 68 per cent in extension and 64 per cent in control area of Jalgaon district. This shows that farm produced fodder accounts for two thirds of the total expenditure on fodder resources. Though the the proportion of own fodder and purchased fodder is more or less the same in the extension and control areas of Jalgaon district, the farmers' dependence on purchased fodder was observed to be slightly more in control area compared to extension area. Surprisingly, the extent of dependence on purchased fodder was very high in extension area of Kolhapur district. The reason for this could be traced in the lower operational holding of the beneficiaries compared to non-beneficiary households of Kolhapur district. Thus, due to lower land resources, the producers in extension area depended more on purchased fodder compared to farm produced fodder. Therefore, the farmers' expenditure on purchased fodder was more than the farm produced fodder in this area and this was more so in the case of small category of farmers. On the other hand, the proportion of expenditure on own and purchased fodder in control area of Kolhapur district was of the order of 80 per cent and 20 per cent, respectively. Further, a negative association was observed between the herd size category and expenditure on farm produced fodder in both extension and control areas of Jalgaon district and only for control area of Kolhapur district. This shows that the small

Table 4.11 : Expenditure on Own and Purchased Fodder in Jalgaon and Kolhapur Districts

(in rupees/household)

	Expenditure on own fodder				Expenditure on Purchased fodder				Total Expenditure
	Summer	Rainy	Winter	Total	Summer	Rainy	Winter	Total	
<u>Jalgaon District</u>									
<u>Extension</u>									
Small	2718.75	2338.13	2594.13	7650.01 (70.44)	1511.63	475.13	1223.63	3210.39 (29.56)	10860.40
Medium	4038.00	4002.00	4106.40	12146.40 (67.65)	2610.00	1306.80	1891.80	5808.60 (32.35)	17955.00
Large	7005.00	5032.50	5587.50	17625.00 (66.15)	2271.00	2211.00	4539.00	9021.00 (33.85)	26646.00
Overall	3730.00	3252.00	3497.34	10479.34 (68.36)	1979.00	983.80	1888.07	4850.87 (31.64)	15330.21
<u>Control</u>									
Small	1935.00	1912.50	2193.75	6041.25 (72.05)	1074.38	391.88	877.50	2343.76 (27.95)	8385.01
Medium	1470.00	2461.50	2832.00	6763.50 (60.49)	1635.00	1282.50	1500.00	4417.50 (39.51)	11180.00
Large	4270.00	4980.00	4990.00	14240.00 (59.48)	4670.00	2320.00	2710.00	9700.00 (40.52)	23940.00
Overall	2278.00	2672.40	2923.20	7873.60 (64.32)	1943.00	1015.00	1410.00	4368.00 (35.68)	12241.60

(continued)

Table 4.11 (continued)

(in rupees/household)

	Expenditure on own fodder				Expenditure on Purchased Fodder				Total Expenditure
	Summer	Rainy	Winter	Total	Summer	Rainy	Winter	Total	
<u>Kolhapur District</u>									
<u>Extension</u>									
Small	2300.87	2300.87	2555.22	7156.96 (46.76)	2871.13	2491.87	2787.09	8150.09 (53.24)	15307.05
Medium	5347.50	4342.50	4920.00	14610.00 (53.76)	2965.25	4304.00	5295.00	12565.25 (46.24)	27175.25
Large	6680.00	4920.00	6700.00	18300.00 (50.97)	3560.00	7430.00	6560.00	17600.00 (49.03)	35900.00
Overall	3145.00	2835.00	3285.00	9265.00 (48.89)	2952.67	3232.43	3498.77	9683.87 (51.11)	18948.87
<u>Control</u>									
Small	2755.33	2813.89	2670.00	8239.22 (86.89)	415.56	422.22	405.56	1243.34 (13.11)	9482.56
Medium	4770.00	4830.00	4222.50	13822.50 (76.25)	1552.50	1267.50	1485.00	4305.00 (23.75)	18127.50
Large	4740.00	5242.50	5767.50	15750.00 (74.79)	1650.00	1650.00	2010.00	5310.00 (25.21)	21060.00
Overall	3557.20	3675.33	3497.00	10729.53 (80.48)	883.34	811.33	907.34	2602.01 (19.52)	13331.54

Figures in parentheses are percentages to total expenditure on own and purchased fodder.

category producers depended more on their own farm produced fodder than on purchased fodder.

In the above context, the seasons also played an important role. The expenditure on both own and purchased fodder was relatively more in summer season compared to other seasons in the extension area of Jalgaon district. On the other hand, the farmers in the control area of the some district spent more on farm produced fodder in the winter season while their spending on purchased fodder increased in the summer season. Kolhapur district followed a trend to the contrary according to which the farmers' expenditure on farm produced fodder increased in the winter season in extension area and in the rainy season in control area. The expenditure on purchased fodder was more in winter season for both the sample areas in Kolhapur district. In general, the total expenditure on fodder resources by our sample producers' was relatively high in Kolhapur district compared to Jalgaon district. On an average, per day expenditure on various fodder resources by sample producers in rearing various types of animals was Rs. 42 in extension and Rs. 34 in control area in Jalgaon district. The corresponding figures for the respective sample areas of Kolhapur district were Rs. 52 and Rs. 37. Thus, sample producers' of Kolhapur district were better endowed to spend more on fodder resources than their counterparts in Jalgaon district. And, a better endowment on fodder resources means better health for the dairy animals.

4.3 Milk Production Functions

The exact nature of milk production and its mathematical form to draw economic interpretations is still not known precisely. There are any number of empirical relationships and mathematical models that represent and describe the modus operandi of milk production for different breeds under varying agro-climatic zones. In the absence of exact

mathematical form of milk production, three alternative forms of milk production surface, namely linear, Cobb-Douglas and Semi log (Log Y) mathematical models were tried to develop milk production functions. The criteria for selecting the appropriate mathematical form for economic interpretations were statistical significance of the regression coefficients complemented by biological, physical and economic logic. Cobb-Douglas production function ($\text{Log } Y = \text{Log } b_0 + b_1 \log x_1 + \dots + b_6 \log x_6$) was finally selected as this function gave higher coefficient of multiple determination (R^2) and also the signs and statistical significance of the coefficients conformed to biological and economic logic.

An attempt was made to develop seasonal production functions for all the breeds of animals possessed by our sample households. Due to small number of observations for Murrah buffaloes, local cows and crossbred cows among different herd size categories in different seasons it was not possible to develop seasonal production functions for these breeds of animals. As a matter of fact, the local breeds of buffaloes were the major milch animals maintained by the sample households constituting about 80 per cent of the total number of milch animals in the herd of beneficiary and non-beneficiary households. Therefore, production functions were developed only for this breed of animal for various categories of sample households. Further, in order to arrest the effect of different seasons on milk production, the dummy variables representing different seasons (D_1 and D_2) were incorporated in the production functions to account for the variation in milk production attributable to changes brought about by climatic factors, such that

D_1 = Seasonal dummy variable for ($D_1 = 1$ for rainy season;
rainy season $D_1 = 0$ otherwise winter
season)

D_2 = Seasonal dummy variable ($D_2 = 1$ for summer season;
for summer season = 0 otherwise winter
season)

The most important inputs in milk production were green fodder, dry fodder and concentrates. Since different types of feeds were used by individual milk producers, it was not possible to transform these inputs into standard comparable units. However, the price of each ingredient indirectly reflects the quality of the feed input. It was, therefore, thought appropriate to express these inputs in value terms instead of physical terms. Hence, value of green fodder, dry fodder, concentrates formed the main explanatory variables in the production function together with value of labour, stage of lactation, value of animal and seasonal dummies while milk production in value terms for local breeds of buffaloes was the dependent variable.

The elasticity of production alongwith standard error of coefficient, and coefficient of multiple determination of the milk production functions for local buffaloes with respect to beneficiary and non-beneficiary households are exhibited separately in Tables 4.12 and 4.13, respectively for Jalgaon and Kolhapur districts.

4.3.1 Milk Production Functions in Jalgaon District

An examination of coefficient of multiple determination for the production equations as cited in Table 4.12 indicated that the various factors influencing milk production included in production functions could explain only 41 to 45 per cent of the total variation in milk production in the case of beneficiary households whereas for non-beneficiary group they accounted for 40 to 64 per cent of the variation.

Among the different feed inputs, concentrate expenditure was found to be the single most important variable. It had positive and highly significant regression coefficients

in almost all the equations fitted. However, the magnitude of this variable was found to increase with the increase in herd size category in extension area. The response of this input was found to be maximum in the case of medium category in both extension as well as control area. In Jalgaon district, every one per cent increase in the expenditure on concentrate resulted in an increase of 0.06 per cent in the returns from milk in extension area and 0.09 per cent in control area, respectively. Thus, the resultant increase in returns from increased investment on concentrate was slightly more in control area compared to the extension area of this district.

The green fodder was the second important feed input exercising positive as well as negative influence on milk production. The coefficient of green fodder input was observed to be positively significant for small and large categories and negatively significant for medium category in extension area. This indicated that there was excessive use of this input by medium category of households in extension area resulting in a reduction of 0.16 per cent returns from milk for every one per cent increase in the expenditure on this input by medium category of producers. In the case of control area, this input was positively significant only in the case of small category and for other categories, it was non-significant. The plausible reason for the non-significance of this variable for other categories in the control area may be attributed to the fact that either the milk producers were feeding optimum quantities of this input or there was small variation in the quantity supplied to individual animals by medium and large households.

The expenditure on dry fodder input had little impact on returns from milk. It had positive and significant regression coefficient in the case of small category and had negatively significant coefficient for large category of

Table 4.12 : Regression Coefficients, Standard Errors and Coefficient of Multiple Determination in Milk Production for Local Buffaloes in Jalgaon District (Cobb-Douglas Algebraic Form)

Household category	N	Intercept	Regression Coefficients							D ₁	D ₂	R ²
			Value of animal (x ₁)	Stage of lactation (x ₂)	Value of green fodder (x ₃)	Value of dry fodder (x ₄)	Value of concen- trate (x ₅)	Value of labour (x ₆)				
<u>EXTENSION</u>												
Small	56	1.5179	-0.0013 (0.1226)	-0.3158*** (0.0935)	0.0477@ (0.0319)	0.1337** (0.0567)	0.0491** (0.0171)	-0.2019 (0.2517)	-0.1243 (0.1207)	-0.1587 (0.1239)	0.4981***	
Medium	55	1.5818	-0.1387 (0.1778)	-0.0859 (0.1469)	-0.1624** (0.0802)	-0.1251 (0.2381)	0.1312** (0.0520)	0.4110 (0.6622)	0.0459 (0.2457)	-0.2857 (0.2968)	0.4500***	
Large	26	0.5626	0.4525@ (0.2691)	-0.1574 (0.1393)	0.5979@ (0.4126)	-0.4283@ (0.2603)	0.1721 (0.3075)	-0.0274 (0.4957)	-0.2022 (0.2040)	0.1284 (0.2403)	0.4062***	
Overall	137	1.4515	-0.0403 (0.0954)	-0.1210* (0.0734)	-0.0422 (0.0365)	0.0379 (0.0727)	0.0639*** (0.0216)	0.0652 (0.2186)	-0.0854 (0.1157)	-0.1536 (0.1250)	0.4122***	
<u>CONTROL</u>												
Small	58	2.3930	0.3123** (0.1226)	-0.1007@ (0.0691)	0.1095** (0.0478)	0.2043 (0.0375)	0.0824*** (0.0144)	0.0959 (0.2464)	-0.0453 (0.1140)	0.0482 (0.1077)	0.6437**	
Medium	44	19.1845	0.1237 (0.1973)	-0.1634* (0.0918)	-0.0241 (0.0365)	0.0319 (0.1994)	0.1012*** (0.0286)	-0.0628 (0.2187)	-0.1773@ (0.1325)	-0.1262 (0.2101)	0.4044***	
Large	39	0.3683	0.5039* (0.2577)	-0.0148 (0.1105)	0.0558 (0.2107)	0.0612 (0.1394)	0.0734** (0.0351)	0.0288 (0.0887)	-0.0733 (0.1889)	-0.1540 (0.2208)	0.4698***	
Overall	141	1.9123	0.3402*** (0.0928)	-0.0793* (0.0461)	0.0130 (0.0237)	0.0064 (0.0364)	0.0861*** (0.0115)	0.0648@ (0.0504)	0.0794 (0.0728)	-0.0092 (0.0826)	0.4990**	

Figures in parentheses indicate standard error of coefficients.

*** Significant at 1 per cent level; ** Significant at 5 per cent level; * Significant at 10 per cent level;

@ Significant at 20 per cent level.

sample producers in extension area. It did not exercise any influence in control area of the district.

Labour expenditure, though an important variable, did not exercise any influence on milk production. The regression coefficient of labour input was found to be significant only in control area and that too at 20 per cent probability level. It was observed that utilization of labour was mainly in the form of family labour and was constant for every household. This might have masked its influence on milk production.

The stage of lactation was found to be statistically significant in most of the equations fitted. The advancement of stage of lactation was found to depress the milk production as revealed by its negative coefficient in different production equations. The value of animal exercised a positive and statistically significant influence in control area of the district. Its response was more or less same in different equations fitted. The coefficient of this variable was negative in some of the equations but statistically not significant.

Seasons did not exercise any influence on returns from milk production in both the sample areas of Jalgaon district, though rainy season was found to decrease returns in the case of medium category of households in control area of the district.

4.3.2 Milk Production Functions in Kolhapur District

Table 4.13 presents results of Cobb-Douglas function for local buffaloes for different herd size categories of Kolhapur district. The estimated equations explained 39 to 60 per cent variation in the value of milk output in extension and 48 to 56 per cent variation in control area of the district due to factors taken into consideration. The significant test of individual coefficients indicated that the concentrate

expenditure was again the major factor influencing returns from milk production. Its coefficient was positive and highly significant in all the equations for both the sample areas. The response of this input was found to be maximum among large category of cattle keepers in both extension and control areas. In general, its response was higher in control area compared to extension area of the district.

Expenditure on green fodder and dry fodder had little influence on returns particularly in control area of the district. However, the coefficient of green fodder input was highly significant in the case of large category and was significant at 20 per cent probability level for small category in extension area only. Labour expenditure did not influence milk production through local buffaloes in extension area. In control area, its positive and significant influence was observed only in the case of small category.

The stage of lactation showed a negative and statistically significant regression coefficient. This shows that as the animal advances in the stage of lactation, its milk yield starts decreasing after a period of time. The increase in the value of animal was found to increase the milk production through local buffaloes. Its coefficient was positively significant in general. It is but natural to expect that as the producers invested more on animals, the production through it also increased.

The regression coefficients for dummy variables indicated that rainy season (D_1) had a significant and negative impact on returns in general and for small and large category of households in particular in the extension area. In the control area, in general, summer season (D_2) had significant and positive impact on returns from milk and rainy season had a negative impact on returns.

Table 4.13 : Regression Coefficients, Standard Errors and Coefficient of Multiple Determination in Milk Production for Local Buffaloes in Kolhapur District (Cobb-Douglas Algebraic Form)

Household category	N	Intercept	Regression Coefficient							D ₁	D ₃	R ²
			Value of animal (x ₁)	Stage of lactation (x ₂)	Value of green fodder (x ₃)	Value of dry fodder (x ₄)	Value of concentrate (x ₅)	Value of labour (x ₆)				
EXTENSION												
Small	82	2.3861	0.3399*** (0.1232)	-0.1408*** (0.0486)	0.1100@ (0.0772)	0.0343* (0.0223)	0.0839*** (0.0273)	-0.0358 (0.1349)	-0.1523* (0.0847)	0.0534 (0.0333)	0.3399***	
Medium	17	0.0191	0.6214 (0.6909)	-0.0391 (0.2042)	-0.2376 (0.7593)	-0.3197 (0.2805)	0.2944 (0.2940)	1.6027 (1.6519)	0.1075 (0.2776)	0.5263 (0.4913)	0.4233***	
Large	17	1.5734	0.0637 (0.8330)	-0.2145** (0.0925)	-0.0530*** (0.0131)	-0.3418 (0.5931)	-0.2426** (0.0167)	-0.8863 (1.7612)	-0.7691@ (0.4756)	-0.0361 (0.4648)	0.5974***	
Overall	116	1.5097	0.4028*** (0.1133)	-0.0964** (0.0433)	0.0239 (0.0370)	0.0011 (0.0269)	0.0775*** (0.0252)	0.0006 (0.1390)	-0.1450* (0.0769)	0.0910 (0.0330)	0.4381***	
CONTROL												
Small	69	0.5743	0.3806*** (0.1180)	-0.1264@ (0.0773)	0.0620 (0.1082)	-0.0090 (0.0259)	0.0714*** (0.0249)	0.4835*** (0.1665)	-0.0410 (0.1136)	0.0255 (0.1019)	0.5644***	
Medium	52	1.1411	0.5751 (0.1711)	-0.1850* (0.1011)	0.0754 (0.1305)	0.1506@ (0.1191)	0.1506*** (0.0373)	-0.0013 (0.1847)	-0.1281 (0.1554)	0.1160 (0.1237)	0.5136***	
Large	20	1.8318	0.0133 (0.6384)	-0.5234 (0.4662)	-0.1655 (0.4944)	-0.1230 (0.9120)	0.2781* (0.1419)	-1.3720@ (1.0324)	-0.0336 (0.3813)	0.2403 (0.3044)	0.5524***	
Overall	141	1.1052	0.3190*** (0.0745)	-0.1723*** (0.0587)	-0.0130 (0.0500)	-0.0133 (0.0257)	0.1131*** (0.0206)	0.0683 (0.1165)	-0.1008@ (0.0728)	0.8780@ (0.0753)	0.4761**	

Figures in parentheses indicate standard error of coefficients.

*** Significant at 1 per cent level; ** Significant at 5 per cent level; * Significant at 10 per cent level; @ Significant at 20 per cent level.

The above analysis clearly indicated the importance of green fodder and dry fodder input in general and concentrate input in particular for higher milk production and profits. The regression coefficient of concentrate input was found to be positive and highly significant in the case of both beneficiary and non-beneficiary sample households for the two study districts. Thus, an increase in the level of this input demonstrated an increase in the milk production. The results obtained are comparable to those reported in earlier studies under field conditions (Chikara and Gangwar, 1975; Rai and Gangwar, 1976; Pandey et al., 1980; Sharma et al., 1987; Gupta and Kumar, 1983 and Shah and Sharma, 1995). Labour charges by far did not influence milk production (Sharma and Singh, 1993). However, the stage of lactation was found to be negatively significant and the value of animal positively significant in most of the equations fitted.

4.4 Marketed Surplus of Milk

So far we have discussed only the production aspects of our sample milk producers. However, milk production is not the only end in the economic process encompassing dairying. The problems faced in the marketing and distribution of milk also encompass this process. Higher milk production does not necessarily mean larger marketed surplus. Increase in milk production would be more beneficial from the consumers point of view, if it is followed by proportionate increase in the marketed surplus of milk. In fact, the disposal of milk in a milk producing household consists of in-house liquid milk consumption and conversion of milk into products at the producer household and the balance is available for sale as liquid milk. However, inadequate marketing facilities sometimes may account for differences in marketable surplus and actual quantities of milk marketed during a given period of time and may result in increased self-consumption of fluid milk.

or conversion of milk into products. In view of these facts, it was thought prudent to study the marketing pattern of milk in the extension and control areas of the two study districts. Before we discuss about the actual quantities of milk being marketed by our sample milk producers during different seasons in extension and control areas, let us first have an overview of the market structure and conditions prevailing in our sample districts for the disposal of milk.

4.4.1 Market Structure

A study of market structure in the two sample districts showed that both organized and unorganized sectors were involved in the marketing of milk. The organized sector represented cooperative societies. These societies collected milk from the producers' on the basis of fat percentage and Solids Not Fat (SNF) and advanced money to them after an interval of ten days. The member producer had to bring his milk to the society located in the village.

The unorganized sector comprised of private dairies, supply of milk directly to consumers, sale of milk to middlemen and others such as halwais, hotels and restaurants, hospitals, etc. It was observed that the bulk of the milk trade in areas not yet covered by the dairy cooperatives was controlled by small private traders popularly known as "dhudhias" or "gowalas" who purchase milk from the rural milk producers and transport it on bicycles to the nearby towns to dispose it off there. Some of the middlemen were found to be in league with small private traders who in turn were hand in glove with some big private traders of the area.

In the control areas, the milk producers brought their milk to the private dairies in their own milk cans for metering before the same was supplied to other places. However, the middlemen in order to entice the milk producers collected milk directly from their doorsteps. Both private

dairies and middlemen were observed to advance money to the milk producers for the purchase of inputs as well as milch animals.

In the absence of cooperative infrastructure in the control area, the producers were observed to sell their milk to private dairies, middlemen, directly to consumers and other marketing agencies. Even in cooperative villages in the extension area the practice of sale of milk to private traders was witnessed albeit on a lower scale. However, due to the increasing influence of the existing cooperative set up in extension area, the private traders could not exercise much influence on milk producers. Among our sample milk producers, only one producer member was observed to sell a part of his marketed surplus to a private dairy in Jalgaon district. The share in total marketed surplus that different agencies cornered from each category of households in our sample districts is presented in Table 4.14.

Since the cooperative market infrastructure was prevalent in extension area, 97 per cent of the marketed surplus of sample producers was sold to cooperative society and the share of private trade in this surplus was limited to only the remaining 3 per cent. In fact, small and large categories of member producers sold their entire marketed surplus to the cooperative society. Only the medium category of households sold part of their marketable surplus to private dairies. The share of consumers, middlemen and other agencies in total marketed surplus was nil in this area. In Kolhapur district, on the other hand, cooperative society's share in the total marketed surplus of sample producers was about 86 per cent and the remaining 14 per cent was sold to consumers within the village. Small category of producers in this district sold maximum proportion of their produce to the cooperative society followed by large and medium categories.

In the case of milk sold directly to consumers, the proportion of medium category was higher than small and large category of households.

