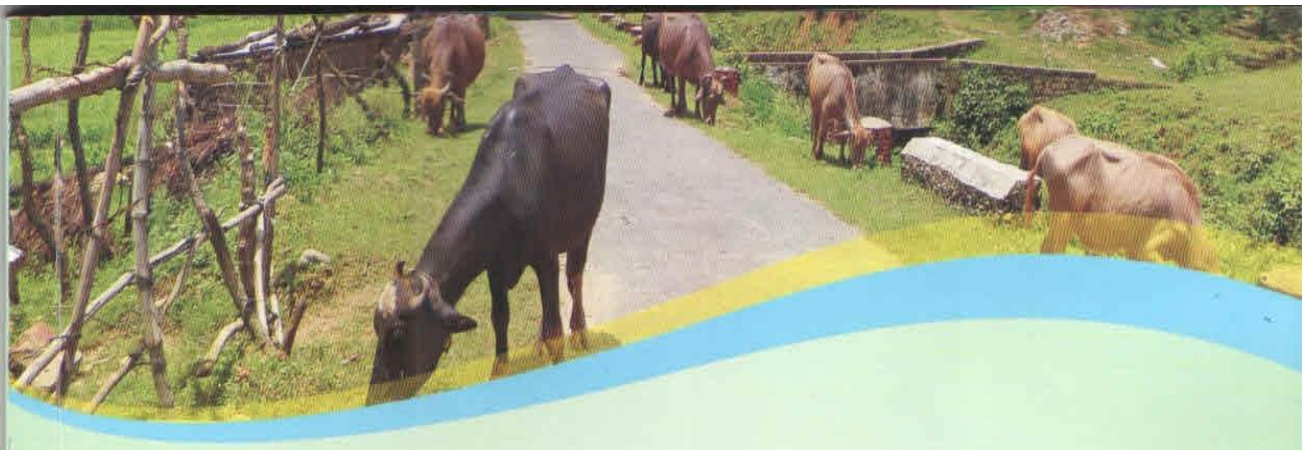
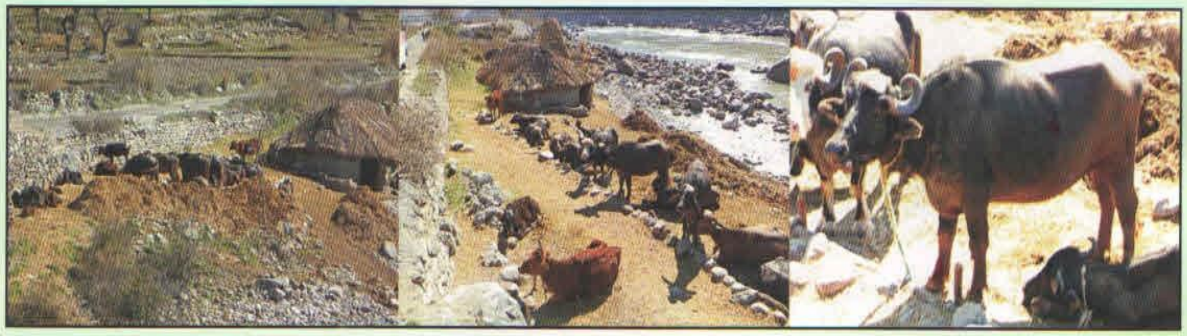


MARKETING OF MILK AND MILK PRODUCTS IN HIMACHAL PRADESH



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FOREWORD

The state of Himachal Pradesh has a huge livestock population; still this subsector is less productive in general, and compared to its potential. As such its direct contribution to the state's economy is limited. Consequently, the aggregate milk production and the overall milk consumption are low, though, the per capita consumption is better than the national average. But this is no consolation, as much has to be done to bring the consumption to the nutritional levels as per recommendations of ICMR.