Table 4.14 : Percentage Share of Marketed Surplus of Milk by Different Agencies

Household category	Consumers directly	Private dairy	Cooperative Society	Middlemen	Others
<u>Jalgaon District</u>					
<u>Extension</u>					
Small	-	-	100.00	-	-
Medium	-	10.00	90.00	-	-
Large	-	-	100.00	-	-
Overall	-	3.33	96.67	-	-
<u>Control</u>					
Small	41.18	5.88	-	29.41	23.53
Medium	33.33	-	-	44.44	22.23
Large	50.00	-	-	16.67	33.33
Overall	40.63	3.12	-	31.25	25.00
<u>Kolhapur District</u>					
<u>Extension</u>					
Small	8.00	-	92.00	-	-
Medium	33.33	-	66.67	-	-
Large	25.00	-	75.00	-	-
Overall	14.29	-	85.71	-	-
<u>Control</u>					
Small	5.56	44.44	-	33.33	16.67
Medium	25.00	62.50	-	12.50	-
Large	-	50.00	-	-	50.00
Overall	10.00	50.00	-	23.33	16.67

As for the control area of Jalgaon district, 41 per cent of the milk marketed was cornered by consumers, 31 per cent by middlemen, 3 per cent by private dairies and the remaining 25 per cent by other agencies. The proportion of milk sold to consumers to total marketed surplus was substantially high in the case of large and small category of producers. However, the medium category of producers sold major portion of their marketable surplus to middlemen, followed by consumers and other marketing agencies. Contrary to this, the producers'

in control area of Kolhapur district were observed to sell major portion of their marketed surplus to private dairies operating in the nearby towns. This was more so in the case of medium category compared to other categories of producers of Kolhapur district. On an average, 50 per cent of the marketed surplus was cornered by private dairies, 23 per cent by middlemen, 10 per cent by consumers and the remaining 17 per cent by other marketing agencies in control area of this district.

A comparison of the scenario obtaining in the control areas of Jalgaon and Kolhapur districts revealed that while consumers and middlemen dominated in cornering the marketable surplus in Jalgaon district, the private dairies predominate in Kolhapur district. The prices offered by various marketing agencies to our sample producers' in different seasons may offer answers for such predominance to a considerable extent. The milk prices offered by different agencies in different seasons for both buffalo and cow milk are, presented in Tables 4.15 and 4.16, respectively.

4.4.1.1 Price Structure for Buffalo Milk

In the extension area of Jalgaon district, the prices offered by private dairies for buffalo milk was higher than the cooperative society's price in all the seasons studied. In order to compete effectively with the cooperative society, the private traders kept the offer price of milk slightly higher than that offered by the cooperative society in order to attract more number of milk producers within their ambit. This difference in offer price was more perceptible during the summer season when the milk supply was relatively scarce. The reason for the medium category of producers selling a portion of their marketed surplus to private trade could be traced in higher prices being offered by the private sector traders to producers. However, inspite of the higher prices being offered

by the private traders for buffalo milk, the majority of our sample producers sold their milk to the village cooperative society only. The average price realized by various milk producers in the extension area of Jalgaon district was of the order of Rs. 7.59 per litre in winter, Rs. 7.92 per litre in rainy and Rs. 8.38 per litre in the summer seasons. This showed that the average price offered by the village co-operative society to various sample producers was by and large not influenced by the isolated phenomenon of higher price being on offer for medium category of households. The average price offered by the co-operative societies remained the same for different seasons. Seasonwise, the large category of households commanded a higher price than the small and medium category of producers. This can be attributed to higher percentage of fat in the buffalo milk of large and small categories compared to that of medium category.

In the control area of Jalgaon district, the sample producers were observed to sell milk directly to consumers and also to private dairies, middlemen and other agencies (Table 4.15). In this area, the prices offered by private dairies were higher in all the seasons compared to other agencies. Further, even though the price offered by the private dairy was maximum in all the seasons, only one small category of milk producer sold milk to this agency. The distant location of the private dairy from our sample villages could be the reason for this. Since the prices offered by consumers was higher than middlemen and other marketing agencies, majority of sample milk producers sold their buffalo milk to consumers. It is surprising to note that although price offered by middlemen was the least, yet one-third of the total sample milk producers preferred to sell milk to middlemen. Since the middlemen offered money in advance and collected milk from the doorsteps of milk producers, they were in a position

Table 4.15 : Seasonwise Milk Prices Offered by Different Marketing Agencies for Buffalo Milk (in rupees/litre)

Household category	Winter					Rainy					Summer				
	Consumers	Pri-vate dairy	Coop.	Middle-men	Others	Consumers	Pri-vate dairy	Coop.	Middle-men	Others	Consumers	Pri-vate dairy	Coop.	Middle-men	Others
Jalgaon District															
Extension															
Small	-	-	7.65 (14)	-	-	-	-	7.92 (13)	-	-	-	-	8.39 (13)	-	-
Medium	-	7.60 (1)	7.44 (9)	-	-	-	8.00 (1)	7.36 (8)	-	-	-	8.50 (1)	8.27 (7)	-	-
Large	-	-	7.70 (4)	-	-	-	-	8.04 (4)	-	-	-	-	8.54 (4)	-	-
Overall	-	7.60 (1)	7.59 (27)	-	-	-	8.00 (1)	7.92 (25)	-	-	-	3.50 (1)	8.38 (25)	-	-
Control															
Small	6.86 (7)	7.30 (1)	-	6.76 (5)	7.13 (4)	7.50 (4)	8.00 (1)	-	7.20 (5)	7.00 (3)	8.11 (7)	3.50 (1)	-	7.64 (5)	8.00 (4)
Medium	7.75 (3)	-	-	7.17 (3)	7.75 (2)	8.08 (3)	-	-	7.00 (4)	8.00 (2)	8.63 (2)	-	-	8.17 (3)	8.50 (1)
Large	6.67 (3)	-	-	7.00 (1)	6.50 (2)	7.08 (3)	-	-	7.50 (1)	7.33 (3)	8.25 (2)	-	-	8.00 (1)	8.00 (2)
Overall	7.02 (13)	7.30 (1)	-	6.92 (9)	7.13 (8)	7.55 (10)	8.00 (1)	-	7.15 (10)	7.37 (8)	8.23 (11)	8.50 (1)	-	7.86 (9)	8.07 (7)

Table 4.15 : (continued)

(in rupees/litre)

Household category	Winter					Rainy					Summer				
	Con-sumer	Pri-vate dairy	Coop.	Middle-men	Others	Con-sumers	Pri-vate dairy	Coop.	Middle-men	Others	Con-sumers	Pri-vate dairy	Coop.	Middle-men	Others
<u>Kolhapur District</u>															
<u>Extension</u>															
Small	8.00 (2)	-	8.15 (20)	-	-	8.50 (2)	-	8.74 (19)	-	-	9.37 (2)	-	9.51 (16)	-	-
Medium	8.50 (1)	-	8.42 (3)	-	-	8.50 (2)	-	8.50 (3)	-	-	9.00 (2)	-	9.50 (3)	-	-
Large	8.60 (1)	-	7.87 (3)	-	-	8.50 (1)	-	8.00 (3)	-	-	9.00 (1)	-	9.00 (3)	-	-
Overall	8.28 (4)	-	8.15 (26)	-	-	8.50 (5)	-	8.62 (25)	-	-	9.16 (5)	-	9.44 (22)	-	-
<u>Control</u>															
Small	7.30 (1)	7.36 (7)	-	6.75 (6)	7.17 (3)	7.40 (1)	7.94 (8)	-	6.80 (5)	7.33 (3)	7.50 (1)	9.06 (8)	-	7.35 (5)	8.00 (3)
Medium	7.37 (2)	7.27 (7)	-	7.00 (1)	-	7.50 (1)	7.70 (5)	-	7.52 (1)	-	7.88 (2)	9.50 (5)	-	-	-
Large	-	7.11 (2)	-	-	7.42 (1)	-	8.04 (2)	-	-	7.25 (2)	-	9.25 (2)	-	-	8.30 (1)
Overall	7.35 (3)	7.29 (16)	-	6.79 (7)	7.23 (4)	7.45 (2)	7.87 (15)	-	6.92 (5)	7.90 (5)	7.75 (3)	9.23 (15)	-	7.35 (5)	8.08 (4)

Figures in parentheses represent number of households selling milk to a marketing agency.

to influence most of the milk producers in control area. This reflects the extent of exploitation of milk producers by the middlemen. The difference between prices offered by private dairy and middlemen's prices was the highest in rainy season (85 paise) followed by summer (64 paise) and winter season (38 paise). In general, milk prices were observed to decrease from summer to rainy and rainy to winter season. Further, the prices received by our sample milk producers for buffalo milk were much higher in extension area compared to control area.

In Kolhapur district, majority of the sample producers of extension area were observed to sell buffalo milk to cooperative societies. Though the average price offered by the society was much higher than the consumer's price especially in rainy and summer seasons, some producers continued to sell milk to consumers within the village mainly because of their good relations with the consumers. However, consumer's price was much higher than the society's price in winter season. Further, due to high demand and lower quantity of milk produced, the buffalo milk prices were maximum in summer season.

In the case of control area of Kolhapur district, consumers in winter season and private dairies in rainy and summer seasons offered maximum price for buffalo milk. In this district, too, the middlemen's price was the least in all the seasons. However, very few producers were observed to sell milk to middlemen. Majority of the producers were selling milk either to private dairies or to consumers and other agencies. The average milk prices offered by various agencies were substantially high in extension area in all the seasons compared to control area.

Now, if we compare buffalo milk prices prevailing in Jalgaon and Kolhapur districts, it can be observed that they are much higher in Kolhapur district. Even the prices

prevailing in control area of Kolhapur district, particularly in summer season, are higher than what is on offer in the extension area of Jalgaon district. This is a clear reflection of the market savvy orientation of the producers in the Kolhapur district. It is this Commercial outlook of the producers that has helped them to practice dairy profession on efficient lines, and thereby, to supplement their family incomes.

In the above context, it should be mentioned here that the village milk societies are making payment to milk producers for buffalo milk as per the circulars issued by the union from time to time after testing the milk twice a day, where the basis is fat content and where minimum standards for fat and SNF are also prescribed. This system discourages adulteration as producers get payment for milk on the basis of fat content and not on volume. This system is widely understood and is easy and simple to operate in villages on the mass scale under the existing facilities available for testing of the milk.

4.4.1.2 Price Structure for Cow Milk

The sample producers in our study districts were observed to sell both buffalo and cow milk to various marketing agencies depending on their excess to a particular agency. As the cow milk has less fat content, it fetched very low price compared to buffalo milk. It can be seen from Table 4.16 that our sample producers of cow milk in extension area of Jalgaon district sold the entire quantity of marked surplus to cooperative societies in all the season studied. It is surprising that the price offered for cow milk by all other agencies in control area of this district were much higher than in extension area. Even middlemen's price was higher than what was offered by the cooperative society. However, strict comparison is not feasible because the cooperative

society normally pays on the basis of fat percentage and SNF content, whereas the prices offered by middlemen, consumers and other marketing agencies are normally based on flat rate which are fixed at a particular level during different seasons. Compared to other marketing agencies, middlemen's rate for cow milk turned out to be maximum in all the seasons. (Table 4.16)

In Kolhapur district, except one isolated case, all the producers of cow milk sold the whole of their marketed surplus to cooperative society. Only one medium category of producer was found to sell cow milk directly to consumers within the village. Consumer's price was much higher than cooperative society's price in all the seasons and the difference between the prices offered by these two agencies was maximum in rainy season (Rs. 1.05) followed by summer (Rs. 0.69) and winter season (Rs. 0.54). Among various categories, medium category of producers received the maximum price which could be associated with higher fat percentage and SNF content. On an average, cow milk price hovered around Rs. 6 per litre in different seasons. Cow milk producers received maximum price in summer and least in winter season. In the control area, on the other hand, the prices offered by consumers, middlemen and other marketing agencies were observed to be more or less equal in different seasons. However, private dairies kept a good margin and kept milk prices substantially high compared to other agencies in all the seasons. In fact, seasons played an important role in determining the price. Because of lower quantity of milk produced in summer season, cow milk prices turned out to be maximum during this season.

In general, cow milk price was much higher in extension area in contrast to control area of Kolhapur district and the difference was observed to be more than a rupee. It was interesting to note that though the cow milk prices were lower in extension area of Jalgaon district

Table 4.16 : Seasonwise Average Milk Prices Offered by Different Marketing Agencies for Cow Milk

(in rupees/litre)

Household Category	Winter					Rainy					Summer				
	Consumers	Private dairy	Coop.	Middle-men	Others	Consumers	Private dairy	Coop.	Middle-men	Others	Consumers	Private dairy	Coop.	Middle-men	Others
<u>Jalgaon District</u>															
<u>Extension</u>															
Small	-	-	4.75 (3)	-	-	-	-	5.08 (3)	-	-	-	-	5.50 (2)	-	-
Medium	-	-	5.00 (3)	-	-	-	-	5.75 (4)	-	-	-	-	6.19 (4)	-	-
Large	-	-	5.25 (2)	-	-	-	-	5.50 (1)	-	-	-	-	6.00 (1)	-	-
Overall	-	-	4.97 (8)	-	-	-	-	5.47 (3)	-	-	-	-	5.97 (7)	-	-
<u>Control</u>															
Small	-	-	-	-	-	5.50 (2)	-	-	-	5.25 (1)	-	-	-	-	5.75 (1)
Medium	6.00 (1)	-	-	5.50 (1)	5.62 (2)	-	-	-	6.00 (1)	-	-	-	-	6.50 (1)	6.50 (1)
Large	5.00 (1)	-	-	-	5.17 (3)	-	-	-	-	5.67 (2)	6.00 (1)	-	-	-	6.00 (1)
Overall	5.50 (2)	-	-	5.50 (1)	5.25 (2)	5.50 (2)	-	-	6.00 (1)	5.53 (3)	6.00 (1)	-	-	6.50 (1)	6.08 (3)

(continued)

Table 4.16 (Continued)

(in rupees/litre)

Household category	Winter					Rainy					Summer				
	Consumers	Private dairy	Coop.	Middle-men	Others	Consumers	Private dairy	Coop.	Middle-men	Others	Consumers	Private dairy	Coop.	Middle-men	Others
<u>Kolhapur District</u>															
<u>Extension</u>															
Small	-	-	5.58 (9)	-	-	-	-	6.06 (9)	-	-	-	-	6.47 (9)	-	-
Medium	6.25 (1)	-	6.00 (3)	-	-	7.25 (1)	-	6.67 (3)	-	-	7.25 (1)	-	6.75 (2)	-	-
Large	-	-	6.00 (1)	-	-	-	-	6.00 (1)	-	-	-	-	7.00 (1)	-	-
Overall	6.25 (1)	-	5.71 (13)	-	-	7.25 (1)	-	6.20 (13)	-	-	7.25 (1)	-	6.56 (12)	-	-
<u>Control</u>															
Small	-	-	-	-	-	-	5.00 (1)	-	-	-	-	6.00 (1)	-	-	-
Medium	5.00 (1)	-	-	5.00 (1)	-	5.25 (1)	-	-	-	-	5.50 (1)	-	-	5.75 (1)	-
Large	-	5.50 (1)	-	-	5.00 (2)	-	5.50 (1)	-	-	5.00 (2)	-	6.00 (1)	-	-	6.00 (2)
Overall	5.00 (1)	5.50 (1)	-	5.00 (1)	5.00 (2)	5.25 (1)	5.25 (2)	-	-	5.00 (2)	5.50 (1)	6.00 (2)	-	5.75 (1)	6.00 (2)

Figures in parentheses represent number of households selling milk to a marketing agency.

compared to the extension area of Kolhapur district, the prices offered by various marketing agencies in the control area of Jalgaon district were much higher than those offered by their counterparts in the same area of Kolhapur district. This provides Jalgaon district a pride of place vis-a-vis cow milk pricing with special reference to control area.

The foregoing reveals that both buffalo and cow milk prices were maximum in summer season followed by rainy and winter seasons. The higher milk price in summer season is understandable in light of the fact that whereas the production of milk during flush and lean seasons normally varies from 100 to 60, the demand for milk remains more or less constant throughout the year. Normally higher prices for milk are offered in ^{the} lean season so as to attract as much of the supply as possible during this season. This also obviates competition in the face of scarce supply. Scarcity of feeds and fodder also has ^a pushing effect on the prices of milk during lean season. The producers are, therefore, justified in seeking a higher price for their produce in the lean season to meet the increased cost of production, without which it is difficult for them to maintain parity in their incomes from milk in different seasons.

In order to examine the impact of milk cooperatives on production and marketed surplus of milk in different seasons, comparison of sample beneficiary and non-beneficiary households was done in respect of production and marketed surplus of milk and 't' statistics was used to test the statistical significance. The average production and marketed surplus of milk per day per household during summer, rainy and winter seasons are presented in Tables 4.17, 4.18 and 4.19, respectively.

4.4.2 Impact of Milk Cooperatives on Production and Marketed Surplus of Milk in Summer Season

Almost all the sample households of extension as well as

control areas sold a part of the milk produced by them in the study districts. The level of production as well as marketed surplus of milk were observed to be substantially higher in clusters covered by the organized sector than those where no organized marketing facilities existed (Table 4.17). This was observed in both of our sample districts. The proportion of milk marketed to total production was about 78 per cent in extension and 72 per cent in control area of Jalgaon district. These proportions in respective sample pockets of Kolhapur district were 81 per cent and 72 per cent. Both the production and absolute marketed surplus increased with the herd size category. However, percentage sale of production was observed to decrease with the increase in herd size in extension area of both the districts. This indicates that small category of producers sold higher proportion to total production compared to other categories of producers. Since the small producers' need for immediate cash being higher, they sold higher proportion compared to other categories. However, control area of both the districts presented a different scenario. While the average marketed surplus to total production increased with the increase in herd size in control area of Jalgaon district, the proportion was more for medium category and it was same for small and large categories in Kolhapur district. The lower proportion of sale in small category in control area of both the districts could be expected due to lower production and some minimum quantity of milk needed for home consumption. However, lower proportion of milk marketed by large category compared to other categories in control area of Kolhapur district is really strange which may be associated to higher quantity of milk utilized for conversion into products. The other reason for this could be the fact that many of the large producers were selling milk to the private dairies and other agencies like hotels, restaurants, etc. who invariably converted this milk

Table 4.17 : Per Day Per Household Average Production and Marketed Surplus of Milk - Summer Season
(in litres)

Household category	Extension			Control			MD - I (1 - 3)	MD-II (2 - 4)
	Production	Marketed surplus	Marketed surplus to production (%)	Production	Marketed surplus	Marketed surplus to production (%)		
	1	2		3	4			
<u>Jalgaon District</u>								
Small	8.38 (1.14)	6.59 (0.93)	78.64	6.81 (0.89)	4.59 (0.69)	67.40	1.57@ (1.0422)	2.00@ (1.1950)
Medium	13.60 (1.31)	10.55 (1.42)	78.31	10.19 (1.33)	7.38 (1.55)	72.42	3.41@ (2.3609)	3.27@ (2.2355)
Large	11.25 (1.24)	8.50 (1.09)	75.56	21.17 (4.80)	16.08 (3.86)	75.95	-9.92@ (5.6754)	-7.58 (5.3726)
Overall	10.50 (1.21)	8.20 (1.11)	78.10	10.58 (1.94)	7.63 (1.55)	72.12	-0.08 (2.3255)	0.57 (1.9390)
<u>Kolhapur District</u>								
Small	11.70 (1.24)	9.74 (1.10)	83.25	5.00 (0.58)	3.47 (0.55)	69.40	6.70*** (1.5341)	6.27*** (1.3700)
Medium	24.25 (4.80)	19.75 (3.61)	81.44	14.44 (2.23)	11.25 (2.41)	77.91	9.81* (5.0737)	8.50* (4.6707)
Large	42.17 (3.50)	32.33 (3.47)	76.67	22.38 (4.73)	15.25 (3.90)	68.14	19.79** (7.3830)	17.08** (6.4030)
Overall	16.42 (1.94)	13.33 (1.57)	81.18	9.83 (1.57)	7.12 (1.49)	72.43	6.59** (2.5384)	6.21*** (2.2763)

Figures in parentheses under production and marketed surplus are their respective standard errors. Figures in parentheses under MD-I and MD-II are standard errors of difference between mean values of beneficiary and non-beneficiary households.

*** Significant at 1 per cent level;
* Significant at 10 per cent level;

** Significant at 5 per cent level;
@ Significant at 20 per cent level.

into products, thereby, reducing the supply of marketed liquid milk through this category. Small and medium farmers in the control area also sold their milk to consumers, middlemen and other agencies, besides private dairy. The quantity sold by large farmers to middlemen, who collect milk from the doorsteps of producers, was absolutely nil. The large farmers might be selling liquid milk as well as milk products like ghee. Thus, due to higher conversion of milk into products, the proportion of quantity sold to production was low for this category of producers compared to other categories in control area of Kolhapur district.

While comparing results of extension and control areas of our study districts, it was observed that the percentage marketed surplus was little higher in extension area of Kolhapur district compared to Jalgaon district. But in the case of control area, the proportion was same in both the districts. However, in absolute quantity these parameters were much higher in extension area of Kolhapur compared to Jalgaon district. Now, let us see the impact of these milk cooperatives on production and marketed surplus of milk.

In fact, the weaknesses in organization and management of cooperatives in general have been highlighted in the past. But very little efforts have so far been made to examine the impact of dairy cooperatives on production and marketed surplus of milk in different seasons. An attempt in this regard, therefore, has been made by working out mean differences in production and marketed surplus between extension and control area and testing it for statistical significance. In general, it was observed that the milk cooperatives in Jalgaon district neither had any impact on production nor on marketed surplus of milk. However, a little positive impact of cooperatives can be observed in the case of small and medium category. But in the case of large category, the impact of cooperatives

was observed to be negative on production, though not on marketed surplus. Since the level of significance was at 20 per cent and as the number of observations were very few for large category, a concrete and clear-cut conclusion in this regard cannot be drawn.

In the case of Kolhapur district, it was noted that the mean differences in production and marketed surplus of milk between extension and control areas were statistically highly significant for all the herd size groups which indicated that the above parameters were significantly higher for beneficiary households compared to non-beneficiary households suggesting thereby positive impact of milk cooperatives on production and marketed surplus of milk in summer season.

4.4.3 Impact of Milk Cooperatives on Production and Marketed Surplus of Milk in Rainy Season

Though the production and absolute marketed surplus for each category of households increased in rainy season, by and large, compared to summer season, the proportion of sale to production declined during this season for all the categories of our sample households (Table 4.13). The average milk production per household per day during this season was 11.09 litres in extension area of Jalgaon district, out of which 8.01 litres was sold representing marketed surplus of 72.23 per cent. On the other hand, the quantities of milk produced and sold in control area of this district were 10.33 litres and 6.26 litres and thus giving an average marketed surplus of only 60.60 per cent. This shows that though the average quantity of milk produced by an average sample household is almost same in both the areas of this district; however, the quantity of milk marketed was much higher in extension area compared to control area. In the case of Kolhapur district, it can be observed that the percentage milk marketed to production was reduced during this season compared to summer season. In general, medium category of producers sold higher proportion

Table 4.18.: Per Day per Household Average Production and Marketed Surplus of Milk Rainy Season

Household category	(in litres)						MD-I (1 - 3)	MD-II (2 - 4)
	Extension			Control				
	Production 1	Marketed surplus 2	Marketed surplus to production(%) 3	Production 3	Marketed surplus 4	Marketed surplus to production(%) 4		
<u>JALGAON DISTRICT</u>								
Small	7.41 (0.92)	5.09 (0.56)	68.69	7.06 (0.92)	4.06 (0.66)	57.51	0.35 (1.3425)	1.03 (0.8969)
Medium	14.60 (1.67)	11.10 (1.55)	76.03	10.38 (2.26)	6.56 (1.64)	63.20	4.22@ (2.9199)	4.54 (2.4132)
Large	17.00 (5.12)	12.00 (4.02)	70.59	19.00 (3.80)	11.75 (2.65)	61.84	-2.00 (6.9971)	0.25 (5.1583)
Overall	11.09 (1.73)	8.01 (1.35)	72.23	10.33 (1.85)	6.26 (1.32)	60.60	0.76 (2.5762)	1.75 (1.9204)
<u>KOLHAPUR DISTRICT</u>								
Small	9.70 (0.81)	7.67 (0.75)	79.07	4.81 (0.60)	3.19 (0.56)	66.32	4.89*** (1.5429)	4.48*** (1.0070)
Medium	21.25 (3.99)	16.13 (2.93)	75.91	8.50 (1.17)	5.19 (0.90)	61.06	12.75*** (3.5851)	10.94*** (2.6633)
Large	29.67 (4.32)	22.33 (3.95)	75.26	17.75 (3.98)	13.38 (4.37)	75.38	11.92@ (7.0118)	8.95 (7.2163)
Overall	13.24 (1.59)	10.26 (1.36)	77.49	7.52 (1.20)	5.08 (1.16)	56.55	5.72*** (2.0519)	5.18*** (1.8181)

Figures in parentheses under production and marketed surplus are their respective standard errors. Figures in parentheses under MD-I and MD-II are standard errors of difference between mean values of beneficiary and non-beneficiary households. *** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level; @ Significant at 20% level.

to production in extension and control area of Jalgaon district. On the other hand, in Kolhapur district, the proportion was much higher for medium category in extension and for large category in control area. Thus, though the large producers' contribution to sale was least in summer season, by and large, it was much higher for this category in rainy season in control area of Kolhapur district.

In rainy season too, except for medium category, the impact of milk cooperatives was absolutely nil on production as well as marketed surplus of milk. On the other hand, milk cooperatives had positive impact on milk production and marketed surplus in Kolhapur district in general and for small and medium categories of producers in particular. In the case of large category, these co-operatives had little positive impact and that too only on production.

4.4.4 Impact of Milk Cooperatives on Production and Marketed Surplus of Milk in Winter Season

In winter season, the proportion of milk marketed to production was lower than summer season but little higher than rainy season for all the categories of households in both the sample pockets of our study districts. (Table 4.19). In this season, no discernible trend could be observed in terms of proportion of milk marketed to production by various categories of households in our study districts. While large category sold higher proportion in extension area of Jalgaon district, the proportion was more for medium category in control area of this district. In Kolhapur district, the proportion was higher for small category in extension and for large category in control area. The reasons for higher quantity of milk sold by a particular category of household have already been discussed in the earlier section.

In winter season also, the positive impact of milk cooperatives on production and marketed surplus could be

Table 4.19 : Per Day Per Household Average Production and Marketed Surplus of Milk -
Winter Season

(in litres)

Household category	Extension			Control			MD-I	MD-II
	Production	Marketed surplus	Marketed surplus to production (%)	Production	Marketed surplus	Marketed surplus to production (%)	(1 - 3)	(2 - 4)
	1	2	(%)	3	4	(%)		
JALGAON DISTRICT								
Small	11.44 (1.60)	8.47 (1.23)	74.30	8.88 (0.91)	5.22 (0.83)	58.78	2.56@ (1.9036)	3.25** (1.5346)
Medium	17.80 (3.19)	13.10 (2.38)	73.60	17.25 (2.54)	11.75 (1.98)	68.12	0.55 (4.4798)	1.35 (3.3949)
Large	26.00 (1.37)	19.88 (0.62)	76.46	26.83 (4.57)	17.08 (3.14)	63.66	-0.83 (6.3853)	2.80 (4.3385)
Overall	15.50 (2.10)	11.53 (1.53)	74.39	14.70 (2.08)	9.33 (1.60)	63.47	0.80 (3.0050)	2.20 (2.2516)
KOLHAPUR DISTRICT								
Small	13.04 (1.12)	10.87 (1.06)	83.36	7.17 (0.71)	4.58 (0.77)	63.88	5.87*** (1.4443)	6.29*** (1.4157)
Medium	27.75 (5.18)	21.75 (4.75)	78.38	12.75 (3.78)	8.81 (2.03)	69.10	15.00*** (4.8692)	12.94*** (4.8363)
Large	32.00 (3.86)	25.33 (2.88)	79.16	19.75 (6.97)	15.38 (6.59)	77.87	12.25 (10.3108)	9.95 (9.4741)
Overall	16.90 (1.93)	13.77 (1.73)	81.48	10.34 (1.83)	7.15 (1.88)	69.15	6.56** (2.7333)	6.62** (2.5985)

Figures in parentheses under production and marketed surplus are their respective standard errors. Figures in parentheses under MD-I and MD-II are standard errors of difference between mean values of beneficiary and non-beneficiary households.

*** Significant at 1 per cent level; ** Significant at 5 per cent level;
* Significant at 10 per cent level; @ Significant at 20 per cent level.

found only in Kolhapur district. However, these cooperatives were found to exercise a positive impact on the marketed surplus of small category of producers in Jalgaon district. By and large, they did not have any impact on these parameters in Jalgaon district.

Thus, seasonal fluctuations were observed in production and marketed surplus of milk in all herd size categories in both the areas of the districts. The production and marketed surplus per day was the lowest in summer season followed by rainy and winter seasons. However, the percentage marketed surplus was the highest in summer season followed by winter and rainy seasons. The higher percentage of marketed surplus in summer season could be due to lower milk production, higher demand and higher price offered by various agencies compared to other seasons. In the above context, we can compare our results with the findings of Bahadure et al (1981), Balishter et al (1982) and Shah and Sharma (1994).

4.4.5 Marketed Surplus Functions for Milk

An attempt has been made in this sub-section to examine the empirical nature of relationship between marketed surplus of milk and its determinants. The explanatory variables considered to develop marketed surplus functions were level of milk production, family size, education of head of the household and the unit price of milk. As in the case of milk production functions, an attempt was made to develop seasonal marketed surplus functions for various categories of households. However, due to smaller number of observations for medium and large categories of sample producers in our sample pockets, it was not possible to develop seasonal marketed surplus functions for these categories of households. Therefore, annual average marketed surplus functions pooled over seasons were fitted separately for each district using seasonal dummies for all the categories of households. Dummy

variable D_1 was used for rainy season and D_2 for summer season. Further, in the present investigation Linear and Cobb-Douglas types of mathematical models were tried. However, as the Linear model explained maximum variation in marketed surplus and also the coefficients of the explanatory variables were consistent in sign and economic logic, it was finally selected for interpretation of results.

4.4.5.1 Marketed Surplus Functions in Jalgaon District

A perusal of Table 5.20 giving the marketed surplus functions for various categories of milk producers in the two sample pockets of Jalgaon district revealed that the explanatory variables included in the study contributed 95 per cent of the variation in the marketed surplus of milk showing high degree of predictability of marketed surplus with the knowledge of the variables included in the function.

Milk production in the household was observed to be the single most determining factor in the marketed surplus of milk. However, its contribution to the marketed surplus with additional increase in milk production was observed to be different among different categories of milk producers in the two sample areas. The extension area was found to contribute more to the marketed surplus in all the categories of milk producers. This could be due to adequate market infrastructure through milk cooperatives available in the area. The small producer contributed relatively lower proportion to the marketed surplus for every additional increase in milk production in both extension and control areas. This is understandable for the total production being lower in this category of household, a larger proportion of the additional milk produced was retained at home for internal consumption.

The price of milk was found to be another significant factor next only to milk production in marketed surplus function particularly in the case of small and medium categories in

Table 4.20 : Marketed Surplus Functions for Milk - Jalgaon District

Household category	N	Constant	Regression Coefficients					D ₁	D ₂	R ²
			Milk production (x ₁)	Family Size (x ₂)	Education (x ₃)	Price of milk (x ₄)				
<u>Extension</u>										
Small	48	-0.6540	0.7346*** (0.0312)	0.0368 (0.1128)	0.0424 (0.0670)	0.1138@ (0.0857)	-0.4244 (0.3912)	0.4033 (0.3821)	0.9427	
Medium	30	6.7599	0.8005*** (0.0444)	-0.1493 (0.2570)	-0.0600 (0.0872)	0.9286** (0.3828)	0.7324 (0.7549)	1.3977* (0.7883)	0.9401	
Large	12	-12.6797	0.7971*** (0.1035)	0.5094 (0.8589)	0.5164@ (0.3161)	0.7183 (0.6288)	-0.4066 (1.6423)	-0.2678 (2.0890)	0.9684	
Overall	90	-0.8834	0.7652*** (0.0211)	0.0372 (0.1152)	0.0597 (0.0511)	0.0429 (0.1008)	-0.1396 (0.3769)	0.4857@ (0.3803)	0.9459	
<u>Control</u>										
Small	48	-1.0464	0.6999*** (0.0605)	-0.1149 (0.1740)	-0.0340 (0.0499)	0.1179 (0.2762)	0.1197 (0.4952)	0.7235@ (0.5630)	0.8167	
Medium	24	-0.8549	0.7780*** (0.0242)	0.0264 (0.0846)	0.0872@ (0.0619)	0.1691* (0.0897)	0.0728 (0.3599)	1.1958*** (0.3737)	0.9899	
Large	18	-13.6159	0.7112*** (0.0838)	0.4812 (0.7832)	0.0013 (0.2980)	1.4054** (0.5827)	-0.5519 (1.2299)	1.7206@ (1.2266)	0.9753	
Overall	90	-1.3394	0.7130*** (0.0182)	0.0416 (0.1030)	0.0474@ (0.0374)	0.0337 (0.1359)	0.0493 (0.3712)	1.2108*** (0.3839)	0.9567	

Figures in parentheses indicate standard error of regression coefficients.
 *** Significant at 1 per cent level. ** Significant at 5 per cent level.
 * Significant at 10 per cent level. @ Significant at 20 per cent level.

extension and medium and large categories in control areas.

Education level of ^{the} / head of the household was the third significant factor affecting marketed surplus, though the level of significance was at 20 per cent probability level. Its positive and significant influence was observed only in the case of large category in extension, and medium category in control area. Normally, selling of milk is considered as a social taboo. However, with the increase in the education level and adequate market infrastructure, the taboo is no longer a constraint in the sale of milk. This is also revealed by the non-significance of education level in small and medium categories in extension and small and large categories in control area who mainly maintained milch animals for the sale of milk.

The family size had no significant impact on marketed surplus. This could be due to relatively small variation in the number of family members for a particular category of household. Normally, there is a negative relationship between marketed surplus of milk and family size (Shah and Sharma, 1993). However, such a relationship could not be observed due to non-significance of regression coefficients.

The seasonal dummy variables included in the model revealed that the contribution of additional milk production to the marketed surplus of milk progressively increased from rainy to winter and winter to summer seasons. The production of milk being lower in summer, demand and price being higher, larger proportion of additional milk produced was, therefore, diverted to marketed surplus. Though the production was the highest in winter season, the proportionate contribution to marketed surplus was lower due to lower demand and lower price.

4.4.5.2 Marketed Surplus Functions in Kolhapur District

The marketed surplus functions for Kolhapur district

are presented in Table 4.21. Milk production in the household was again found to be one of the most determining factors in the marketed surplus of milk ($P < 0.01$) in all the herd size categories in both the sample pockets of Kolhapur district. The magnitude of the regression coefficients of average category of household revealed that with every additional increase in milk production, the marketed surplus was more or less the same (of the order of 800 ml) in both the sample pockets. However, the response was slightly more in control area compared to extension area especially for small and medium categories of households.

The family size had a negative influence on marketed surplus. Though it was not significant in a number of cases, by and large, larger family sizes tended to decrease the marketed surplus. This could be due to larger requirement of milk for internal consumption. This was more so in extension than that of control area.

Education level of the head of the household was found to have positive and significant influence on marketed surplus particularly in control area of the district. The price of milk had no significant effect. Further, while both rainy and summer seasons had significant and positive impact on marketed surplus in the case of small category in control area, the influence of former on marketed surplus was negative in extension area of Kolhapur district.

Thus, the foregoing analysis revealed that milk production was the only determining factor in the marketed surplus of milk. Its response was relatively higher in Kolhapur compared to Jalgaon district. Though the price of milk had a significant positive influence on marketed surplus in Jalgaon district, its influence on marketed surplus could not be observed in Kolhapur district. However, family size, which did not exercise any influence on marketed surplus in Jalgaon

Table 4.21 : Marketed Surplus Functions for Milk - Kolhapur District

Household category	N	Constant	Regression Coefficients					D1	D2	R ²
			Milk production (x ₁)	Family size (x ₂)	Education (x ₃)	Price of milk (x ₄)				
<u>Extension</u>										
Small	69	0.1954	0.8979*** (0.0198)	-0.1808* (0.1042)	-0.0255 (0.0257)	0.0066 (0.0868)	-0.184 (0.2485)	0.0732 (0.2544)	0.9756	
Medium	12	-20.7275	0.7849*** (0.0941)	2.1646 (2.5864)	0.6861 (0.6795)	0.5743 (1.2472)	-0.5662 (1.7823)	0.1700 (2.0504)	0.9632	
Large	9	10.0748	0.8134*** (0.0937)	0.4090 (0.5587)	0.7449@ (0.4971)	-2.6092 (2.6746)	-0.2932 (1.6069)	1.3308 (2.9383)	0.9890	
Overall	90	1.4808	0.7935*** (0.0133)	-0.3343*** (0.1203)	0.0155 (0.0340)	0.0676 (0.1202)	-0.5990* (0.3162)	-0.1163 (0.3325)	0.9796	
<u>Control</u>										
Small	54	-1.8533	0.9357*** (0.5757)	-0.0147 (0.1265)	0.0696@ (0.0453)	-0.0872 (0.1177)	0.8108** (0.3413)	1.0167*** (0.3831)	0.8962	
Medium	24	-7.3287	0.8679*** (0.0996)	-0.4608@ (0.3223)	0.2366*** (0.0823)	0.0431 (0.4183)	0.0437 (0.9218)	0.9075 (0.9270)	0.9557	
Large	12	-1.7340	0.6482*** (0.2044)	0.2853 (1.2744)	0.8746 (1.0652)	-0.0534 (2.4296)	-0.6474 (3.1493)	-1.7281 (4.3142)	0.9865	
Overall	90	-3.9869	0.8040*** (0.0253)	-0.2223* (0.1236)	0.1301*** (0.0385)	0.1367 (0.1421)	0.1711 (0.3872)	0.1851 (0.4250)	0.9529	

Figures in parentheses indicate standard error of regression coefficients,
 *** Significant at 1 per cent level. ** Significant at 5 per cent level.
 * Significant at 10 per cent level. @ Significant at 20 per cent level.

district, had a negative impact on marketed surplus in Kolhapur district. Larger family size tended to decrease the marketed surplus in Kolhapur district. Thus, the usual phenomenon that the family size is negatively associated with marketed surplus of milk could be confirmed only in Kolhapur district. Except some isolated cases, the education level of the head of the household, who is one of the important decision makers in the family, had a positive and significant influence on marketed surplus of milk in both the sample districts. Thus, with more awareness, the milk producers showed tendency to increase marketed surplus of milk.

4.5 Impact of Milk Cooperatives on Income and Employment Levels

The magnitude of income generation by an enterprise reflects its economic soundness and viability. Besides, income is the ultimate indicator through which impact of any development programme can be assessed. Thus, with a view to examine the impact of milk co-operatives on the income accruing to beneficiary households (i.e. sample households in extension area) from dairy enterprise, the relevant data on costs and returns were analysed. In order to work out per day per milch animal annual average costs and returns for different breeds and category of households, the data on per day costs and returns for different seasons were pooled together. The various components of annual costs and returns were worked out using the method of Shah and Sharma (1994). Further, as the number of observations related to different herd size categories for murreh buffalo, local cows and crossbred cows were very less, only the overall average costs and returns were worked out for all the breeds of animals maintained by our sample households.

The pattern of human labour absorption in dairy farming during different seasons was judged by comparing the sample beneficiary and the non-beneficiary households (households in

control area) of the two districts. The impact of dairy co-operatives on human labour absorption was also revealed by this analysis, the statistical significance of which was tested by employing 't' test.

4.5.1 Economics of Milch Animals

A comparative economics of milk production for different breeds of bovines maintained by our sample households in extension and control areas was worked out separately with respect to each of the two study districts and the data have been shown in Tables 4.22 and 4.23. While working on the production economics of milk, the gross maintenance cost of milch animals was divided into various components such as cost of green fodder, dry fodder and concentrate, cost of human labour, miscellaneous expenses including veterinary and health care charges, depreciation and interest on fixed capital like milch animals, cattleshed and dairy equipment. The net maintenance cost is computed by deducting the value of dung (farm yard manure) from the gross maintenance cost,

4.5.1.1 Income from dairy farming in Jalgaon district

A close examination of Table 4.22 revealed that the annual gross maintenance cost was higher in extension area for local breeds of cows ^{and} buffaloes. Whereas in the case of superior breeds of these animals, it was more or less the same in both the sample areas. The highest gross maintenance cost was for murreh buffaloes in both extension and control area. Of the total cost of milk production, 20-30 per cent was fixed cost and the remaining was variable cost. Feed cost alone accounted for nearly 60 per cent of the gross cost for all the breeds of milch animals in both the sample packets. Similar observations were made by Reddy et al (1975), Reddy and Mathur, (1980), Vashist and Katiha, (1988), Goswami and Rao (1992) and Shah and Sharma (1994). The expenditure incurred on human labour use varied from 10-20 per cent among different breeds

Table 4.22 : Annual Cost, Returns and Income According Breed of Milch Animal - Jalgaon District

(in Rupees)

Particulars	Cooperative Area (Extension)				Non-Cooperative Area (Control)			
	Local Buffalo	Murrah Buffalo	Local Cow	Crossbred Cow	Local Buffalo	Murrah Buffalo	Local Cow	Crossbred Cow
A. Fixed Cost								
1. Depreciation on fixed assets	765 (8.94)	1326 (11.02)	515 (9.38)	1115 (11.46)	783 (9.54)	1452 (11.60)	537 (11.33)	1414 (14.15)
2. Interest on fixed capital	984 (11.49)	1944 (16.15)	657 (11.96)	1251 (12.87)	969 (11.94)	1740 (13.89)	1645 (13.62)	1702 (17.04)
Total fixed cost	1749 (20.43)	3270 (27.17)	1172 (21.34)	2366 (24.33)	1752 (21.58)	3192 (25.49)	1182 (24.95)	3116 (31.19)
B. Variable Cost								
1. Green fodder	1721 (20.11)	2039 (16.94)	1055 (19.21)	1883 (19.36)	1615 (11.89)	2819 (22.51)	940 (19.84)	2360 (23.62)
2. Dry fodder	1742 (20.35)	1896 (15.75)	1444 (26.29)	1540 (15.83)	1570 (19.33)	1927 (15.39)	1035 (21.84)	1340 (13.41)
3. Concentrate	1515 (17.70)	3410 (23.33)	659 (12.00)	2191 (22.53)	1362 (15.77)	2776 (22.17)	395 (8.34)	1500 (15.02)
4. Human labour	1664 (19.44)	1214 (10.09)	951 (17.31)	1549 (15.93)	1619 (19.94)	1628 (13.00)	1064 (22.46)	1504 (15.06)
5. Misc. Charges	163 (1.97)	206 (1.72)	212 (3.36)	197 (2.02)	202 (2.49)	180 (1.44)	122 (2.57)	170 (1.70)
Total variable cost	6810 (79.57)	8765 (72.33)	4321 (78.66)	7360 (75.57)	6368 (78.42)	9330 (74.51)	3556 (75.05)	5874 (68.81)
Gross Cost (A+B)	8559	12035	5493	9726	8120	12522	4738	9990
Income from dung Not Cost	483	568	433	436	538	589	395	508
Returns from milk	3076	11457	5060	9290	7532	11933	4343	9482
Net Income	11376 3800	19134 7717	5185 125	11364 2074	9977 2395	16589 4654	4736 393	10569 1087
Input-Output Ratio	1:1.47	1:1.67	1:1.02	1:1.22	1:1.32	1:1.39	1:1.09	1:1.11

of bovines. It was highest for local buffaloes (19 per cent) in extension and for local cows (22 per cent) in control area. In the case of murrah buffaloes and crossbred cows, the major expenditure was on green fodder and concentrate (nearly 45 per cent) in both the areas. Since improved breeds possessed better feed conversion efficiency, they were supplied more green fodder and concentrate compared to other breeds of bovines.

The returns from milk and income over gross and net cost also showed a similar trend as that of gross cost of maintenance for different breeds of bovines. The net income derived was substantially higher in extension area. It was Rs. 3,800 from local buffaloes, Rs. 7,717 from murrah buffaloes, Rs. 125 from local cows and Rs. 2,074 from crossbred cows in extension area. The corresponding figures in the case of control area for the respective breeds of milch animals were Rs. 2,395, Rs. 4,654, Rs. 393 and Rs. 1,087. This indicated an increase in net income by 59 per cent from local buffaloes, 66 per cent from murrah buffaloes and 91 per cent from crossbred cows on the beneficiary households over and above non-beneficiary households. This may be attributed mainly to higher milk production as a result of greater care and management of the animals by the beneficiary households. Further, the milk cooperatives extended various technical inputs and health cover services to the beneficiary households which might have led to greater milk production leading to higher gross returns on the beneficiary households. The net income derived was the highest for Murrah buffaloes in both the areas. The input-output ratio was also the highest for murrah buffaloes. In fact, the income accrued from local cows was mainly from dung production since the gross cost of maintenance and net returns from milk were almost the same in control area. However, in extension area, the gross cost was higher than the returns from milk. Thus, local cow rearing

was not found to be a worthwhile proposition.