Dairy production, among the sector of livestock production systems, is an important issue in Himachal Pradesh where livestock and its products are important sources of food and income. Due to the pivotal role that dairy production plays in the economy of the state as well as the enhancement of the nutritional status of the citizens, development of the sector is crucial. To be effective, the efforts to improve the productivity of smallholder dairy production and improve its market orientation needs to be supported and informed by detailed understanding of the current and dynamic conditions of production, marketing, processing and consumption of milk and dairy products.

However, in the country, milk production, handling, processing, consumption and marketing is traditional and constrained by multiple problems. Moreover very limited researches were done to identify the handling, processing and consumption of milk in the state. I am glad to know that this study has been conducted to study the present scenario of dairy production, dairy products' handling, and processing, and utilization practices and to evaluate dairy marketing system. The demand and supply projections of milk will surely act as guidepost for designing and streamlining the dairy development policies of the state.

The Agro Economic Research Centre at this University undertook the present study for evaluating the current production and marketing scenario of milk and its products in Himachal Pradesh, which is an indicator of the valuable services that the Centre has been rendering in its field of specialization. The staff members of the Centre engaged in the study deserve appreciation in bringing out this volume for wider circulation. The findings of the study, it is hoped, will be found useful for proper implementation of the diary development programmes and schemes of government departments and financial institutions aimed at diary development the state.

I learn with pleasure that the authors will welcome the suggestions for their future guidance.

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Executive Summary

Abstract

The animal husbandry sector is emerging as an important sector with sustained annual growth rate of 4.04 percent in milk production and has become an important source for households to supplement their farm incomes. Livestock sector not only provides essential proteins and nutritious human diet through milk, eggs, meat etc., but also plays an important role in utilization of non-edible agricultural by-products. Keeping in view this importance of animal husbandry sector, the present study attempts to analyze processing and marketing systems of milk and its products under different dairy production systems of the state. The study also evaluates the consumption pattern and consumer behavior in respect of milk and products and role of women in this venture. The study revealed that though the per capita milk availability has significantly gone up, it still remains lower than the neighboring states. The highest returns are from rearing the Holstein breed among cows and graded buffalo. It was found that deficit between nutritional demand of milk and its supply is likely to remain somewhat in limit, the deficit between economic demand of milk and its supply will continuously increase over a period of next 15 years. In order to bridge this gap the study has come out with some useful recommendations like breed and feed improvement measures etc.

Objectives of the Study

The study has focused on following objectives:

1. To study the growth trend and dynamics of population of milch animals in Himachal Pradesh,
2. To analyse the dairy production systems in the state,
3. To study the processing and marketing systems of milk and milk products in the state.
4. To analyse the consumption, consumer behaviour and preferences towards dairy products,
5. To examine the role of women and contribution of natural resources based inputs in dairy enterprise.

Methodology

The study has been conducted in milk shed areas of two districts, Shimla and Kangra which also represent low and mid hill areas. The further sampling was based on the consideration that different milk marketing systems get due representation. As such Tara Devi and Rampur areas of district Shimla were selected. On the similar considerations Palampur area of district Kangra was selected for the survey of dairy farmers. In order to study the consumer preference, 60 households from Shimla city and 30 from Palampur town were randomly selected and categorized in to three income groups of low middle and high income groups. The secondary data was collected from various sources including the private and public milk marketing agencies of Himachal Pradesh, Punjab and Haryana States.

Main findings

The following text presents the main findings of the study.

The study indicates that according to 2007 livestock census the total livestock population the state was 5.22 millions of which 2.27 million were cattle and 0.76 million buffaloes. There have been substantial inter and intra district variations due to climatic and other factors like availability and type of fodder etc. There was a marginal decline in percentage of cattle with an increase in the proportion of buffaloes. The highest number of milch animals were in district Mandi closely forwarded by district Kangra. The district Lahaul-Spiti was at the bottom in this respect. The percentage of cows in productive milch animals during 1982 was about 62 percent which increased to 67 per cent during 2007. During this period, the percentage of cross breed cows, among total milch animals, increased substantially from about four to 31 per cent whereas that of indigenous cows declined from about 58 to 34 percent.

The gross milk production in the state increased from about 870 thousand tons during 2004-05 to about 1139 thousand tons during 2012-13. In this the contribution of buffaloes was 39 percent. It was also found that the average daily milk yield cross breed cows during the whole lactation period was 4.61 liters as compared with the indigenous cow's yield of 1.5 liters. As a result of these positive developments the per capita milk availability in the state increased from 0.392 to 0.455 liters per day during this period. However, this enhanced milk availability is still lower than that of neighboring states of Punjab and Haryana but higher than the nation average of about 0.290 liters. The results of the study indicate that about 80 percent of the cows' milk and about 76 percent of buffaloes' milk is marketed as fresh whole milk. About 17 percent of the cows' milk and 18 percent of buffaloes' milk is consumed with in the household.

The study is based on five different diary production systems, which are Milkfed, private dairies, sale through traders, direct sale and self processing. The 'per farm' number of dairy animals was highest under the system of direct sale and was 3.24 milch animals per farm and in addition to this they also had one young stock per farm. The farmers under the system of sale through traders had 1.33 milch animal and young stock each on their farms. The study also presents the composition of livestock indicating the prevalence of cross bred cows under different systems. The production of milk was highest on the farms having direct sale and was 25.20 liters per day. As such the value of the milk produced was about Rs.615 and was highest during summer season.

There were wide variations in maintenance cost of different milch animals and it was found that the net cost of rearing cross bred cows was about Rs.114 per animal in case of cross bred cows which increased to Rs.123 in case of Jersey cows and Rs.168 in case of Holstein cows. The maintenance cost per animal in case of graded buffaloes was about Rs.107 and in case of local buffaloes it was Rs.98 per animal. The milk yield was observed to be 8.64, 10.97 and 15.43 liters

per day in case of cross bred, Jersey and Holstein cows whereas the milk yields of graded and local buffaloes was 6.50 and 4.67 liters per day. This resulted in cost of milk production to be Rs.13.33, 11.34 and Rs.10.94 per liters in case of cross bred, jersey and Holstein cows. This cost of production was Rs.17.13 and 21.02 per liters for graded and local buffaloes. The cows' milk was sold at an average price of Rs.20 per day whereas the price of buffalos' milk was Rs.25 per liter. This translated into per day profit of Rs.57.63, Rs.93.87 and Rs.139.80 per day per animal in case of cross bred, jersey and Holstein cows respectively. The per day gains were Rs.55.19 per day per animal in case of graded buffalo which figure for local buffalo was only Rs.18.58 per animal per day.

The projections of demand and supply of milk have been made based on the annual population growth of two percent and increase in milk production at the rate of annual compound growth rate of 0.22 percent. It has been estimated that the population of the state will be 10000424 during the year 2029-30 and the production of milk during this year is likely to be 1182 million liters. The projected nutritional demand of milk during this year is likely to be 912.54 million liters, based on the recommended intake of at least 250 ml of milk per capita per day. This leads to a scenario of surplus milk production of about 269 million liters over the nutritional demand. However, entirely different scenario emerges when economic demand is considered. The economic demand during the year 2029-30 has been estimated to be about 2623 million liters there by resulting in a deficit of about 1441 million liters.

The marketing of milk in the state is carried out by various agencies including, Milkfed and private dairies within the state and milk supplied by agencies located outside the state. During the year 2013-14 a total of about 67 thousand million liters of milk was marketed and the share of agencies of the state was about 57 percent in this. About 90 percent of the milk was supplied by Punjab and Haryana milk federations and the rest about 16 per cent was supplied by private dairies located outside the state. Due to the milk supplied from outside the state the per capita availability of milk per day has increased from 0.455 liters per day to 0.466 liters per day. The study also found out that of the total milk produced in the state about 13.53 percent is consumed within the home itself and the rest, 86.47 percent is marketed predominantly as fresh whole milk. Only about six percent of the milk marketed is processed in to cheese etc.