4.5.1.2 Income from dairy farming in Kolhapur district

In Kolhapur district too, the expenditure on fixed assets turned out to be around 20 per cent (Table 4.23). Of the total expenditure, our sample households spent 41-49 per cent on green fodder and concentrate alone in extension area and 36-47 per cent in control area in rearing different breeds of milch animals. The income derived from all the breeds of milch animals was substantially high in extension area of Kolhapur district compared to the extension area of Jalgaon district. Though local cow rearing was not a profitable proposition in both the sample pockets of Jalgaon district, however, it turned out to be a useful and profitable venture in control area of Kolhapur district. On an average, the annual net income derived by our sample producers was Rs. 5,915 from local buffaloes, Rs. 9,571 from Murrah buffaloes, Rs. 242 from local cows and Rs. 5,870 from cross-bred cows. The corresponding figures in the counterpart were Rs. 1,981 from local buffaloes, Rs. 7,114 from murrah buffaloes and Rs. 1,500 from local cows. Thus, the net income of our sample beneficiaries increased by 199 per cent in rearing local buffaloes and 35 per cent in the case of murrah buffaloes. However, in the case of local cows, it declined by 84 per cent over non-beneficiary households.

The higher gross cost of maintenance and returns from milk through different breeds of milch animals in extension area suggest that the resource endowment for expenditure in dairying was more in this area than in control area. There appeared to be a scale effect in terms of expenditure, returns from milk and income derived through different breeds of milch animals. With the increase in resource endowments, the producers went for superior breeds of animals and followed better feeding and management practices. This was true in both

Table 4.23 : Annual Cost, Returns and Income According to Breed of Milch Animal - Kolhapur District
(in Rupees)

Particulars	Cooperative Area (Extension)				Non-Cooperative Area (Control)			
	Local Buffalo	Murrah Buffalo	Local Cow	Crossbred Cow	Local Buffalo	Murrah Buffalo	Local Cow	Crossbred Cow
A. Fixed Cost								
1. Depreciation on fixed assets	735 (7.46)	887 (7.48)	484 (6.55)	1096 (9.67)	667 (8.36)	853 (9.09)	321 (7.03)	-
2. Interest on fixed capital	941 (9.54)	1245 (10.49)	664 (8.99)	1419 (12.53)	848 (10.52)	1106 (11.80)	402 (3.80)	-
Total fixed cost	1576 (17.00)	2132 (17.97)	1148 (15.54)	2515 (22.20)	1515 (18.98)	1959 (20.89)	723 (15.83)	-
B. Variable Cost								
1. Green fodder	2717 (27.56)	2682 (22.60)	1842 (24.94)	2882 (25.44)	2253 (23.22)	2209 (23.56)	1170 (25.62)	-
2. Dry fodder	1555 (15.78)	1361 (15.63)	1957 (26.50)	1303 (11.50)	1482 (18.56)	1319 (14.07)	1039 (23.34)	-
3. Concentrate	2018 (20.47)	3188 (26.87)	1255 (17.99)	2582 (22.79)	1106 (13.85)	2134 (23.29)	446 (9.77)	-
4. Human labour	1304 (18.30)	1912 (16.11)	1151 (15.58)	1394 (16.72)	1482 (18.56)	1425 (15.20)	1053 (23.06)	-
5. Misc. charges	83 (0.89)	91 (0.77)	33 (0.45)	153 (1.35)	146 (1.83)	230 (2.99)	86 (1.83)	-
Total variable cost	8183 (83.00)	9734 (82.03)	6238 (34.46)	8814 (77.80)	6459 (81.02)	7417 (79.11)	3344 (84.17)	-
Gross Cost (A+B)	9859	11366	7336	11329	7984	9376	4567	-
Income from dung	538	592	554	548	546	560	432	-
Net Cost	9321	11274	6832	10781	7438	8816	4135	-
Returns from milk	15236	20345	7074	16651	9419	15930	5635	-
Net Income	5915	9571	242	5370	1931	7114	1500	-
Input-Output ratio	1:1.63	1:1.85	1:1.04	1:1.54	1:1.27	1:1.81	1:1.36	-

the sample pockets of our study districts.

4.5.2 Human Labour Employment in Dairy Farming

Human labour is one of the vital component of ~~198st~~ milk production and its utilization plays a pivotal role in dairy enterprise which reflects the extent of employment generation by it. In order to study the impact of milk cooperatives on human labour employment during different seasons, data were analysed and are presented in Tables 4.24 and 4.25.

Examination of Table 4.24 revealed that there was an increasing trend in terms of seasons in human labour use per household in dairy enterprise on both beneficiary and non-beneficiary households. It increased from summer to rainy and rainy to winter season. The overall human labour absorption in dairy enterprise was about 298 man days on the beneficiary households as against 254 man days on the non-beneficiary households during the year in Jalgaon district. In Kolhapur district, the average annual per household labour absorption was 296 man days on beneficiary household and 250 man days on non-beneficiary households. Further, the average family labour use was about 91 and 94 per cent of the total labour employment in dairy enterprise on the beneficiary and non-beneficiary households, respectively in Jalgaon district. In Kolhapur district, the sample households in control area were not found to employ hired labour in this enterprise. The proportion of family labour in extension and control area of this district was, therefore, 92 per cent and 100 per cent, respectively. When family labour utilization component was broken into man, women and child labour and analysed (Table 4.25) it was observed that women's participation in various dairy operation was higher in control area (31 per cent) compared to extension area (24 per cent) of Jalgaon district. Whereas in Kolhapur district, it was more or less same in both

Table 4.24 : Season-wise Human Labour Employment in Dairy Farming on the Sample Households

(Man equivalent days/household)

Season	Extension			Control			t-value for the difference in means between beneficiary & non-beneficiaries
	Family Labour	Hired Labour	Total	Family Labour	Hired Labour	Total	
JALGAON DISTRICT							
Summer	78.84 (91.19)	7.62 (8.81)	86.46	65.27 (94.48)	3.81 (5.52)	69.08	2.1509**
Rainy	94.56 (90.44)	9.99 (9.56)	104.55	32.87 (93.09)	6.15 (6.91)	89.02	1.5226@
Winter	96.90 (90.22)	10.50 (9.78)	107.40	89.55 (93.28)	6.45 (6.72)	96.00	1.1878
Total (Annual)	270.30 (90.58)	28.11 (9.42)	298.41	237.69 (93.54)	16.41 (6.46)	254.10	1.5901@
KOLHAPUR DISTRICT							
Summer	82.35 (92.31)	6.86 (7.69)	89.21	79.61 (100.00)	-	79.61	1.0142
Rainy	94.10 (91.75)	8.46 (8.25)	102.56	88.71 (100.00)	-	88.71	1.5117@
Winter	94.05 (90.61)	9.75 (9.39)	103.80	81.45 (100.00)	-	81.45	2.4065**
Total (Annual)	270.50 (91.52)	25.07 (8.48)	295.57	249.77 (100.00)	-	249.77	1.6808*

Note: Figures in parentheses indicate percentage total
 **, * and @ represent significance at 5%, 10% and 20% respectively.

the sample pockets (about 30 per cent). Further, women labour use was found to be consistently higher in winter season compared to other seasons.

It was noted that the 't' values were statistically significant in most of the cases which indicated that the human labour employment on the beneficiary households was higher than that of non-beneficiary households suggesting thereby a positive impact of milk cooperatives on the human labour absorption in dairy farming in both the sample districts.

Table 4.25 : Family Labour Utilization in Dairy Farming on Sample Households

(Man equivalent days/household)

Season	Extension				Control			
	Men	Women	Child- ren	Total	Men	Women	Child- ren	Total
JALGAON DISTRICT								
Summer	56.90	17.64 (22.37)	4.30	78.83	43.46	20.28 (31.22)	1.43	65.27
Rainy	68.46	22.86 (24.18)	3.24	94.56	55.49	23.10 (27.87)	4.28	82.87
Winter	68.79	24.52 (25.30)	3.59	96.90	52.82	30.29 (33.82)	6.44	89.55
Total (Annual)	194.15 (71.83)	65.02 (24.05)	11.13 (4.12)	270.30	151.77 (63.85)	73.77 (31.04)	12.15 (5.11)	237.69
KOLHAPUR DISTRICT								
Summer	51.05	26.82 (32.57)	4.48	82.35	54.25	22.85 (28.70)	2.51	79.61
Rainy	57.83	32.61 (34.65)	3.66	94.10	58.35	26.83 (30.30)	3.48	88.71
Winter	59.90	31.17 (33.14)	2.98	94.05	53.85	25.47 (31.27)	2.13	81.45
Total (Annual)	168.78 (62.40)	90.60 (33.49)	11.12 (4.11)	270.50	166.45 (66.64)	75.20 (30.11)	8.12 (3.25)	249.77

Figures in parentheses indicate percentage to total.

In the above context it should be mentioned here that the increase in human labour utilization recorded in the extension area over that of control area was about 17 percent in Jalgaon district and 13 percent in Kolhapur district. This additional employment generation may be attributed to the keen interest created in dairying in the beneficiary households by the milk cooperatives which might have led them to devote more time in the maintenance and upkeep of the animals.

4.5 Members Perception of the Working of Milk Cooperative Societies

Adoption of any advanced technology involves a process in which awareness is created, attitudes are changed and

favourable conditions for adoption are provided. How latest is the knowledge of a dairy producer about various animal husbandry practices such as animal feeding, breeding and management of milch animals determines largely the success or failure of a dairy enterprise. The viability of a dairy enterprise also depends on the favourable attitudinal changes of the member producers' towards adoption of technical inputs and animal husbandry services. In this context, milk cooperatives have quite ambitious objectives. They not only want to increase the productivity of milch animals but also wish to raise the economic status of rural people at large through increased milk production. The realisation of these objectives mainly depends on the awareness of the milk producers about the various facilities extended by the dairy co-operatives and, more specifically, on the individual member producer's interest in running his enterprise on efficient lines.

The characteristics such as socio-economic behaviour of cattle keepers, market infrastructure prevailing in extension and control areas, production and marketing aspects of our sample milk producers have already been discussed in the previous sections. Let us now examine the attitude and perception of our sample producers with regard to the functioning of milk cooperative societies, especially in terms of types of facilities provided by the societies and the constraints perceived by member producers in availing such facilities through cooperatives. Some data, opinions and available information on sample milk producers have been sampled to ascertain their degree of awareness about the facilities being extended by dairy co-operatives.

4.6.1 Conditions and Reasons for becoming a member of the Society

The members were asked to indicate their perception regarding the conditions and reasons for becoming the member of milk cooperative society. This made the sample producers to

come out with as many as 7 conditions and 7 reasons for becoming the member of their village milk cooperative society. The conditions and reasons cited by the member producers have been enlisted in Table 4.26. While the conditions were laid down by the concerned co-operative, the reasons were member producer's own. The most important conditions in this respect were : a member should be above 18 years of age; he must be a shareholder; must be a resident of the some village and he must be a milk producer. The other conditions were : good character of the member; he should not be a member of other milk cooperative society and that should have been producing milk for at least one preceding year. The member's awareness and response in terms of first three conditions was more than 80 percent in both the districts. In the case of medium category of producers, the response was cent percent in both the sample districts.

Table 4.26 : Members Perception Regarding Conditions and Reasons for Becoming a Member of Milk Cooperative Society

Conditions/Reasons	(in per cent)							
	Jalgaon				Kolhapur			
	S	M	L	O	S	M	L	O
A: Conditions								
a) Above 18 years of age	94	100	100	97	100	100	100	100
b) Must be a share holder	94	100	100	97	78	100	67	80
c) Must be a resident of the some village	88	100	100	93	96	100	100	97
d) Good character	13	-	-	7	52	50	-	47
e) Must be a milk producer	25	30	50	30	70	75	100	73
f) Should not be a member of other milk co-op. society	-	-	-	-	17	-	-	13
g) Should be producing milk for last one preceding year	6	-	-	3	-	-	-	-
B: Reasons								
a) Payment on fat & SNF basis	63	40	75	57	65	25	100	63
b) Sense of security for supply	63	100	75	77	78	100	67	80
c) Regular/Timely payment	31	40	25	33	39	50	33	40
d) Availability of feeds & fodder on credit	56	60	50	57	52	50	-	47
e) Availability of veterinary facilities	6	10	-	7	30	50	33	33
f) Availability of loan for milch animals	44	60	50	50	52	75	-	50
g) Payment of a share of profit (dividend)	7	10	-	10	-	-	-	-
S = Small; M = Medium L = Large; O = Overall								

At the time of survey the producers were requested to state how they were motivated to become a member of the milk society. Though many reasons weighed in favour of dairy co-operatives, the respondents were asked to elucidate only the most prominent ones among them. Most member producers in the sample areas favoured milk co-operatives for the latter's perceived fair trade play and the basis of payment for their produce. The mode of functioning of co-operatives was successful in infusing and in inculcating a sense of security among member producers about the viability of their trade. The producers' in Kolhapur district responded more favourably to the regular and timely payments made by their society compared to those in Jalgaon district. About 50 per cent of the respondents were in favour of receiving inputs provided by the society and these were in the form of various feeds and fodder, veterinary and health care services and milch animal loans. Since in Jalgaon district, veterinary facilities provided by the society were limited to only the A.I service, the members' response in favour of this facility was only 7 percent. On the other hand, in Kolhapur district, the milk cooperative society provides all types of veterinary and health care facilities to its members, that is, right from vaccination to disease control. This prompted as many as 33 percent of the member producers in this district to opt for various veterinary and health care services provided by the society. By far, the small and medium category of producers' were more concerned about the type of facilities provided by the society and of course, about the basis of payment too. The sample members producers' of Kolhapur district were not unduly allured by the dividend that accrued to them at the end of the year. Their concern was more for the various input facilities that were provided by the society rather than for the profit that society made.

responded favourably who actually availed loan from the society. This held true for both the districts. About 13 percent of the producers in Jalgaon district and 50 percent in Kolhapur district responded in favour of the subsidy being provided by the firm on such loans. Normally, IRDP provided 33 percent subsidy on milch animal loans to its beneficiaries and, the society simply serves as a guarantor in this process. While the producer members in Jalgaon district did not face any

in availing such facilities through IRDP and milk cooperatives, the availability of funds at the right time was the most vital and serious problem faced by the members of Kolhapur milk societies. As mentioned above, the society did not provide direct loan to its members but only served as a guarantor to the firm. Therefore, about two-thirds of the sample producers in both the districts were of the opinion that such facilities should be provided at the society level itself, especially for the purchase of milch animals and for the feeds and fodder. About 23 percent of members in Kolhapur district also showed their concern in favour of loan facility for the construction of cattle shed as well as for domestic use.

4.6.3 Technical Inputs

In response to a question on feeds and fodder supply, about 83 percent of the respondents in Jalgaon district and 90 percent in Kolhapur district maintained that such inputs are readily supplied by the milk cooperative societies (Table 4.27). The feeds and fodder supplied by the societies included cotton cake, cattle feed manufactured by the respective district cooperative unions, maize seed, sugrass and wheat bhusa. In fact, maize seed and wheat bhuse were supplied only by the milk cooperative societies of Kolhapur district. In Jalgaon district, the Union's cattle feed was the main input provided by the society to its members, followed by sugrass

Table 4.28 : Members' Suggestions Regarding Smooth Functioning of the Society

(in percent)

Suggestions	Jalgaon Dist.				Kolhapur Dist.			
	S	M	L	O	S	M	L	O
a) The Society should provide loan for purchasing milch animals	50	40	25	43	30	-	-	23
b) The Society should provide loan for the construction of cattle shed	38	30	-	30	22	25	-	20
c) Feeds and fodder should be provided by the society on credit basis	38	20	25	30	9	-	-	7
d) Subsidy should also be given on feeds and fodder	38	50	-	37	22	50	-	23
e) All types of veterinary services should be provided by the society	100	90	75	93	-	-	-	-
f) Timely and regular payment by the society	13	10	25	13	17	-	-	13
g) Society should increase the existing milk rate	13	20	25	17	30	50	-	30
h) Payment should be made on fat and SNF basis instead of average rate	50	50	50	50	-	-	-	-

S = Small; M = Medium; L = Large; O = Overall

and cotton cake. In Kolhapur, the order that technical inputs followed was Union's cattle feed, sugrass, wheat bhusa, cotton cake and maize seed.

Neither Jalgaon milk co-operatives nor those in Kolhapur district provided subsidy on feeds and fodder. Nevertheless, almost all the member producers were unanimous in their opinion that such inputs should also be provided by the co-operative societies. A significant section of member producers believed that extension of such a facility by the societies will induce more of them to increase the input of feeds and fodder for their milch animals which in turn will enhance the productivity of animals and will, thereby, lead them to earn

more through milk business.

4.5.4 Members' Suggestions for Smooth Functioning of the Society

The respondents, whose impressions had been sought on the working of the society, were further probed to find out if they had any particular suggestions to make to further improve the functioning of the society. While majority of the members favoured the provision of loan facilities for various purposes, a few of them were critical about society's reluctance to increase existing milk rates; they also accused societies of occasional untimely payments. In all, eight suggestions regarding the smooth functioning of the society could be elucidated and Table 4.23 gives a fairly good account of all these suggestions of the member producers. Through their suggestions members sought provision of loans for the purchase of milch animals and construction of cattle sheds. They also wanted feeds and fodders to be provided to them on credit basis at substantial rates at society's level itself. The extension of veterinary and health care facilities, timely and regular payment and a hike in the existing milk rates were among the other demands of the sample producers.

More than 50 per cent of the member producers in Jalgaon district resented payments made to them based on a common fat percentage. They wanted their payments to be based on the individual fat and SNF contents of their produce rather than on a whole pool of milk collected from the entire village.

5.6.6 Marketing of Milk

A study of the sales routes of milk producers showed that more than 85 per cent of the marketed milk was sold to only milk cooperatives in both the sample districts. As expected, 60 per cent of the respondents in Jalgaon district and 43 per cent in Kolhapur district were not satisfied with the

existing milk prices (Table 4.29). The resentment was more among small category of producers. A majority of the discontented producers pressed for an immediate hike in the prices of both buffalo and cow milk. The rising cost of important inputs such as feeds and fodder and higher prices of superior breeds of animals were cited as the major reasons which in their reckoning justified demand for such a hike.

Table 4.29 : Members Response Regarding Marketing of Milk

Particulars	(in per cent)							
	Jalgaon Dist				Kolhapur Dist.			
	S	M	L	O	S	M	L	O
1. Do you sell milk to the society								
- Yes	100	90	100	97	92	67	75	86
- No	-	10	-	3	8	33	25	14
2. Are you satisfied with the payment by the society								
- Yes	38	40	50	40	52	50	100	57
- No	62	60	50	60	48	50	-	43
3. If No, give reasons								
a) Milk prices should be hiked due to increasing cost of milk production	50	60	50	53	39	-	-	30
b) Milk prices should be hiked due to increasing value of milch animals	13	-	-	7	9	50	-	13
4. Basis of Payment								
1. Fat and SNF	63	30	50	50	100	100	100	100
2. Average rate	37	70	50	50	-	-	-	-
5. Distance of place of disposal								
a. below 1 km.	94	80	75	87	70	75	100	73
b. 1.1 - 4 km.	6	10	25	10	30	25	-	27
c. 4.1 - 8 km.	-	10	-	3	-	-	-	-
6. Time spent in disposal								
a. Below 1 hour	75	80	75	77	74	75	100	77
b. 1.1 - 2 hours	25	10	25	20	26	25	-	23
c. 2.1 - 3 hours	-	10	-	3	-	-	-	-
7. Mode of transport								
a. Walking	75	80	75	77	65	75	100	70
b. Bicycle	25	10	25	20	35	25	-	30
c. Motor cycle	-	10	-	3	-	-	-	-

S = Small; M = Medium; L = Large; O = Overall

In Jalgaon district, the milk co-operatives located in the eastern part followed 'Anand' pattern of milk collection which laid emphasis on payments to member producers based on spot measurement of fat and SNF contents in their produce. Such facilities were totally absent in the Western part of this district and thus, 50 per cent of the sample producers received only average rates for milk based on a common fat percentage which was worked out for the whole lot of milk collected from the entire village. The 'Anand' pattern of Co-operatives were common through out the length and breadth of Kolhapur district and this ensured a remunerative price to all the sample producers as each individual producer's payment was exclusively based on the fat and SNF contents of his very own produce.

Most of the Cooperative Societies in the sample districts were found to be located within a radius of one kilometre from the point of production. Though majority of the producers were selling milk to the Cooperative Society, the practice of sale of milk to private traders and other agencies was also prevalent. While in Jalgaon district, only one member sold milk to a private dairy located in nearby town, more number of member producers were found to practice such inclinations in Kolhapur district. Although the co-operative network was fairly strong in the district of Kolhapur, yet it could not prevent a good number of their members from selling their milk to private dairies and other agencies which included sale of milk directly to consumers located within the village also.

The sample milk producers took varying length of time to dispose of their milk produce. While 77 per cent of the members spent an hour to dispose of the surplus milk, 20 per cent could do so in 1 to 2 hours and the remaining 3 per cent took 2 to 3 hours in such an activity. It all depended on the

time that member producers required to commute and reach the point of milk collection. It was interesting to note that the majority of the sample producers preferred to walk to sell the surplus milk. Other modes of transport used in the disposal of milk included bicycles and motor cycles.

In conclusion, two differing points of view emerge about the status of dairy co-operatives. While these Co-operative Societies were overwhelming favourites among the member producers in Kolhapur district, their functioning and the kind of inputs and services extended by them left much of the sample producers in Jalgaon district quite dissatisfied and they scurried for more and better facilities. The beneficiary households in Kolhapur district firmly believed that dairy co-operatives had a catalytic effect in improving their economic status. Dairying through co-operatives, according to them, not only raised their milk production but was also helpful in increasing their farm output. Some member producers, however, were not so forthcoming about their views and chose to reserve their comments on the utility and impact of dairy co-operatives in both the districts.