The survey revealed that there are five type of milk marketing channels in the state viz.: (i) Producer-Consumer, (ii) Producer-other producer-Consumer, (iii) Producer-Trader-Consumer, (iv) Producer-Milkfed-Retailer-Consumer, (v) Producer-private dairies-Retailer-Consumer. The share of producer in consumer rupees varied with the channel used and was 48.38 percent through Milkfed, 55 percent through private dairies, more than 66 percent through traders, 88 percent through direct sale and 94 percent through self processing marketing system.

As per NSS report the proportion of milk and milk product in consumers expenditure were on the second priority in 1998 while it come on the first priority during 2011-12 in the state and in neighboring northern states.

The role of women in various dairy activities was higher in all operations. Women participation was equal to males in marketing of milk under cooperative set-up as well as under private marketing systems. In other systems their participation was limited to only 5 percent.

Income generating sources of sampled households are livestock rearing, crops husbandry, service in public and private sectors, petty business, wage labour etc. Livestock was the main source of income which contributes 62 percent of the total income followed by service with about 18 percent.

The proportion of plan outlay for the agriculture and allied activities accounted 8 percent in the eleventh plan as against the highest proportion 13.37 percent in ninth plan. The farmers reported the problem of non-availability of improved fodder seed, lack of veterinary facilities, low price of milk offered by the Milkfed. For obtaining higher returns from dairy animals proper breeding, feeding and weaning of livestock is urgently needed. There are presently lacking due to hilly terrain and inaccessible villages.

Executive Table

#	Indicators	Value
	Total livestock population in lakh (2007)	52.16
	% of cattle	43.50
	Buffaloes	14.60
	Cross bred cattle	15.20
	Average milk yield of (liters/day)	
	Cow local	1.50
	Cow CB	4.61
	Buffalo	3.27
	Per capita milk availability, 2012-13(liters/day)	0.455
	Total annual milk production in H.P 2012-13 (,000 tons)	1138.61
	Share of cow's milk (%)	60.68
	Share of buffaloes milk (%)	35.03
	Marketed surplus of cow milk (%)	80
	Marketed surplus of buffalo milk (%)	76
	No. of sample dairy farmers	150
	Family size	4.97
	Literacy	80
	Farm Size	1.09
	Total livestock	405
	Cows	386
	buffaloes	19
	Per day milk production (liters)	2294
	Marketed per day (liters)	1912
	Cost of production of milk Rs/Liters:	
	Cow CB	10.94 to 13.33
	Buffalo graded	17.13
	Buffalo local	21.02
	Women work participation in livestock rearing %	64
	Total milk procured marketed in H.P	66.92
	Share of Milkfed	38.77
	Other private dairies	18.34
	Outside state agencies	42.89

	Capacity utilization of MCC	85
	Capacity utilization of MPP	100
	Average milk consumption in urban (liters/day/family)	2.83
	% of income spent on dairy products	20.56

Chapter-1

INTRODUCTION

Preamble

The livestock sector has played a crucial role in the overall development of Indian economy. Though during the last two decades the contribution of agriculture and allied activities to the Gross Domestic Product (GDP) has declined, the contribution of livestock sector has exhibited continuous improvement. This is largely due to the sustained annual growth rate of 4.04 percent in milk production, thus becoming an important secondary source for income for 70 million rural households engaged in dairying and for 70 percent of the workforce that comprised women (Economic Survey of India, 2013-14). By far the most significant aspect of growth in the livestock sector is the role played by it in improving the economic lot of rural millions.

As per Central Statistical Organization (CSO) estimates, the value of output from livestock sector at current prices was about Rs. 3,27,838 crore during 2011-12, which is about 25.85 per cent of the value of output of Rs.12,68,081crore from Agriculture & Allied Sectors. The contribution of animal husbandry sectors to the total GDP during 2011-12 was 3.92 per cent.