CHAPTER V

PERFORMANCE OF MILK COOPERATIVES AND ALTERNATIVE STRATEGIES

Having discussed in brief the functioning of various cooperative milk producers' unions in Chapter 2 and the performance of our sample milk producers in Chapter 4, let us now compare the performance of district level milk producers' cooperative unions in relation to their procurement of milk in different seasons through different types of milch animals and different price structures followed by various unions in contrast to government prices fixed for lean and flush season and with respect to changes in various technical inputs provided by the union to its members. This chapter, thus, revolves round a comparative study on the performance of Jalgaon and Kolhapur districts cooperative milk producers' unions with respect to the aspects delineated above and also examines various problems faced by these district level milk cooperative unions and suggests various alternative strategies to cope up with the problems.

5.1 Seasonwise Milk Procurement

An integrated systems approach on dairy development comprising collection, processing and marketing of milk and milk products is warranted in present circumstances. Of the three important planks of dairy business, collection of milk is by far the most important for industry as the efficiency and development of the industry heavily relies on its assured collections.

A set of objectives usually govern the organised system of milk collection and these can be summarised as under:

- 1) To provide assured market to milk producers.

ii) To provide a remunerative price to the farmer producers and ensure adequate and attractive incentives to them in the form of various inputs and services in order to wean them away from the juggernaut of private traders.

iii) To provide wholesome and good quality milk products to a large section of consumers at reasonable prices.

Various unions have drawn different strategies to achieve these objectives. Every single union has passed through a different cycles of progress. Needless to mention here that the dairy cooperative unions have, now, specialised in integrating the producers with the consumers. However, the performance of many district level milk cooperative unions is still not upto the mark and much below expectations. The dismal performance of the Jalgaon District Cooperative Milk Producers' Union is a case in point in this respect.

The comparative performance of Jalgaon and Kolhapur District Cooperative Milk Unions with respect to seasonal milk procurement reveals a considerable variation in collection of milk in flush and lean season (Table 5.1). The trend in milk collection over the last three years indicates that Jalgaon Milk Union procures nearly two-third of buffalo milk in flush season and the remaining one thirds in lean season. However, the figures for cow milk procurement show very little lean or flush season variation. It is readily discerned from Table 5.1 that both cow milk and total milk procurements are beset with a declining trend for the Jalgaon Union. While the cow milk procurement has shown a steep decline of 44 per cent over the last three years, the procurement of buffalo milk by the Union has shown marginal improvement over the same period and has increased by 15 per cent. However, as the decline in procurement of cow milk of the last 3 years is of a much higher order than the increase in procurement of buffalo

Table 5.1 : Annual and Seasonal Milk Procurement by Jalgaon and Kolhapur District Co-operative Milk Union

(in Lakh Litres)

Year	Season	JMPU			KMPU		
		Buffalo Milk	Cow Milk	Total Procurement	Buffalo Milk	Cow Milk	Total Procurement
1991-92	Lean	50.20 (34.75)	87.58 (52.66)	137.78 (44.34)	294.95 (41.39)	139.67 (48.05)	434.62 (43.32)
	Flush	94.24 (65.25)	78.74 (47.34)	172.98 (55.66)	417.71 (58.61)	151.00 (51.95)	568.71 (56.68)
	Total	144.44	166.32	310.76	712.66	290.67	1003.33
1992-93	Lean	62.08 (39.78)	72.58 (53.55)	134.66 (46.18)	355.16 (41.17)	152.09 (48.71)	507.25 (43.17)
	Flush	93.98 (60.22)	62.96 (46.45)	156.94 (53.82)	507.51 (58.83)	160.16 (51.29)	667.67 (56.83)
	Total	156.06	135.54	291.60	862.67	312.25	1174.92
1993-94	Lean	50.30 (30.26)	47.52 (51.14)	97.82 (37.75)	404.20 (41.34)	134.35 (43.14)	538.55 (43.26)
	Flush	115.90 (69.74)	45.41 (48.86)	161.31 (62.25)	573.51 (58.66)	199.15 (51.86)	772.66 (56.74)
	Total	166.20	92.93	259.13	977.71	333.50	1311.21

Note 1: Figures in parentheses are percentages to the total

2: Figures for lean and flush seasons have been worked out from monthly figures.

Source : Records of 'Vikas' and 'Gokul'.

milk, the net result is a downward pull in total procurement of milk for the Union to the tune of 29 per cent. Such a heavy fall in milk procurement cannot be considered conducive for the health of any dairy. The factors contributing to decline in total milk procurement are discussed at the end of this chapter.

Now, if we look into the procurement figures for Kolhapur Milk Union, the results are quite encouraging. Over the last three years, the Union registered an increase of over 30 per cent for both buffalo and cow milk procurements. The increase in buffalo milk procurement was, however, slightly more compared to cow milk. Further, if we take a closer look at the procurement trends during the lean and flush seasons over the last three years, the ratios appear to be fairly uniform for both buffalo and cow milk. The Kolhapur Union's buffalo milk procurement is substantially higher (around 70 per cent) compared to cow milk procurement chiefly because of the very high concentration of buffaloes in this district. The Union's total milk procurement has risen by 36 per cent over the last three years mainly because of increases in both buffalo and cow milk procurement leading to a net positive cumulative effect.

Now, if we compare Tables 2.4 and 2.9 of Chapter 2, it is striking to note that upto 1985-86, the total milk procurement of Jalgaon Milk Union was much higher than that of Kolhapur Milk Union. The downward slide in milk procurement for the Jalgaon Milk Union started from 1986-87 and it has continued unabated until recently. On the other hand, Kolhapur Milk Union has shown remarkable progress on their milk procurement front as is evidenced from Table 2.9 (Chapter 2).

Based on figures provided in Table 5.1, the annual and seasonal variations in milk procurement for the Jalgaon and

Kolhapur district cooperative milk unions have been worked out and presented in Table 5.2.

The increase in procurement of milk in flush over lean season was substantially high (65 per cent) for the Jalgaon milk union during 1993-94 mainly due to substantial rise (130 per cent) recorded in buffalo milk procurement in this year. Contrastingly, the rise in milk procurement in flush over lean season remained fairly uniform (of the order of 31 per cent) for the Kolhapur Milk Union over the last three years. It was strange and startling to note that cow milk procurements recorded a decline in flush over lean season for all the last three years in case of Jalgaon Milk Union as revealed by this study. The maximum decline in procurement of milk for the Jalgaon Milk Union was recorded in 1993-94 over 1991-92 and this was of the order of 29 per cent. Though buffalo milk procurements increased both in lean and flush seasons for Jalgaon Union, this could not affect a steep decline in cow milk procurements and the total milk procurement for the Union fell by 17 per cent in 1993-94 compared to what it was in 1991-92. On the greener side, Kolhapur District Cooperative Milk Union witnessed a reverse trend and the total milk procurement for this Union rose by 36 per cent in 1993-94 over 1991-92 for the flush as well as the lean season. Thus, while on one hand, the Kolhapur Milk Union is showing a constant rise in its total procurement figures, on the other hand, Jalgaon Milk Union is showing a continuously declining trend in milk procurements.

5.2 Trends in Milk Procurement

Milk procurement trends over the last 12 years for the Jalgaon and Kolhapur Milk Unions have been plotted by drawing representative straight line curves for annualised total milk procurement with respect to each union reckoning the year

Table 5.2 : Annual and Seasonal Variation in Milk Procurement by Jalgaon and Kolhapur District Co-operative Milk Union

(in per cent)

Annual/Seasonal Change	Season	JMPU			KMPU		
		Buffalo Milk	Cow Milk	Total Procurement	Buffalo Milk	Cow Milk	Total Procurement
Change in procurement of Milk in 1992-93 Over 1991-92	Lean	+23.67	-17.13	- 2.26	+20.41	+ 8.89	+16.71
	Flush	- 0.28	-20.04	- 9.27	+21.50	+ 6.07	+17.40
	Total	+ 8.04	-13.51	- 6.17	+21.05	+ 7.42	+17.10
Change in procurement of milk in 1993-94 Over 1992-93	Lean	-18.98	-34.53	-27.36	+13.31	+21.54	+16.13
	Flush	+23.32	-27.87	+ 2.78	+13.00	+24.34	+15.72
	Total	+ 6.50	-31.44	-11.14	+13.34	+22.98	+15.90
Change in procurement of milk in 1993-94 Over 1991-92	Lean	+ 0.20	-45.74	-29.00	+37.04	+32.35	+35.53
	Flush	+22.98	-42.33	- 6.75	+37.30	+31.89	+35.86
	Total	+15.07	-44.13	-16.51	+37.19	+32.11	+35.72
Increase in procurement of milk in flush over lean season in	1991-92	87.73	10.09*	25.55	41.62	8.11	30.85
	1992-93	51.39	13.25*	16.55	42.90	5.31	31.63
	1993-94	130.42	4.44*	64.55	41.89	7.44	31.17

* Procurement of milk decreased in flush over lean season

1982-83 as the point of beginning for such a study. This is shown in Figure 1.

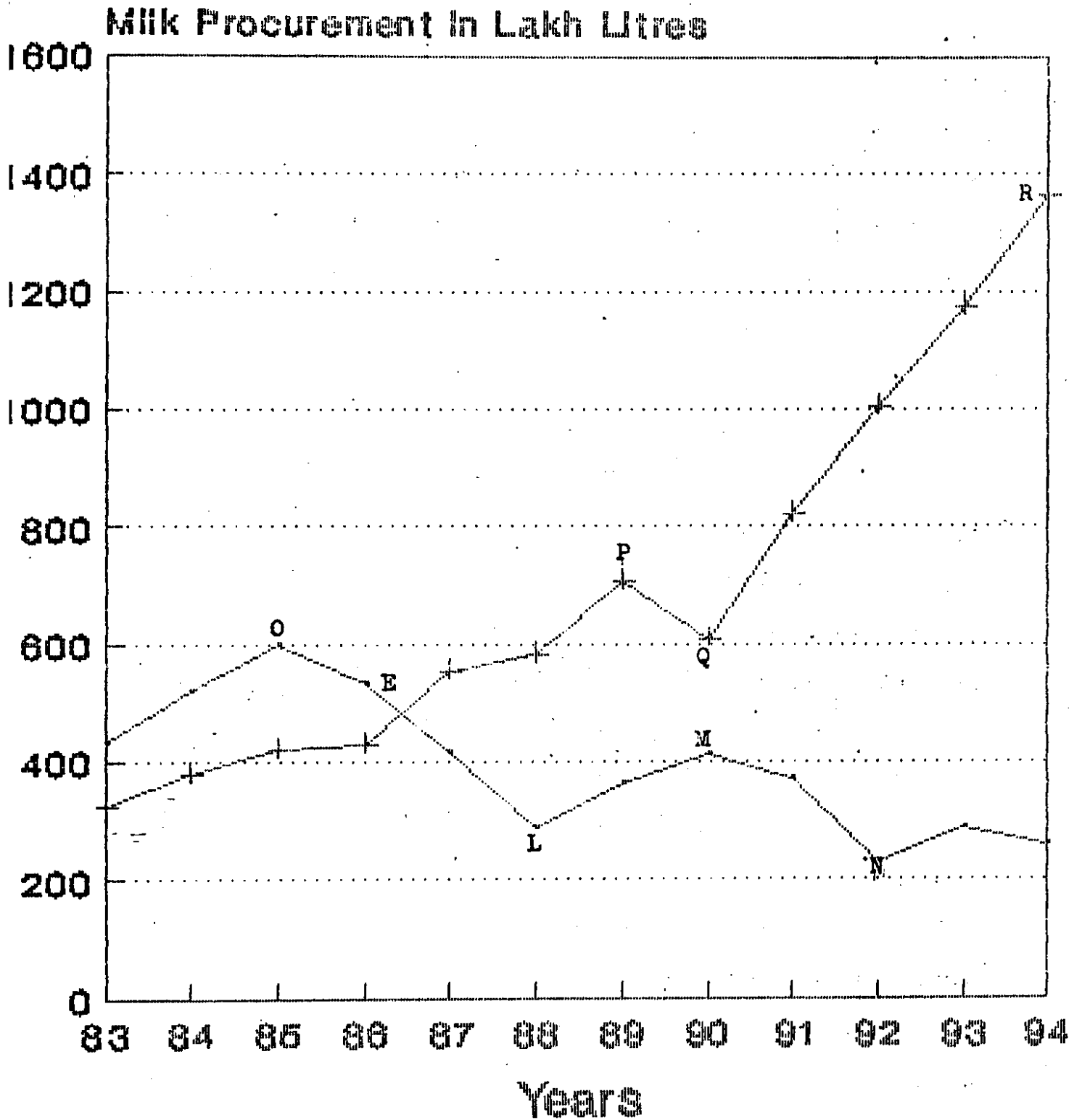
A cursory look at the trend lines for both the unions (Fig. 1) reveals that initially the annual milk procurement of Kolhapur Milk Union was much lower than the Jalgaon Milk Union. However, the Kolhapur Milk Union crossed the procurement figures of Jalgaon Milk Union somewhere between 1985-86 and 1986-87. This is represented by point E in the plot. Thereafter, the Kolhapur Union showed a sustained rising trend in its procurement figures except for the period between 1988-89 and 1989-90 when its milk procurement slumped by about 100 lakh litres and this momentary downward slide is reflected by the straight line joining point P to Q. After 1989-90, the curve representing procurement figures for Kolhapur Milk Union became steeper denoting a sharp rise in total milk procurement by the Union. On the contrary, after reaching a maximum procurement level of 600 lakh litres during 1984-85, the milk procurement figures for Jalgaon Milk Union kept showing a declining trend and its procurement level touched a low of 300 lakh litres during 1987-88. This fall is represented by the straight line from point O and L. For a couple of years after 1987-88, this union showed marginal improvement in its milk procurement. However, an all pervasive declining trend in milk procurement again caught up with Jalgaon Milk Union after 1989-90 and its procurement touched the lowest ever in 1991-92 as indicated by point N. Thus, wide fluctuation in milk procurement over the last 12 years has become the ultimate nemesis for Jalgaon Milk Union. Today, the Union has reached such a stage where improving the operational efficiency of the Union has become imperative need of the hour.

5.3 Procurement Pricing

Pricing issue is of primary importance because this decides the availability of milk. Under this system, the

Figure 1

Trend in Milk Procurement



— Jalgaon Dist.

- - - Kolhapur Dist.

exceeded prescribed government rates. The difference between

Table 5.3 : Comparative Rates (procurement price) of Buffalo and Cow Milk for Jalgaon and Kolhapur District Co-operative Milk Unions

(in Rs./Litre)

Year	Season	Buffalo Milk			Cow Milk		
		Union Rate	Govern-ment Rate	Differ-ence	Union Rate	Govern-ment Rate	Differ-ence
A - Jalgaon District Co-operative Milk Union							
1991-92	Lean	6.19	6.80	-0.61	4.66	5.50	-0.84
	Flush	6.61	5.50	+1.11	4.85	4.50	+0.35
	Average	6.40	6.15	+0.25	4.76	5.00	-0.24
1992-93	Lean	7.99	8.24	-0.25	5.62	6.50	-0.88
	Flush	6.50	7.25	-0.75	4.23	5.70	-1.47
	Average	7.25	7.75	-0.50	4.93	6.10	-1.17
1993-94	Lean	7.93	8.53	-0.60	4.84	6.70	-1.86
	Flush	6.65	7.25	-0.60	4.50	5.70	-1.20
	Average	7.29	7.89	-0.60	4.67	6.20	-1.53
B - Kolhapur District Co-operative Milk Union							
1991-92	Lean	7.63	6.80	+0.83	5.53	5.50	+0.03
	Flush	7.32	5.50	+1.82	4.53	4.50	+0.03
	Average	7.48	6.15	+1.33	5.08	5.00	+0.08
1992-93	Lean	9.02	8.24	+0.78	6.72	6.72	-
	Flush	7.70	7.25	+0.45	5.92	5.92	-
	Average	8.36	7.75	+0.61	6.32	6.32	-
1993-94	Lean	8.76	8.53	+0.23	7.07	6.96	+0.11
	Flush	7.25	7.25	-	5.92	5.92	-
	Average	8.01	7.89	+0.12	6.50	6.44	+0.06

Note: 1. Buffalo Milk Rates are at 7.0% fat and 9.0 SNF

2. Cow Milk Rates are at 4.5% fat and 8.5 SNF.

rates fixed by the Government and the Union rates in buffalo and cow milk procurement pricing was found to be maximum during 1993-94 with cow milk witnessing a more pronounced price differential than buffalo milk. Kolhapur Milk Union, on the contrary, has shown a more pragmatic and consistent pricing policy for buffalo as well as cow milk procurements in both flush and lean seasons and the rates fixed by the Union were quite comparable to those prescribed by the Maharashtra Government. In fact, at no point in time the Kolhapur Union rates were less than Government rates.

Interestingly, during 1991-92, the prices fixed by Kolhapur Milk Union for cow milk procurement were equal to the Government rates for both flush and lean seasons. The differential procurement pricing of Kolhapur Milk Union was always weighed in favour of the producer farmer and this goes on to show why this Union has functioned so efficiently over the last 3-4 years and how its milk procurement figures have shown a steep and dramatic improvement over these last few years.

A comparative analysis of changes in procurement prices at Union and Government levels for both the Unions under study is presented in Table 5.4. The basis for these changes stems from the unit fixed pricing of Government as well as of the Unions under study for both flush and lean seasons as outlined in Table 5.3.

An interesting feature of this analysis is that the Jalgaon Milk Union increased the procurement price of buffalo and cow milk in 1991-92 in order to increase the procurement. Though this had a positive effect on buffalo milk procurement, cow milk procurements by and large remained unaffected. Instead, cow milk procurements declined in the flush season for the Union compared to lean season.

Table 5.4 : Annual and Seasonal Variation in Milk Prices in Jalgaon and Kolhapur Districts

(in per cent)

Annual/Seasonal Change	Season	Jalgaon District Co-operative Milk Union				Kolhapur District Co-operative Milk Union			
		Buffalo Milk		Cow Milk		Buffalo Milk		Cow Milk	
		Union	Government	Union	Government	Union	Government	Union	Government
Change in price of milk in 1992-93 over 1991-92	Lean	+29.08	+21.18	+20.60	+18.18	+13.22	+21.18	+20.43	+22.18
	Flush	- 1.66	+31.82	-12.78	+26.67	+ 5.19	+31.82	+29.26	+31.56
	Average	+13.28	+26.02	+ 3.57	+22.00	+11.76	+25.02	+24.41	+26.40
Change in price of milk in 1993-94 over 1992-93	Lean	- 0.75	+ 3.52	-13.88	+ 3.08	- 2.88	+ 3.52	+ 5.21	+ 3.57
	Flush	+ 2.31	0.00	+ 6.38	0.00	- 5.84	0.00	0.00	0.00
	Average	+ 0.55	+ 1.81	- 5.27	+ 1.64	- 4.19	+ 1.81	+ 2.85	+ 1.90
Change in price of milk in 1993-94 over 1991-92	Lean	+28.11	+25.44	+ 3.86	+21.82	+14.31	+25.44	+25.70	+26.55
	Flush	+ 0.61	+31.82	- 7.22	+26.67	- 0.96	+31.32	+29.26	+31.56
	Average	+13.91	+28.29	- 1.89	+24.00	+ 7.09	28.29	+27.95	+28.80
Decrease in price of milk in flush over lean season in	1991-92	6.79*	19.12	4.08*	18.18	4.06	19.12	17.92	18.18
	1992-93	18.65	12.01	24.73	12.31	14.63	12.01	11.90	11.90
	1993-94	16.14	15.01	7.02	14.92	17.24	15.01	16.27	14.94

* Price of milk increased in flush over lean season

In general, the procurement pricing trend for Kolhapur Milk Union has shown a consistently increasing trend and this positive change in Milk pricing has been common to both lean as well as flush seasons (Table 5.4). On the other hand, in the case of Jalgaon Milk Union, the procurement price of cow milk decreased in 1993-94 compared to both 1992-93 and 1991-92. Thus, Kolhapur Milk Union offered a much better procurement price for cow milk compared to Jalgaon Milk Union. And, as cow milk happens to be the major contributor towards total milk procurement for Jalgaon Milk Union, lower price fixation for cow milk may work towards weaning away producers from this union and without doubt, this will further exacerbate and compound matters for the efficiency of Jalgaon Milk Union. In this connection, it should be mentioned here that since cows contribute considerably to the total milk procurement, and since the fat content of cow milk is much lower than that of buffalo milk, the pricing of milk based on fat alone may discourage farmer producers from increasing cow milk production an aspect that directly impinges on the efficacy of a Milk Union like that of Jalgaon. Hence, planners seem to favour a two-axes pricing policy for milk that reckons both fat and solids-not-fat (SNF) content of milk for its pricing in order to stimulate and give fresh fillip to cow milk production. Though SNF as the basis for milk procurement payments is yet to gain full currency, the two axes mode of payment for milk procurements may eventually replace the fat-based pricing system as cow milk is becoming increasingly important in the processing sector. This necessitates the need for a simple and economically viable technique for SNF testing at village level and such a cost effective simple method is not readily available as of now. Efforts are currently on towards developing a low-cost automatic milk analyser that can test.

the milk both for its fat and SNF contents and with inception of such a tool, the milk procurement pricing policy will definitely march forward ^{towards} a better overall dairy development.

The foregoing emphasises the prevalence of a differential milk procurement pricing policy for various unions with respect to flush and lean seasons in accordance with the objective realities obtaining in areas falling under respective unions.

The proportion of milk production during flush and lean seasons varies from 100 to 40, the overall demand, however, remains more or less constant throughout the year. To meet with competition, higher price is usually paid for milk during the lean season to attract more supply. This is in tune with the fact that feeds and fodder are on short supply during lean season and, thus, costlier to use making milk production dearer. The producer farmers are, therefore justified in seeking higher price for milk during lean season to offset increased cost of production and, in maintaining uniformity in income from milk sales throughout the year even when there may be slump in demand for milk during flush season owing to restricted handling capacity of dairy processing plants and, hence, a lower procurement price on offer for them.

Further, milk production being seasonal, under the co-operative set up a provisional price is paid in the beginning for milk supplies based on projections and a final price is fixed only at the end of the year. Thus supplementary prices, if any, are paid to the producers at year end irrespective of their being members of village milk producers' cooperative societies. A distinction must be made here between this kind of supplementary payment and the bonus which is paid by co-operatives to their members. This kind of provisional pricing and supplementary payments has created confidence among the milk producers and today they are willing allowing cooperatives

to adjust their milk pricing policy in line with objective market conditions.

5.4 Technical Inputs

The two-tier approach, i.e., the organisation providing a package of assistance to marginal farmers to improve the dairy animals and their productivity and the price which assures them sufficient profits to not only manage their own livelihood but also provide them with the required resources for other inputs including money for loan refunds, appears to be the best solution for the present. These yardsticks became the focal point for judging the performance of Jalgaon and Kolhapur Milk Unions. The performance for the two Unions over the last ten years has been compared based on certain quantitative and qualitative parameters on per society basis. The operational indicators are presented in Table 5.5.

A comparative performance of the two unions reveals that while Kolhapur Milk Union achieved remarkable progress in terms of all the parameters (as outlined and discussed in Table 5.5) considered, its counterpart, that is, Jalgaon Milk Union could show progress in only certain select spheres. The limited areas of success for Jalgaon Union revolved around membership per society, share capital and number of improved animals born to its producer farmers owing to AI facilities advanced by the Union to them.

It is indeed a matter of surprise and concern that in spite of achieving magnificent progress in all its development activities, the number of members per society for the Kolhapur Milk Union has actually declined over the last ten years. The number of members for the Kolhapur Union, which stood at 203 per society during 1983-84, came down to 186 by 1993-94, thereby, showing a membership decline of nearly 8 per cent over the last ten years. Contrary to this, the number of

Table 5.5 : Operational Indicators of Jalgaon and Kolhapur District Co-operative Milk Union

Indicators	JDCMU			KDCMU		
	1983-84	1993-94	Change (%)	1983-84	1993-94	Change (%)
1. Number of members per society	106.85	111.05	+ 3.93	202.88	185.91	- 8.36
2. Share capital per society (in Rs.)	2310.81	20202.02	+105.92	7549.07	76185.23	+909.20
3. Annual Milk Procurement per society ('00' litres)	638.82	289.56	- 54.67	546.81	897.63	+ 64.16
4. Average Milk procurement per society ('00' litres)	1.75	0.79	- 54.86	1.50	2.46	+64.00
5. No.of cows artificially inseminated per society	20.24	100.95	- 45.90	5.44	27.03	+400.55
6. No.of buffaloes artificially inseminated per society	6.90	7.51	+ 8.84	6.68	45.50	+581.14
7. No.of animals artifically inseminated per society	27.14	18.46	- 31.98	12.12	72.73	+500.08
8. No.of Improved cows born per society	4.22	5.13	+ 21.56	1.13	7.47	+561.06
9. No.of Improved buffaloes born per society	1.01	2.42	+139.60	1.14	12.81	+1023.68
10. Total No.of animals born per society	5.23	7.55	+ 44.36	2.27	20.28	+793.39
11. Cattle feed sold per society(in MT)	9.05	5.00	- 44.75	18.98	32.37	+ 70.55

JDCMU = Jalgaon District Co-operative Milk Union KDCMU = Kolhapur District Co-operative Milk Union

members per society for Jalgaon Milk Union showed a moderate increase of 4 per cent over the same period. However, this may not reflect the true picture since the number of members per society for Kolhapur Milk Union was much higher than that of Jalgaon Milk Union. In spite of showing some progress in its membership drive, share capital and AI done to buffaloes, Jalgaon Milk Union's overall progress remained quite tardy and dismal as the Union's performance remained unsatisfactory in terms of improving milk procurement as well as cattle feed distribution. It is to be noted that for the Jalgaon Union the milk procurement has declined by a whopping 55 per cent and that its cattle feed distribution has come down by 45 per cent over the last ten years.

Earlier the reasons for declining trend in total milk procurement and net cattle feed sales for Jalgaon Milk Union were attributed to the closure of most of its societies, but now, on working out the figures on per society basis that revealed an actual improvement (marginal though) in its membership drive per society over the last ten years, it becomes clear that the decline in procurement figures and cattle feed distribution per society is mainly due the inefficient functioning of the Jalgaon Milk Union. In this connection, it is suggested that the union should take immediate recourse to putting its house in order and, thereby, improve its working and efficiency. And, a beginning can be made in this direction by ensuring adequate input facilities to at least its working societies. This in turn will lead to higher milk production as well as procurement and will help build greater confidence in its member producers.

5.5 Growth and Instability

Another angle through which the performance of Jalgaon and Kolhapur district cooperative milk unions can be judged

and assessed is to visualise the growth and instability in their milk procurement figures and other related activities over the last ten years. This was done by collecting season-wise time series data on milk procurement for the period from 1984-85 to 1993-94 from the offices of the respective district level milk unions. The data on certain other operational indicators were also collected for the same period from these offices. To this time series data, exponential trend equations were fitted in order to work out compound growth rates. Further, coefficient of variation (CV) is usually used as an index of instability. However, since the time series data often contain the trend component, an index of instability as suggested by Cuddy and Della (1978) and used by Gujanana and Sharma (1990) was incorporated into the exponential analysis in order to take care of the trend component in the data. An understanding of the pattern of growth and instability in milk procurement and other important operations encompassing our sample cooperative milk unions is likely to provide insight that may help in the formulation of policies for the overall development of such unions.

5.5.1 Growth and Instability in Milk Procurement

The comparative study on milk procurement in the two districts of Jalgaon and Kolhapur showed that the milk collections of Jalgaon District Cooperative Milk Union declined drastically over the last 10 years (Table 5.6). This decline was more vigorous during lean season as compared to flush season, particularly in the case of buffalo milk. The annual compound growth rate of milk procurement for both buffalo and cow milk was negative and significant ($P < 0.01$) showing, thereby, an annual decline in milk procurement for both the types of animals. The annual decline in milk procurement figures of Jalgaon milk cooperative union was 10 per cent in

Table 5.6 : Growth Rates and Instability Indices for Lean and Flush Season Milk Procurements by JDCMPU and KDCMPU (1984-85 to 1993-94)

(in per cent)

Milk Procurement	JDCMPU		KDCMPU	
	Growth Rate	Instability Index	Growth Rates	Instability Index
<u>Buffalo Milk</u>				
Lean	-12.67*** (65.54)	32.05	13.04*** (96.97)	6.46
Flush	-6.48*** (57.42)	17.92	12.04*** (97.32)	5.65
Total	-9.03*** (64.99)	22.59	12.44*** (97.89)	5.15
<u>Cow Milk</u>				
Lean	-6.94*** (45.12)	21.05	18.58*** (98.26)	6.23
Flush	-6.31***	18.03	20.23*** (98.15)	6.57
Total	-6.66*** (48.72)	18.22	19.36*** (98.92)	4.96
<u>Total Procurement</u>				
Lean	-9.79*** (64.25)	23.24	14.53*** (98.54)	4.82
Flush	-6.02*** (45.12)	20.38	13.71*** (98.97)	3.82
Total	-7.74*** (62.19)	18.48	14.05*** (99.31)	3.19

JDCMPU = Jalgaon District Cooperative Milk Producers' Union

KDCMPU = Kolhapur District Cooperative Milk Producers' Union

Note : *** indicates 1 per cent level of significance
 Figures in parentheses are the values of R^2 (in per cent)

lean season and 6 per cent in flush season giving this union an overall average decline of 8 per cent over last 10 years. Further, a wide variation in the instability of milk procurement between lean and flush season was witnessed. The instability index was the highest (32.05 per cent) in the case of buffalo milk procurement during lean season followed by lean season cow milk procurement (21.05 per cent) which corresponds to an overall average lean season instability index of 23.24 per cent as against an average of 18.48 per cent instability in flush season.

While on one hand Jalgaon Milk Union showed a negative growth in its procurement figures during the last ten years, the Kolhapur Milk Union, on the other hand, showed a substantial positive and significant growth in its procurement figures for both cow and buffalo milk. The annual increment in the procurement figures of Kolhapur Milk Union was 14.53 per cent during the lean season and it was 13.71 per cent in the flush season. This gives an overall annual increment of 14.05 per cent in procurements for Kolhapur Union. In this respect, cow milk grew more rapidly in procurements than buffalo milk. This underscores the pre-eminence of crossbred cows in the Kolhapur district which are more productive than local cows or local buffaloes and which might have been responsible for increased milk production and, thereby, increased milk procurement for Kolhapur Milk Union. Though in the lean season, the instability in milk procurements was slightly higher, overall procurements were of the same order for different seasons and there was not any significant differences.

In order to understand milk procurement instabilities better, typical monthly milk procurement data for the period 1986-87 to 1993-94 were obtained from the respective milk cooperative unions of the two districts. This data was used

Table 5.7 : Computation of Typical Seasonal Index for Milk Procurement - Jalgaon District
Co-operative Milk Union (1986-87 to 1993-94)

Rank	January	February	March	April	May	June	July	August	September	October	November	December
1	129.55	121.20	129.15	115.42	106.04	85.81	79.02	78.04	96.37	108.78	115.56	128.43
2	128.33	118.36	124.29	114.44	104.34	84.38	70.58	75.33	92.42	107.92	114.96	125.36
3	125.81	114.49	123.77	113.37	101.81	76.29	65.37	70.84	87.98	103.39	112.98	122.38
4	123.95	110.84	122.82	111.96	100.88	76.24	64.61	69.99	86.25	100.84	110.65	117.17
5	123.21	110.32	121.94	109.18	91.17	69.34	63.86	69.03	80.59	95.50	106.44	113.95
6	122.13	107.40	117.00	107.92	89.58	65.21	57.41	67.09	79.87	94.00	99.01	113.53
7	115.88	106.82	115.38	104.40	83.35	59.43	45.14	63.49	79.00	81.92	98.45	106.56
Modified Total	623.43	561.41	609.82	557.37	488.28	372.46	321.83	353.28	427.11	502.05	544.01	592.35
Modified Mean	124.69	112.28	121.96	111.47	97.66	74.49	64.37	70.66	85.42	100.41	108.80	118.48
Seasonal Index	125.66	113.16	122.91	112.34	98.42	75.07	64.87	71.21	86.09	101.20	109.65	119.42
Correction factor : $\frac{1100.00}{1190.69} = 1.007819$												

Table 5.8 : Computation of Typical Seasonal Index for Milk Procurement - Kolhapur District
Co-operative Milk Union (1986-87 - 1993-94)

Rank	January	February	March	April	May	June	July	August	September	October	November	December
1	125.45	106.27	110.93	97.17	89.29	82.25	84.10	92.84	104.27	115.17	119.06	123.87
2	124.33	105.75	109.17	96.16	89.03	81.36	80.90	90.59	102.65	117.76	117.24	119.59
3	122.46	105.74	107.62	94.99	88.53	79.50	80.79	87.57	100.92	117.29	116.50	118.73
4	115.93	103.47	106.78	94.23	82.80	78.51	79.95	85.95	100.36	115.48	114.20	116.60
5	114.01	101.82	106.29	93.78	82.61	76.61	79.73	86.90	98.19	115.09	111.62	116.25
6	113.72	101.47	104.89	93.64	82.01	71.97	79.68	86.29	25.59	112.68	106.14	115.33
7	112.83	99.70	102.91	92.64	80.62	71.91	76.97	83.44	92.77	110.84	102.95	114.26
Modified Total	826.60	725.54	748.68	662.92	594.76	543.16	561.50	613.65	695.73	809.65	791.98	821.08
Modified Mean	118.09	103.65	106.95	94.70	84.97	77.59	80.21	87.66	99.53	115.66	113.14	117.30
Seasonal Index	118.14	103.70	107.00	94.74	85.01	77.63	80.25	87.70	99.57	115.71	113.19	117.35

194

Correction factor : $\frac{1200.00}{1199.45} = 1.0004585$

to work out seasonal indices of milk procurement for each of the 12 months. The typical seasonal indices, thus, computed are presented in Tables 5.7 and 5.8, respectively. The figures shown for the last 8 years in Table 5.7 clearly exhibit that milk procurements for Jalgaon Milk Union peaked in the month of January and July was the month when it touched the lowest. The rising trend in milk procurement for this district started from the month of August and continued until January when it reached the highest level of procurement. In general the peak months of procurement for this union were December, January, February and March while the lean months were June, July, August and September (Table 5.7 and Figure 2).

For Kolhapur Milk Union too the peak month of milk procurement during the last 8 years was the month of January (Table 5.8). However, the lowest procurement figures were witnessed in the month of June. It is clear from Table 5.8 that the months of April to September represented the lean patch when the milk procurements in this district were much lower compared to October to March months which in general were representative of flush season. In fact, the decline in milk procurements for this union started from the month of February till it reached its lowest level in the month of June. Beyond June, Kolhapur Milk Union again showed a rising trend in milk procurements (Table 5.8 and Figure 3).

5.5.2 Growth and Instability Regarding Certain Operational Indicators

Inherent in the procurement of milk are certain basic responsibilities such as providing technical inputs to member producers and these are usually shouldered by cooperative milk unions which act as vehicles for such input services. However, if any milk union chooses to shirk this responsibility, it will be to its own detriment. The example of Jalgaon Milk Union is a case in point in this regard. Mere

growth in terms of increasing their numerical strength, that is enlisting more number of member producers in their fold is not a true index for judging the health of any cooperative milk union. A milk union can be made vibrant only if its affiliate member producers have full confidence in it. And, this confidence is usually built by the kind of technical inputs and services that the union renders to its associate members. Thus, if a Jalgaon like Milk Union has to be revitalised, the imperative need of the hour for such unions is to give fresh fillip to various technical services instead of trying to withhold or withdraw them.

In the above context, the growth and performance of the two sample milk unions have been assessed in the light of their inherent instabilities using the relevant data for the period from 1984-85 to 1993-94 and comparative analysis in this regard is presented in Table 5.9. The Jalgaon Milk Union showed a decline in all its activities during the last ten years except in terms of registered societies, share capital build up, number of first aid centres and the number of improved animals born to its member producers consequent to AI facilities extended by the Union to them. The annual compound growth rates for most of the parameters analysed and shown in Table 5.9 were negative and significant. The instability index associated with higher negative growth was maximum in the case of milk procurement followed by cattle feed sale and then for the veterinary facilities provided by the union to its members. The minimum instability indices were noticed in the case Union's number of registered as well as functional societies, its share capital and first aid centres. The higher instability indicates that the Union's milk procurement as well as cattle feed sale and AI related facilities were exposed to risks of very high magnitude.

Seasonal Index for Milk Procurement

Jalgaon Dist.Milk Union:86-87 to 93-94

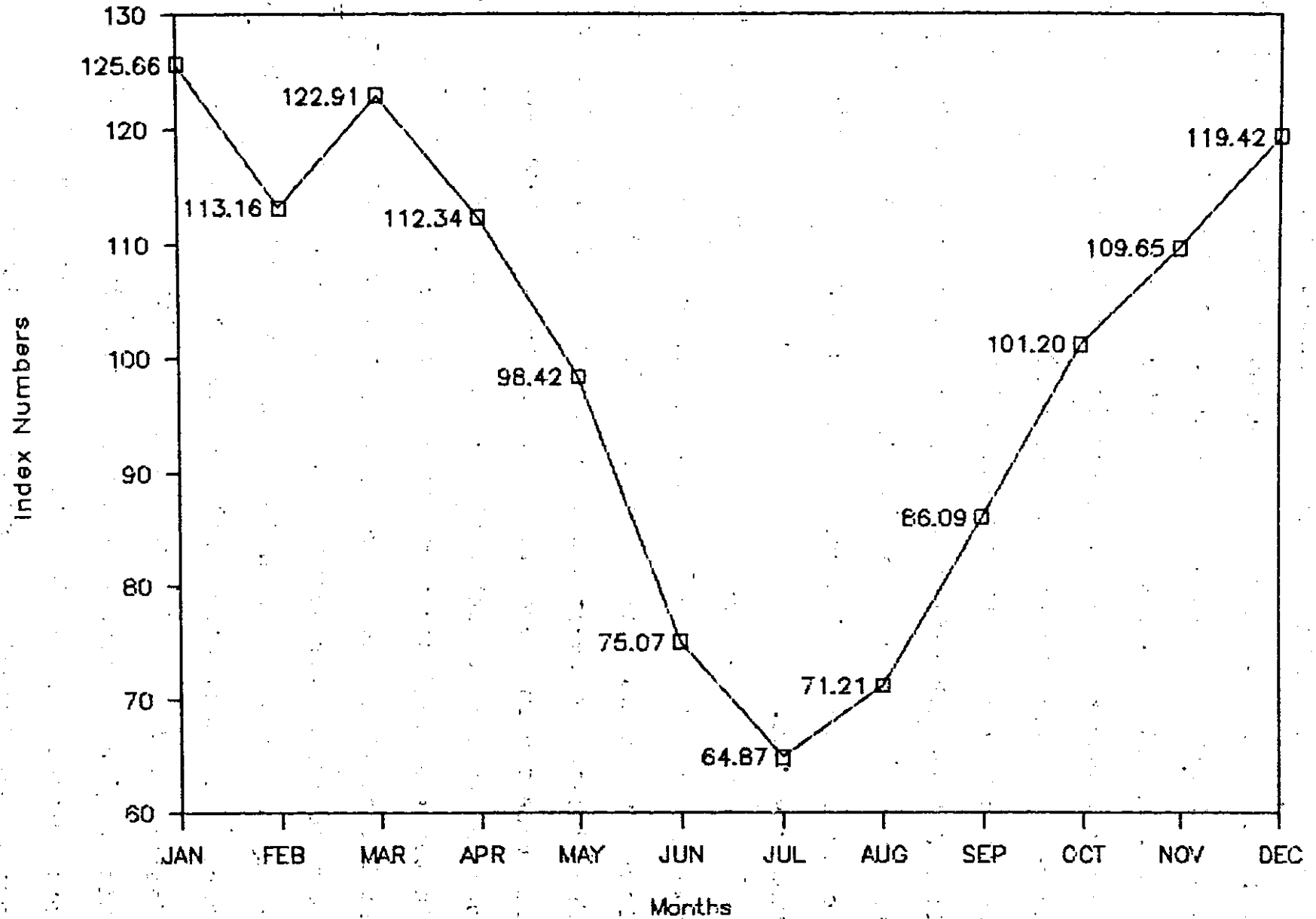


Figure 2

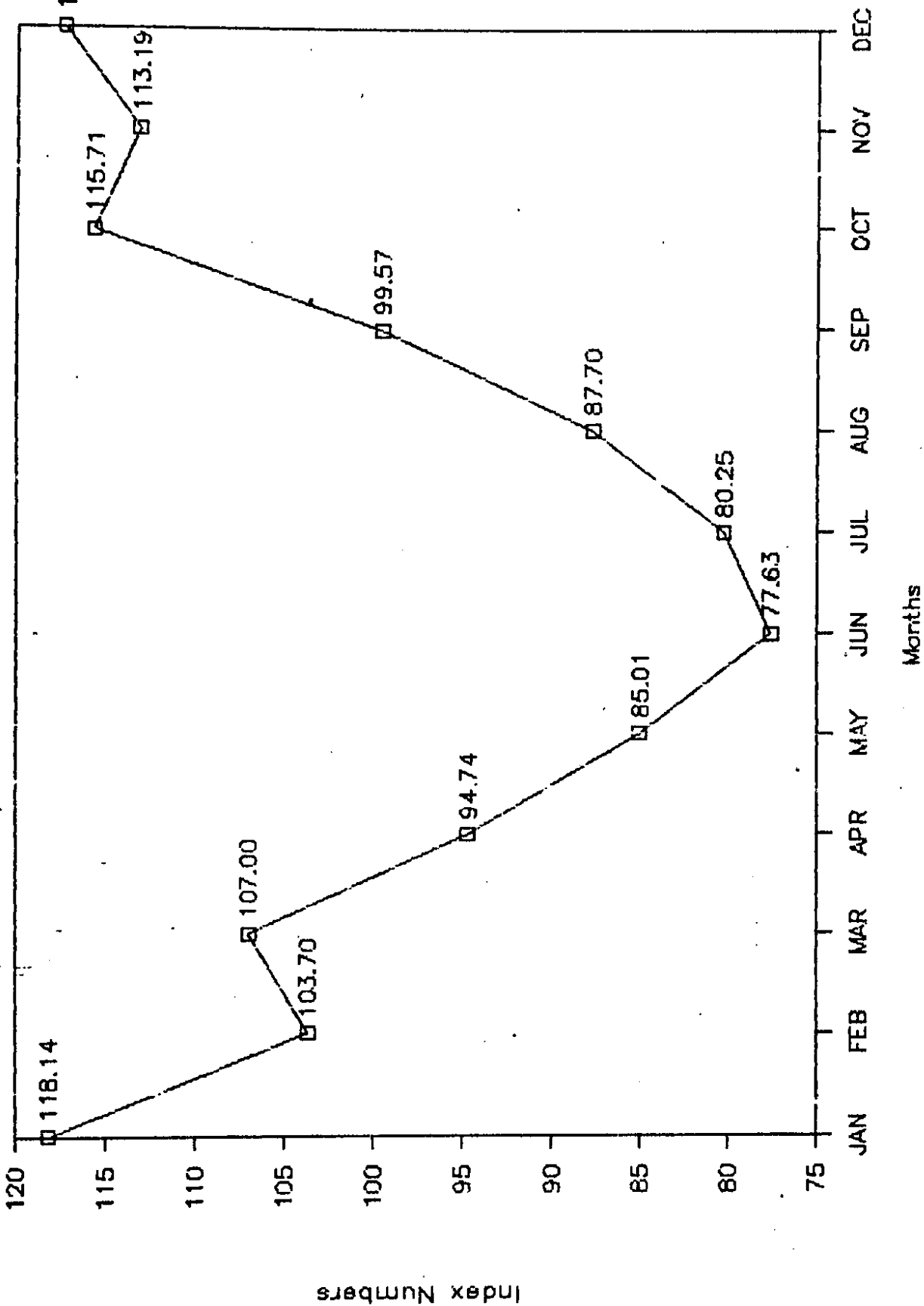
KDCMFU = Kolhapur District Cooperative Milk Producers' Union
 Note: *, ** and *** indicate 10, 5 and 1 per cent level of significance respectively.
 Figures in parentheses are the values of R² (in percent)

risks of very high magnitude.

Figure 3

Seasonal Index for Milk Procurement

Kolhapur Dist. Milk Union: 86-87 to 93-94



KDCMFU = Kolhapur District Cooperative Milk Producers' Union
 Note: *, ** and *** indicate 10, 5 and 1 per cent level of significance respectively.
 Figures in parentheses are the values of R (in percent)

risks of very high magnitude.

Table 5.9 : Growth Rates and Instability Indices for Certain Selected Operational Indicators of JDCMPU and KDCMPU (1984-85 to 1993-94).

(in per cent)

Indicators	JDCMPU		KDCMPU	
	Growth Rates	Instability Index	Growth Rate	Instability Index
1 No. of Registered Societies	0.59*** (37.80)	2.15	7.85 (97.45)	3.61
2 No. of Functional Societies	-3.75*** (85.96)	4.33	8.33 (94.93)	5.61
3 Share Capital (in Lakh Rs.)	6.86* (95.72)	3.81	36.52*** (93.78)	23.16
4 Annual Milk Procurement	-7.60*** (64.27)	17.44	13.62*** (94.96)	8.80
5 Average Daily Milk Procurement (in Lakh Lts.)	-7.60*** (70.46)	15.59	13.80*** (99.00)	3.76
6 No. of Societies Benefitted by Mobile Veterinary Hospitals	-2.61** (50.95)	11.15	12.61** (87.88)	11.78
7 First Aid Centres	2.87** (46.90)	5.87	79.79 (29.36)	29.01
8 Frozen Semen "	-2.66** (11.81)	20.97	13.47*** (93.51)	9.12
9 A.I. Done - Cow	-2.97*** (15.60)	20.39	22.47*** (94.05)	12.68
- Buffalo	2.86** (14.69)	18.83	23.70*** (97.90)	8.65
- Total	-1.14*** (0.03)	18.79	23.21*** (96.97)	9.83
10 No. of Improved calves borne to				
- Cow	-1.36*** (13.81)	10.02	25.18*** (91.00)	15.94
- Buffaloes	5.96 (58.19)	14.06	30.68*** (89.20)	20.15
- Total	0.42 (0.01)	10.57	28.18*** (90.30)	17.91
11 Cattle feed sold (in tonnes)	-2.66*** (11.71)	18.88	11.41 (94.05)	7.78

JDCMPU = Jalgaon District Cooperative Milk Producers' Union
KDCMPU = Kolhapur District Cooperative Milk Producers' Union

Note: *, ** and *** indicate 10, 5 and 1 per cent level of significance respectively.

Figures in parentheses are the values of R (in percent)

On the other hand, a cursory look at the performance of Kolhapur Milk Union in terms of its affiliated societies, its share capital, milk procurement, cattle feed sale and other input facilities extended to its members shows that all the developmental activities of this union during the past ten years have grown by leaps and bounds many folds. Though the instability indices in terms of Union's share capital, first aid centres and number of improved animals born due to AI services, were higher, this was also associated by a higher annual compound growth rate which showed that the Union made remarkable progress in terms of all parameters assessed and indicated in Table 5.9.

The foregoing shows that while Kolhapur Milk Union has made rapid strides in all spheres of developmental activities and has shown remarkable progress and improvement in this regard, the Jalgaon Milk Union has failed to live upto expectations. The Jalgaon Union's achievements with regard to increased number of registered societies and share capital were overshadowed by its overall functional inefficiency. Therefore, real concerted efforts are required to be launched to improve Jalgaon Union's milk procurement figures and the quality of technical service that it renders to its member producers. Only then the sagging morale of Jalgaon Milk Union can be boosted and its functioning improved in real terms.

Further, to sustain the interest of the producers', prices have to be remunerative throughout the year. The higher milk prices, however, may not be themselves lead to higher productivity of milch animals. For increasing the productivity of milch animals, it is necessary to provide proper input services such as balanced feed, improved breeding, veterinary care and management, etc. Jalgaon Milk Union, unfortunately, woefully lacks in terms of many of these

input services. In our kind of dairying and village economy, it is well nigh impossible for an individual farmer producer to arrange all such services completely on his own. The societies, therefore, have this onerous task of ensuring necessary input services to all producers. Timely provision of input services is not only likely to reduce the cost of milk production by increasing the productivity of individual animals but may also work towards improving the overall genetic stock of such milch animals.

5.6 Problems Faced by Milk Cooperative Societies in their Efficient Functioning

The milk cooperative societies were initially formed to break the unholy exploitative nexus between the middlemen and the private traders involved in the trading of milk with the producers. This not only ensured remunerative prices to the dairy farmers for their produce but also helped in the stabilisation of market price of milk over a reasonable period of time and, thus, protected the interests and concerns of the consumers as well. However, growth of vested interests and interference by local political-satrap in the functioning of such societies have led to closure of more than 50 per cent of the milk producing societies in Jalgaon district. Both the producers and the union of cooperatives blame each other for this malaise afflicting the societies. On closer scrutiny, the following reasons were discernible for the closure of Jalgaon milk cooperative societies.

1) The payment by the society to its members was irregular, that is, the society was not making payment to its members on time. This triggered closure of some of the societies. This was especially true in societies which were located in remote villages.

2) The predominance of private traders also caused closure of societies. Normally the private traders give

slightly higher price compared to milk cooperative societies. This is a ploy employed by private traders to lure away the producers from the cooperative societies. The closure of some of the societies could also be linked to successful employment of this ploy by the traders. Further, dairy farmers seemed to be quite critical of the ever increasing costs of feeds and fodder supplied by the society to its members. Such periodic increases in input costs were strongly resented and were simply not acceptable to the members of the society.

3) In addition, the private traders were extending additional facilities such as giving loan advances to the producers for the purchase of milch animals provided they supplied and sold 75 per cent of milk produced to them. This ensured captive milk supply for these private traders. Such facilities were absent at the society level. Attracted by such inducements, many producers stopped supplying milk to cooperative societies and started diverting their produce to private traders. Finally this resulted in the closure of such societies.

4) From the society's point of view, the recalcitrant attitude of its members in not supplying milk on regular basis contributed to lower total milk collection by the society. Insufficient milk collections further aggravated the efficiency and distribution of milk by such societies leading finally to their closure.

5) Another problem relates to the improper place of establishment of milk cooperative societies. Some of the societies were so located that they depended for their milk supply largely on the producers based in remote villages. It became a difficult task for the union to send their vehicle(s) for the collection of milk from such inaccessible remote villages. Union's vehicles were often found wanting

in arriving in time to collect milk from such producers. Due to late or untimely arrival of such vehicles many times the produce itself was getting spoilt before it could be collected. To stem the rot emanating from such losses the union at times preferred to close down societies located around such remote villages.

6) This outlier here was perhaps one of the major reasons for the closure of most of the societies in Jalgaon district which were not following 'Anand' pattern of milk collection. Only 30 per cent of the total working societies were following 'Anand' pattern of milk collection in this district. It may be pertinent to mention that the Anand pattern ensures just and remunerative price to all its society members based on spot scanning of their respective produce for their content using suitable milk testers. The facilities for such fat testing were totally absent in talukas covered by the union in the western part of Jalgaon district. In the absence of proper fat testing equipment, such ill equipped societies devised their own whimsical ways of compensating the members for their produce. This included collection of milk samples from each member and sending of a pool of such samples to the union for working out common fat percentage for the whole of milk collected from members of an entire village. The payments to members were made based on such common fat percentage. Obviously, the dairy farmers whose produce contained higher fat felt cheated and were aghast at seeing their counterparts with less milk fat gaining at their expense. In such villages, the society level workers were also found indulging in malpractices such as adding water to the milk collected from the members before the arrival of union vehicle. And, the thus generated corrupted surplus was sold in the nearby local markets for a gain by such unscrupulous

society level workers. Owing to such unethical practices, by and by members started losing their faith on the efficacy and functioning of such societies. An enterprising dairy farmer further lost out on being justly and adequately compensated for his richer produce due to watering down indulged in by the society workers which further depressed the common fat percentage and, hence, meant a still lower payment to him for his otherwise much better quality milk. Disenchanted and disillusioned, the members were increasingly reluctant to sell their milk to such societies. Consequently, the total milk collections in many societies sharply declined leading ultimately to their self-inflicted closure. Unless correctives are applied sincerely and societies are equipped with proper spot fat testing kit, more of the societies in the district are likely to close down.

7) At the society level, there was no direct loan facility to the members for the purchase of animals. In fact the society serves as a surity or a guarantor to the firm from which the producers take loan to the effect that in the event of failure or default in repayment of loan by the member, the amount would have to be repaid by the society. In such cases the loan money is recovered by making deductions from the payment due to a producer member. The society sometimes gives indirect loan to the members for the purchase of animals. In such cases the society usually resorts to taking loan from a bank at the rate of 7.5 per cent per annum interest. However, society disburses such loans to its members at the rate of 10.5 per cent interest per annum. In this scheme, the bank retains 10 per cent of the loan money as share capital and only 90 per cent of loan money is advanced to the society. A similar procedure is followed by the society. A producer member can avail loan upto Rs.6,000 for the purchase of one animal from

the society. Out of this loan, 10 per cent of loan money is held back by the society as share capital (i.e. Rs.600/-). The member is required to repay it within a period of 30 months. As soon as the society has recovered 50 per cent of the loan money by making necessary deductions from the payments due to such members, the member becomes eligible to seek a fresh loan for the purchase of another animal. At the most, the farmer can avail loan for two animals. As mentioned above, the loan money is usually recovered from the payment due to a producer member. However, the society is faced with problems in the recovery of loans when the producer suddenly turns hostile and stops supplying milk to the society. The societies at times, have incurred heavy losses owing to such hostility and have had to finally close down.

8) Another reason relates to the demeaning and dirty politics indulged in by village directors. The personal conflicts of such village level directors and lack of their interest in the functioning of the society has also caused the closure of many milk cooperative societies in Jalgaon district.

9) Due to shortfalls in total milk collection at the society level, the payment of salaries to the secretary and other employees of the society became a real problem. The payment of audit fees and other related expenses also became tardy for such societies. The closure of some of the societies was due to such multiplicity of problems.

10) The societies which were located in villages near the city could not function for long due to the increasing interference of private traders. The producers' in villages located closer to cities have multiple marketing outlets at their disposal for the sale of their produce. Such farmer producers prefer to sell their milk to private traders if the prices offered by the latter compares favourably than one

offered to them by the cooperative societies. Thus, unless producers are paid remunerative prices for their milk or are extended other additional facilities, the societies in villages faced as they are with increasing competition from private traders will continue to close down.

11) The union in Jalgaon district has completely stopped extending veterinary facilities to its member societies. This is indeed a serious blow to the cooperative societies' mode of dairy development and functioning, especially as Zilla Parishads (ZP) have very few veterinary clinics to cater to such needs. Needless to say that for the sustained health of milching animals, it is very much essential for producer farmers to have such facilities. In the absence of proper veterinary facility and animal husbandry care at the ZP level, it becomes incumbent upon societies to ensure such facilities to keep alive the interest of producers in such cooperatives.

12) The basic difference between the working of societies in Kolhapur and Jalgaon could be traced to the presence of 2-3 milk producers' society in almost all the villages of Kolhapur district. The benefit that accrues from having more than one society in a village is quite obvious as under such a scheme even if due to some reason one society closes down, the other(s) keep kicking and breathing. As a result, the supply of milk from the village is truly ensured on a continuous basis and it seldom faces a slump or fall. Further, in such situations, the members of closed societies have the option of becoming member of some other working society in the same village and they often exercise this option to their overall advantage. This type of practice was not observed in Jalgaon district. Not even a single village in the whole of Jalgaon district could boast of having more than one society in any of its villages. This can be taken as a major and serious flaw in the

establishment of milk cooperative societies by the Jalgaon Milk Union. This situation needs to be immediately altered and remedied by establishing more societies per village if the remaining societies in Jalgaon district have to survive and overcome their continuous cycles of closure.

In view of the above problems faced by the milk cooperatives, it needs to be mentioned here that a milk district union has to be self-reliant to fulfil its obligations towards its producer members, its constituent village level societies, the state and national level federation, its financiers and towards its own future growth, expansion and diversification. The above-mentioned functions and obligations of a milk union have been discussed here separately in order of their priority.

5.7 Obligations Towards Village Level Cooperatives

A district union has one-to-one and direct contact with the village cooperatives because they are among its immediate constituents, active members and shareholders. It is, therefore, essential that the union contributes to their business and financial capability. Unless the union is financially sound and is able to generate profits, it will not be able to make timely payments to the village cooperatives. Consequent to this, the village cooperatives are likely to lose their creditability with producer members. Not only this inordinate delay in payments to village societies is likely to trigger a decline in milk procurements as producers who are not paid in time may desert such societies. This may lead to societies being faced with inactive members. And, once the creditability of village society comes under doubt, the member may in fact withdraw from such societies paving the way ultimately for their closure.

The activities that generate profits for the village cooperative societies are built-in the Anand pattern of

system. A society can easily make profit and build reserves, if it can procure on an average 80-100 litres of milk daily.¹ A good village dairy cooperative can serve as an effective shock-absorber, if its district level union is faced with temporary liquidity problem, by making on time payments to the producer members. A healthy village cooperative can, thus, make up for transient credibility gap but it cannot go too far. In the ultimate reckoning the financial viability of village cooperatives does depend upon the financial health of the district union. There is absolutely no doubt that a wilting district milk union cannot sustain its village constituents at all times, no matter how healthy its village constituent is. The two way mutually sustaining relationship holds only to a limited extent in this regard.

5.8 Obligations towards Producer Members

Apart from discharging its obligation towards the milk producers through its constituent village societies, a district union has direct obligations to fulfil towards the producer members who contribute to its total business. In fact, most of the milk producers are illiterate and above all unorganised. They are, thus, prone to the mercy of unscrupulous, self-centred, profit motivated milk vendors and contractors. This exploitative unscrupulous nexus ensure that a milk producer sells the milk at an uneconomic price when his produce is a plenty and at just about a remunerative price when his produce is the least. That is, it forces them to sell milk at a cost of self denial. A dairy cooperative union, therefore, offers the best answers to all his miseries and financial vagaries.

1 R. S. Khanna (1994). "Dairy Cooperative - As a Business Enterprises Hints for Self-reliance," Indian Dairyman, 46(6) : 315-324.

A union should ensure that a maximum share of the rupee earned from the consumer is passed to the milk producer. The price paid to the member-producer over the year should be declared as provisional so that the union is able to share its annualised profit with its producer members. This profit is shared as final payment made to the producer member at the closing of the financial year. A loss making dairy cooperative that cannot meet even these basic costs and obligations is a curse on the member-producers.

5.9 Obligations towards the State Federation

The district union and the State Federation nurture a two-way relationship. The federation is an apex organisation coordinating many activities among constituent district unions, the State Government, other state and national federations and the various financial agencies. The state federation is an active business partner of the district union in marketing and in earning high profits for the products manufactured by the union. Survival, stability, growth and expansion of both the federation and the union are clearly interdependent. It is important for a union to process milk and manufacture milk products of high quality standards and in accordance with the demands of the market. This will ensure a continued presence in the market for the federation. Unless a union is financially strong and viable, it will be difficult for the federation to survive. It is important that the federation not only markets the milk and milk products in order to generate profits but also maintains the desired liquidity for the union. The delay on the part of the federation to market milk products can either be ascribed to its inability or incompetence or its tendency to hoard milk products. Such delays can arrest the availability of cash and can mean drying up of liquidity for the union, thus, forcing it to borrow higher

working capital from other financial agencies and to pay more interest. There is a need for a federation to take commercially hard-nosed decisions that would be favourable to the union and to its own financial viability. Financially unviable federation cannot be a useful partner in the progress of a union.

5.10 Hint for Self-Reliance

Khanna (1994) has given some broad hints for the self-reliance of milk cooperatives. His suggestions are based on the experience of Ludhiana Union which could evolve an excellent system to prevent pilferage indulged in by the secretary of the village society during transportation of milk. It was further pointed out by Khanna (1984) that even the workers in a dairy plant at times indulged in such pilferages. The Ludhiana kind system operates as follows:

i) The societies were supplied milk cans calibrated with 40 litres mark. Each can was filled upto the mark.

ii) Milk in a ^{can}, not filled upto the mark, was measured by resorting to dipstick in presence of the transporter. The quantity of milk written on the slip was verified by the transporter.

iii) The transporter only handed over the specified quantity at the dairy dock. He was only made responsible for any shortages in quantity.

iv) Bulk sample of milk was drawn by the secretary in presence of the transporter and put into two plastic bottles of 10 ml. each.

v) Each bottle was sealed and signed by the secretary in presence of the transporter.

vi) The bottle was thrown into a, letter box type, locked steel box. It was not possible to take out any sample bottle without opening the lock.

vii) For any variation in quality of fat, the transporter was held responsible.

5.11 Performance Indicators which Need to be Watched

Agarwal (1984) suggested some of the performance indicators which have a bearing on the viability of a dairy plant and which need to be watched on a continual basis. These indicators are listed below and the rationale for monitoring them is also explained:

(a) Transport Cost Per Litre : Keeping a track on this item will increase the awareness about the routes through which milk is transported to a dairy plant. This is likely to reduce cost of per litre transportation of milk. The cost incurred in transporting milk using varying modes of transport such as truck, matador, tempo, tractor etc. can also be appraised to analyse mediumwise per litre cost of transportation.

(b) Procurement Growth Percentage : Each dairy plant should compare its current period procurements with the procurements of the last two years in the same corresponding period and ascertain for itself if the procurement was adequate in light of its potential, other economic factors and opportunities available. This should also help in knowing if the current procurements were commensurate with the goals fixed in this regard or with regard to the steps taken to increase it.

(c) Procurement as a Percentage of Target : To what extent procurement targets are met can be gauged by this indicator.

(d) Growth Percentage in Liquid Milk Sales : The factors like impact of a dairy plant on liquid milk market, plant's share in this market and role of other market players can be appraised and analysed through this indicator. This may also help in monitoring the market share of different types of liquid milk.

(e) Percentage of Milk from Members : Aspects such as the extent of milk supplied by the member producers to a dairy plant, the diversion of milk by the producers to other buyers and agencies and the loyalty of the member producers to the dairy plant affiliated to their society can be appraised through this indicator.

(f) Processing Cost Per Litre : This will help the dairy plant to keep its processing cost per litre well under control. All processing costs, including the cost of utilities, should be considered for this purpose.

(g) Fat Loss Percentage : Each dairy plant should set a standard for its fat losses depending on its manufacturing processes, equipments and product mix. If there are different product mixes in different seasons, separate standards should be set for each of these mixes. The plants should compare the fat losses in the light of standards and the reasons for such losses should be investigated.

(h) SNF Loss Percentage : In a similar to that of fat, SNF losses should also be monitored.

(i) Overall Cost Per Litre of Milk Procured : The total cost incurred by a dairy plant, including that on procurement, transportation, processing, etc., should be determined and an overall cost per litre of milk should be computed. It will be useful to compute this ratio at different stages as follows:

- Overall cost per litre of raw milk;
- Overall cost per litre of milk after including transport cost;
- Overall cost per litre after including processing costs, packing cost (but excluding the staff costs);
- Overall cost per litre after including marketing expenses;
- Overall costs including salaries and administrative expenses;

- Overall costs including technical inputs;
- Overall costs including interest charges, etc.

All the above costs individually and together indicate the viability and health of a dairy plant.

(j) Expenses Per Litre : It is also useful to monitor the salary cost per litre, administrative expenses per litre, distribution expenses per litre and selling expenses per litre. It will also be useful to look at each of these heads of expenses as a percentage of sales.

(k) Number of Days Producers' Payments Outstanding : This will facilitate monitoring of delays in payments to producers. Such delays are likely to result in milk being diverted to other buyers, resulting in increased cost per litre and poor capacity utilisation of the dairy plant.

(l) Number of Days Debtors Outstanding : This will enable monitoring of outstanding collections so that a dairy plant does not suffer from unnecessary delays in receiving payments from its debtors, customers, etc.

(m) Number of Days Creditors Outstanding : This will enable a dairy plant in keeping its tab on its creditors. A dairy plant should not unduly delay payment to its creditors, as better known suppliers will hesitate to deal with the dairy plant. At the same time, a dairy plant should not pay prematurely without taking full advantage of the normal credit terms offered in the market.

(n) Total Advances as a Percentage of Sales : This will facilitate monitoring of excessive funds locked up in advances for which a dairy plant may not be receiving its goods and services. A very close look at this would enable many dairy plants to release funds for working capital. Funds lying in this account over a long period of time without recovery/adjustment may run the risk of becoming non-recoverable.

(o) Contribution Per Rupee of Sales : This indicator is computed by deducting all the variable costs of operation from the sales value in a particular period. Such variable costs include milk, other raw material, packing material, transport costs for goods, utilities, etc. This is a very useful indicator and will enable a dairy plant to constantly monitor whether its selling prices and variable costs are in consonance with each other. Not only should the sales value cover the variable cost but it should also generate adequate cash for meeting the fixed expenses of a dairy plant. A dairy plant's obligations do not end with meeting its fixed expenses. Over and above that the plant should make a profit. It should also be in a position to service its borrowings and set aside some funds for replacement and addition to its fixed assets.

CHAPTER VI
SUMMARY AND CONCLUSIONS

6.1 Introduction

In India, managing the dairy industry through Government departments was not very successful, but with the initiation of "operation flood" by the NDDB in 1970, production, procurement, processing and marketing of milk and milk products got a big boost through Anand pattern of milk producers' cooperatives, in which milk producers get not only reasonable prices for their milk but also essential inputs and services for milk production. Though the number of dairy cooperatives in the country, which stood at 34,523 during 1984-85, increased substantially to 65,300 by 1993-94, many of the milk cooperatives are financially not very healthy. Many state dairy federations like those in Andhra Pradesh, Uttar Pradesh and Karnataka are incurring losses.

As regards the cooperative movement in Maharashtra, it has played a significant role in the social and economic development of the state, particularly in the rural areas. Initially the movement was confined mainly to the field of agricultural credit. Later it rapidly spread to other fields like agro-processing, agro-marketing, rural industries, consumer stores, agro services, etc. Dairy related cooperative movement started taking roots in Maharashtra during the late 1950s. Its main objective was to bring incremental income to the farmers, organizing inputs and providing veterinary and health care facilities including cross-breeding of cows and grading of local breeds of buffaloes with Mehsana breeds by Artificial Insemination (AI). In the beginning, the 'Operation Flood (OF) I' was launched in Jalgaon and Kolhapur districts only. However, under 'OF-II', 19 more districts in the state were selected for assistance. In Maharashtra, although some of the

milk cooperatives have shown remarkable results and are working on profitable and efficient lines, yet scores of failure can also be witnessed. In fact, out of 96 cooperatives in the state, only 25 are viable.

It is a matter of great concern that only a couple of regions (Pune and Nashik) in the state are contributing to more than 50 per cent of the total milk production and the procurement of milk by organized structure in these regions is more than 80 per cent of the state total. It seems the unorganized sectors are more dominant than cooperative set up in rest of the regions. Even within the same region, some district unions may be working efficiently while others could be found on the verge of collapse due to the interaction of multiple internal as well as external problems. Even those dairy cooperatives which have built a loyal membership may vary enormously in their organizational performance and in the quality of services they deliver to their members. Accordingly, their socio-economic impacts may vary too.

The cooperative's impact operates primarily through 'pull' factors; over time, livestock producers raise productivity through improved breeding, feeding and management. While increase in dairy enterprise productivity directly translates into increased income, the 'pull' and the 'push' created by a successful cooperative encourages members to expand their dairy enterprise so as to make fuller use of the slack offered by family labour and crop residues. All these spill-over effects of successful cooperatives may, in the long run, prove to be a powerful, educative experience transforming the cooperatives into a vast human resource development programme for village communities.

Thus, in light of the above background, the present study examines the functioning of cooperative milk Unions, the

performance of primary milk cooperative societies affiliated to these Unions and the impact of these cooperatives on member producers in terms of production and marketing aspects of milk and in relation to various technical inputs provided by the society to its members.

6.2 Objectives and Methodology

The objectives of the study were (1) to study the resource structure, milk productivity and production pattern for different categories of households, (2) to estimate the contribution of various factors in milk production in cooperative and non-cooperative areas, (3) to examine the factors affecting marketed surplus of milk for different categories of households and (4) to suggest suitable ways and means to improve the operational efficiency of various milk cooperatives in the State.

It was decided to conduct and confine the investigation in Jalgaon and Kolhapur districts of Maharashtra. The rationale for the selection of these two districts was based on certain parameters such as productivity of foodgrains, irrigation potential, cropping intensity, livestock density, number of milk producers' cooperatives, literacy rate, etc., in each district of the State. As regards the selection of Talukas, it was decided to select one taluka from eastern part and another from western part of each of the study districts. Thus, two talukas each from Jalgaon and Kolhapur districts were selected for this investigation.

Stratified random sampling procedure was adopted for the selection of villages and milk producers. Within each selected taluka, the villages were stratified into two strata, namely, villages covered under the umbrella of milk cooperative infrastructure encompassing the district cooperative milk union and those not covered by such organized milk marketing infrastructure. One village falling under cooperative infrastructure

and another village not covered by it were selected at random from each selected taluka. Thus, four villages were selected from each district - two from cooperative area (extension area) and other two from control area.

A list of milk producer households in selected villages along with their herd size was obtained and the households were categorized as small (1-2 milch bovines), medium (3-4 milch bovines) and large (5 and above milch bovines) categories using cumulative frequency square root technique. A sample of 15 households was selected from each selected village. The number of households selected in each category were in proportion to total number of households in that category subject to the selection of minimum 2 households in each category. Further, the households selected from the villages covered under milk cooperative infrastructure were those who were also members of the cooperative societies in the village. In all, 120 households were covered by the study, 60 from Jalgaon and another 60 from Kolhapur districts.

The relevant primary data on various parameters were collected for the last preceding one year by personal interview method during the period January-March, 1995. In addition to the collection of primary data, secondary data related to total milk production, procurement of milk by various cooperative unions, their price structures; inputs, loans and veterinary facilities provided by unions/societies to their members were also collected from various offices.

6.3 Working of Milk Cooperative Unions

For the modernization and growth of Dairying Industry in Maharashtra, it is needless to stress that there should be a well knit procurement system under which milk producers would have full confidence in the Dairies so that whole surplus milk may be transferred from rural to urban areas. It is only due to their well knit procurement system that some district co-

operative milk unions are showing remarkable results. And, this is amply proved in Kolhapur district where at present two cooperative milk unions are functioning. These two cooperative milk unions together are procuring around 46 per cent of total milk produced in Kolhapur district. On the other hand, the ratio of total procurement of milk by cooperatives to total production is only 14 per cent in Jalgaon district. This clearly gives an impression of poor performance of Jalgaon Milk Producers' Union (JMPU).

While examining the functioning of various milk cooperatives in our study districts, it was observed that out of 1174 registered primary milk producers' cooperative societies of JMPU, about 50 societies were under liquidation and 494 societies were dormant and only 530 were functional societies. The past trend of JMPU in terms of total milk procurement, sale of cattle feed and veterinary and AI related facilities was not encouraging and showed a decelerating trend. The average daily milk collection of JMPU declined drastically from 1.68 lakh litres during 1984-85 to 0.71 lakh litres by 1993-94. The sale of cattle feed also followed a similar trend. It declined by 40 per cent during the last 10 years. Due to increasing overheads, the JMPU has completely stopped extending veterinary facilities to its members from 1992-93. These services are very much essential and under no circumstances they should be stopped. In fact, the imperative need is to further bolster and accentuate such veterinary services to improve the breeding efficiency of animals. Therefore, the need of the hour is to reactivate the closed societies and, thereby, increase the total procurement of milk so that the Union attains self-sufficiency and is able to work its way towards wiping out the current accumulated losses.

In order to check the predominance of private traders and in view of overall failure of the district cooperative

milk Union in Chalisgaon taluka of Jalgaon district, a scheme called 'Chalisgaon Milk Scheme' was implemented. This scheme helped the Government of Maharashtra in weaning away milk producers from the clutches of middlemen and private dairies the cartel of which had paralysed the normal effective functioning of the district cooperative milk union by exercising unscrupulous total domination of the market place. It deserves mention here that the positive supplementary role played by the JMPU also helped in this resurrection.

In dismal contrast to the functioning of JMPU, the functioning of various milk Unions in Kolhapur district is quite worthy of appreciation. The district level milk union (KMPU) in Kolhapur is successful in implementing all its goal objectives set forth for the overall dairy development. The KMPU's average daily milk procurement, which stood at only 83.50 thousand litres during 1981-82, increased substantially to 373.07 thousand litres by 1993-94, thus, registering an increase of 347 per cent during the last 13 years. KMPU procures both cow as well as buffalo milk. However, cow milk procurement showed a decline from 1981-82 to 1984-85 and picked up from 1985-86 onwards and increased rapidly thereafter. The reason for rise in both cow and buffalo milk procurement from 1985-86 could be traced in the commissioning of a new dairy at Gokul Shirgaon towards the end of 1985. The KMPU registered a quantum jump in the production and sale of cattle feed in a matter of just one year after commissioning of its cattle feed plant in January 1982 and this trend has been continuing. An interesting feature of KMPU was that its ratio of quantity of liquid milk sale to total milk procurement showed a continuously declining trend, This was mainly due to increase in wide range of milk products by the KMPU. The Union has a procurement and input department which provides all the extension services. This department

has laid stress on scientific breeding, feeding, animal health care programmes and management practices. The KMPU keeps its plant capacity fully utilized by manufacturing various types of milk products. In brief, it can be said that the KMPU is quite successful in the implementation of both 'OF-I' and 'OF-II' programmes.

Another milk cooperative Union which is working parallel to KMPU in Kolhapur district is Warna Sahakari Dudh Utpadak Prakriya Sangh. While KMPU has its primary milk cooperative societies in all the 12 Talukas of the district, only two Talukas, viz. Panhala and Hatkanangale, fall under the jurisdiction of this Sangh. The Sangh initially made a moderate beginning by collecting 1,950 litres of milk per day which substantially increased to 18,027 litres by 1974-75 and to 52,118 litres by 1979-80. Thus, the procurement figures leap frogged and increased by manyfolds in a matter of ten years. The Sangh is unable to collect the estimated quantity of milk from its command area in Kolhapur district alone and is, therefore, dependent on other institutions in Maharashtra and Karnataka for about 40 per cent of its total milk collection. The Sangh is manufacturing cattle feed under its brand name of 'Warna Cattle Feed'. During 1981-82, it sold around 2 thousand metric tonnes of cattle feed, the sale of which had escalated to around 6 thousand metric tonnes by 1985-86. At present the Sangh is producing and selling about 14 thousand metric tonnes of cattle feed. The performance of the Sangh in terms of production and sale of various products over last 5 years revealed that the Sangh had a cutting edge over Gokul Dairy (KMPU) in the manufacture and sale of milk products like shrikhand and ghee. The trend revealed that the quantity of shrikhand produced and sold by the Sangh was nearly 10 times more than the Gokul Dairy. Similarly, the figures for ghee production and sale were almost

double. The Sangh has ambitious future plans which include manufacture of Yoghurt and export of shrikhand and other products. The goals set forth by the Sangh for its growth are truly worth emulating.

6.4 Impact of Milk Cooperatives on Sample Producers

The impact of milk cooperatives on the sample producers is studied by analysing data related to socio-economic profile of sample cattle keepers, productivity of different breeds of bovines owned by the sample households, investment pattern of cattle owners, feeding practices followed, market structure prevailing in different sample areas along with actual quantities of milk marketed, etc. In addition to this, the member producers' perception of the working of milk cooperative societies was also ascertained.

6.4.1 Family Size and Educational Status of Sample Households

The average size of a producer family consisted of 5 persons in both extension and control areas of our sample districts. The number of members in more than 15 years age category, both among males and females, was higher in all categories of households and, thus, revealing a higher work force for dairy business. The availability of a higher work force was more in the extension area compared to control area. As regards the educational status of the households, it was observed that the cattle keepers in the medium and large herd size categories attained higher education and appeared to be better equipped to take effective management decisions than cattle keepers in small category.

6.4.2 Composition of Cattle and Buffalo

The breed composition of various animals maintained by sample households revealed that buffaloes were the major milch animals accounting for 75 to 90 per cent of the total bovine

stock. Among cattle, the percentage of crossbred cattle was more in extension area, while local cattle were more in control area and this trend was common to both the sample districts. In general, households in extension area possessed better breeds of buffaloes compared to control area.

6.4.3 Productivity of Milch Animals

The productivity of all the breeds of milch animals was higher in extension area which was either due to better feeding, breeding and management practices followed by the farmers or due to various inputs and health care facilities extended by the cooperative societies to its members in these areas.

6.4.4 Investment Pattern

The information pertaining to total investment on milch animals, cattle sheds and stores and other dairy equipments by the cattle keepers revealed that nearly three-fourths of the investment was on milch animals, around 20 per cent on cattle shed and the remaining was on dairy equipment for all the categories in both extension and control areas of the study districts. However, these investments were more in extension area compared to control area which may be due to better resource endowment for investment in dairying in extension than in control area.

6.4.5 Feeding Practices Followed

In our study districts, the milk producers were feeding green fodder, dry fodder and concentrates during different seasons depending upon their availability. Both compounded cattle feed, manufactured by respective district cooperative milk Unions, and home-made concentrate mix were fed to milch animals. It was observed that the average daily feed basket per individual animal in different seasons was in conformity with the milk production. The sample households in extension area supplied more quantities of feeds and fodder to their

milch animals than those in control area. Further, the extent of dependence of the producer farmer on farm produced and purchased fodder revealed that the farmer's dependence on farm produced fodder was more or less same (about 65 per cent) in both the sample areas of Jalgaon district. However, in extension area of Kolhapur district, the producer depended more on purchased fodder. This was mainly due to lower operational holding of the beneficiaries compared to non-beneficiary households of Kolhapur district.

6.4.6 Milk Production Functions

The analysis of milk production functions developed particularly for local breeds of buffaloes for various categories of producer households clearly indicated the importance of green fodder and dry fodder inputs in general and concentrate input in particular for higher milk production and profits. The regression coefficients of concentrate input were found to be positively and highly significant in the case of both beneficiary and non-beneficiary sample households for the two study districts. Thus, an increase in the level of this input demonstrated an increase in the milk production.

6.4.7 Market Structure

A study of market structure for the disposal of milk in two sample districts showed that both organized and unorganized sectors were involved in the marketing of milk. While the organized sector essentially represented cooperative societies, the unorganized sector not only comprised private dairies but also supply of milk directly to consumers, sale of milk to middlemen and others such as halwais, hotels, restaurants, hospitals, etc. Since the cooperative marketing infrastructure was deeply entrenched in the extension area of Jalgaon district, 97 per cent of the marketed surplus of sample producers in this district was sold to the cooperative

society and the share of private trade in this surplus was limited to only the remaining 3 per cent. In Kolhapur district, on the other hand, cooperative society's share in the marketed surplus of sample producers' was about 36 per cent and the remaining 14 per cent was sold to consumers within the village. A comparison of the scenario obtaining in the control areas of Jalgaon and Kolhapur districts revealed that while consumers and middlemen dominated in cornering the marketed surplus in Jalgaon district, the private dairies predominated in Kolhapur district.

6.4.8 Impact of Milk Cooperatives on Production and Marketed Surplus

The application of 't' statistics to test the mean differences in production and marketed surplus between extension and control areas revealed that in general, milk cooperatives in Jalgaon district neither had any impact on the production nor on marketed surplus of milk. However, in Kolhapur district, the cooperatives had positive impact not only on milk production but also on marketed surplus of milk and this impact was more manifest in the summer season than other seasons.

6.4.9 Impact of Milk Cooperatives on Employment

A significant 't' test for most of the sample households in extension area suggested that the extent of human labour employment was more in the case of beneficiary households than their non-beneficiary counterparts. This further emphasized the positive role that dairy cooperatives have played over the years in generating employment in the extension areas of both the sample districts.

6.4.10 Members' Perception of the Working of Milk Cooperatives

At the time of survey the producers were requested to state how they were motivated to become a member of the milk society. Most member producers in the sample areas favoured

milk cooperatives for the latter's perceived fair trade play and the basis of payment for their produce. The producers in Kolhapur district responded more favourably to the regular and timely payments made by their society compared to those in Jalgaon district. As regards veterinary services, only 23 per cent of the sample producers of Jalgaon district responded in its favour and that too in terms of only AI services. It is important to note here that the Union in Jalgaon district has stopped extending veterinary facilities to its member producers from 1992 onwards; now such facilities are available only in emergency cases. The plea of the member to restart extension of these facilities in this district stems from this fact. On the whole, the members in Kolhapur district were quite appreciative of the efforts of the Societies in rendering them the required veterinary services. The respondents were further probed to find out if they had any particular suggestion to make to further improve the functioning of the society. Through their suggestions members sought provision of loans for the purchase of milch animals and construction of cattle sheds. They also wanted feeds and fodders to be provided to them on credit basis at subsidized rates at society level itself. The extension of veterinary and health care facilities, timely and regular payments and a hike in the existing milk rates were among the other demands of the sample producers.

6.5 Comparative Performance of Milk Cooperatives and the Existing Lacunae in Their Functioning

A comparative performance of the two Unions (JMPU and KMPU) revealed that while KMPU achieved remarkable progress in terms of all the parameters considered, its counterpart, that is, JMPU could show progress in only certain select spheres. JMPU's overall progress remained quite tardy and dismal as the Union's performance remained unsatisfactory in terms of improving milk procurement as well as cattle feed

distribution. Further, a critical analysis of comparative rates for milk procurement revealed that JMPU offered below par rates for buffalo as well as cow milk procurement both in lean and flush seasons when the rates fixed by the Government of Maharashtra in this respect were considered as standard. In contrast, at no point in time the KMPU rates were less than Government rates. In general, the procurement pricing trend for KMPU has shown a consistently increasing trend.

The failure of JMPU at most of the developmental fronts can be associated to a number of factors. In fact, the inward looking practices and policies of dairy cooperative societies in Jalgaon district have forced many of them to become defunct. Many societies which were once vibrant in this districts are observed to be closing down now because of the retrogressive ways of their functioning and operation. The middlemen-private trade nexus has also weaned many of the milk producers away from dairy cooperatives. The problems faced by the producers in transporting milk to distantly located societies, delayed payments, and dishonesty of society level functionaries were among the major reasons responsible for creating this disinterest among member producers. These very reasons were cause celebre for middlemen in this district who in collusion with private trade exploited them to their definite advantage to the detriment of milk cooperative societies. There was some degree of randomness in the behaviour of employees in these trouble ridden cooperative societies; they not only lacked proper work culture, certain standards which were not in harmony with the local conditions, when forced on them also proved counter productive. The prevalence of caste rivalries, nepotism, rivalry of leadership, leadership crisis, etc., among the local level functionaries did no good to the reputation of these faction-ridden dwindling cooperatives. The need of the

hour, for Jalgaon cooperatives is, therefore, to adopt a forward looking egalitarian producer friendly approach that is capable of winning back the confidence of milk producers of this district. Only such an approach can revitalize the milk cooperative societies of Jalgaon district.

BIBLIOGRAPHY

- Acharya, T.K.T. and T.G. Pawar (1980). "The Economics of milk production by different types of milch animals," *Indian J. Agril. Econ.*, 35(4) : 153-154.
- Agarwal, S.P. (1994). "Improving viability of dairy plants," *Indian Dairyman*, 46(8) : 443-455.
- Atmaram, K. (1993). "Present status of dairy industry in India," *Dairy farming in Asia. Report of an APO study meeting, 26th July-6th August, 1988, Tokyo, Japan* : 237-256.
- Bahadure, J.Z., C.B. Singh and R.K. Patel (1981). "Milk production, consumption and marketed surplus in some villages around Karnal," *Agril. Marketing*, 24(3) : 19-22.
- Balishter, R.P. Singh and Bhikam Singh (1982). "Milk production, consumption and marketed surplus in Agra district - A case study," *Dairy Guide*, 4(9) : 33-35.
- Chikara, O.P. and A.C. Gangwar (1975). "Resource productivity in milk production and returns from cattle, crossbred cow and Murrah buffalo," *Indian J. Agril. Econ.*, 30(3) : 145.
- Cuddy and Della, V. (1978). "Measuring the instability in time series data," *Oxford Bulletin of Economics and Statistics*, February.
- Dhaka, J.P. (1981). "Study of marketed surplus and supply functions for milk in the plains and high ranges of Kerala State," Unpublished Ph.D. Thesis submitted to Punjab University, NDRI, Karnal.
- Gangadharan, T.P. (1978). "Studies in feed milk relationship in cattle in Kerala," Unpublished Ph.D. Thesis submitted to Punjab University, NDRI, Karnal.
- Gajanan, T.M. and B.M. Sharma (1990). "Instability in dryland agriculture - A study of drought prone district in Karnataka," *Annals of Arid Zone*, 29(4) : 237-242.
- Goswami, S.N. and N.V. Rao (1992). "Economics of milk production in the East Kashi district," *Indian J. Dairy Sci.*, 45(2) : 59-63.
- Gupta, J.N. and Pradeep Kumar (1988). "Resource use efficiency in milk production in Muzaffarnagar district of Uttar Pradesh," *Asian J. Dairy Res.*, 7(4) : 203-212.
- Kumbhare, S.L., K.N.S. Sharma, and R.K. Patel (1983). "Standardization of bovine units," *Indian J. Anim. Sci.*, 53 : 547.
- Pandey, U.K., J.P. Singh and K.S. Suhag (1980). "Milk production functions for Bundelkhand region of Uttar Pradesh," *Indian J. Dairy Sci.*, 33(1) : 99-109.

- Rai, K.N. and A.C. Gangwar (1976). "Resource use efficiency and cost of milk production in India," *Indian J. Anim. Sci.*, 46(1) : 571-579.
- Rao, K.R. (1981). "Economic evaluation of intensive cattle development project, Hyderabad (A.P.)," Unpublished Ph.D. Thesis submitted to Kurukshetra University, NDRI, Karnal.
- Reddy, Y.V.R., S.R. Jayashankar and S.R. Sampath (1975). "Studies on the economics of milk production," *Indian J. Agril. Econ.*, 30(3) : 156.
- Reddy, Y.V.R. and S.J. Mathur (1980). "Economics of milk production with special emphasis on proper allocation of concentrate feed and fodder to dairy animals," *Indian J. Dairy Sci.*, 33(3) : 351-356.
- Sardiwal, D.L. and J.C. Kalla (1975). "Comparative economics of cows and buffaloes in milk production in the Western Rajasthan," *Indian J. Agril. Econ.*, 30(3) : 153-154.
- Shah, Deepak and K.N.S. Sharma (1993). "Marketed surplus functions in Bulandshahr district of Uttar Pradesh," *Indian J. Anim. Sci.*, 63(10) : 1085-1093.
- Shah, Deepak and K.N.S. Sharma (1994). "Production and reproduction performance of bovines in Bulandshahr district," *Indian J. Anim. Sci.*, 64(2) : 178-185.
- Shah, Deepak and K.N.S. Sharma (1994). "Economics of milk production in Bulandshahr district of Uttar Pradesh," *Indian J. Dairy Sci.*, 47(11) : 937-944.
- Shah, Deepak and Parmatma Singh (1995). "Resource productivity and resource use efficiency of milk production in Bulandshahr district of Uttar Pradesh," *Indian J. Anim. Sci.*, 65(8) : 921-929.
- Sharma, A.K., D.P. Handa and S.K. Rajpali (1987). "Economic evaluation of dairy units in different seasons of Gwalior," *Indian Dairyman*, 39(3) : 93-96.
- Sharma, V.P. and Rajvir Singh (1993). "Resource productivity and allocation efficiency in milk production in Himachal Pradesh," *Indian J. Agril. Econ.*, 48(2) : 201-215.
- Singh, D.K. (1980). "An economic analysis of milk production by different breeds of milch cattle on various sizes of farms in Jaunpur district of Uttar Pradesh," *Indian J. Agril. Econ.*, 35(4) : 158.
- Singh, Shivtar, K.C. Raut and J.P. Jain (1986). "Performance of crossbred cows vis-a-vis nondescripts in a hilly area of Himachal Pradesh," *Indian J. Anim. Sci.*, 56(5) : 542-545.
- Singh, Lotan and C.B. Singh (1986). "Impact of dairy co-operatives on production, consumption and marketed surplus of milk in Western Uttar Pradesh," *Indian Dairyman*, 38(8) : 404-405.

Singhal, Vikas (1995). Handbook of Indian Agriculture.
Vikas Publishing House Pvt. Ltd., New Delhi.

Tomar, N.S. (1965). "Breeding efficiency of buffaloes,"
Indian Dairymen, 17 : 389.

Vashist, G.D. and P.K. Katiha (1988). "A comparative economic
analysis of milk production for different milch animals
in Himachal Pradesh," Agril. Situation in India, 43(2) :
133-138.