Animal husbandry sector provides large self-employment opportunities. According to the National Sample Survey Organization's latest survey (NSS 61st round) 5.5% of the workforce in the country was engaged in Animal Husbandry sector in 2004-05. The total employment in animal husbandry and fisheries is around 5.80%.

Livestock sector not only provides essential proteins and nutritious human diet through milk, eggs, meat etc., but also plays an important role in utilization of non-edible agricultural by-products. Livestock also provides raw material byproducts such as hides, skin, blood, bone, fat etc. The contribution of milk alone (Rs.1, 62,136 crore) was higher than paddy (Rs.95,038 crore), wheat (Rs.71,579 crore) and sugarcane (Rs.33,691 crore).

Dairying sector plays an important role in the national economy and in the socio-economic development of the country. This sector also plays a significant role in supplementing family incomes and generating gainful employment in the rural sector, particularly, among the landless laborers, small and marginal farmers and women, besides providing cheap nutritional food to millions of people. Livestock are the best insurance against the vagaries of nature like drought, famine and other natural calamities.

Indian agriculture is an economic symbiosis of crop production and cattle rearing. Small and medium farmers own nearly 80 percent of total land holdings and about 64 percent of the population is engaged in agriculture either as farm labourers or as cultivators. In a normal year,

crop production can generate 90 to 120 man days of employment per person. For the remaining period, they are virtually unemployed. In this milieu, dairy sets right the imbalance in employment.

Relevance of the Study

The main objective of development planning in underdeveloped areas is to achieve higher standards of living for the masses through generating additional employment and increasing productivity per unit of land and man. In the Western Himalayan region of India (which consists of Jammu-Kashmir, Himachal Pradesh and Uttrakhand), industrial potential is limited and hence the farm sector is the major employer. The question generally raised is whether the farm sector alone will be able to gainfully absorb growing labour force and provide satisfactory income and standard of living to local people in this mountainous region. It is generally believed that there are still ample opportunities to generate more income and employment within this region through diversification and balanced integration of rural activities. Western Himalayan region has vast potential for commercialisation of agriculture through fruits and vegetable production and improvements in animal husbandry sector. Next to agricultural land, livestock is the largest productive asset in rural areas. The small size of land holdings in the region are further dwindling fast because of subdivision due to increasing population. Under such a situation animal husbandry, which, largely, depends on common property resources, helps in supplementing the farm income. Livestock in addition to be a direct provider of milk, meat, wool etc., also plays a vital role in the development of agriculture, especially in hilly areas like Himachal Pradesh where livestock is the main source of energy for ploughing and transport and supply of much needed organic manure. Therefore, keeping some livestock is a normal feature of all types of farming systems in Himachal Pradesh. The poor crop productivity, low availability of per capita arable land, substantial availability of common property grazing lands and lack of other income generating activities have made the rearing of milch animals an economic compulsion in this region. Besides the small investment, there are other factors such as regular cash income and employment, which have prompted all categories of farmers and even the agricultural labourers (weaker sections) to supplement their incomes through livestock rearing as a subsidiary occupation. Animal husbandry contributes between 10 to 32 per cent in the total household income in different agro-climatic zones. The share of animal husbandry in the total agricultural output has registered a steady increase from about 25 per cent in 1980-81 to 33 per cent during 1989-90**.** The importance of the dairy enterprises also becomes apparent from the fact that more than 93 per cent of the households rear some sort of bovine and these constitute about 56 per cent of the total livestock population of the state.

Dairy sector plays a definite role in balanced agricultural production systems by adding nutritional and economic value to food as well as to other agricultural resources. Animal

husbandry and dairying so far have been treated as rural occupations and only ancillary to crop farming. Little emphasis has been laid on developing them as commercial ventures. The major problem being faced by this sector includes lack of adequate feed and near absence of marketing infrastructure. Therefore, there is a need to tailor and evolve a development strategy for livestock sector to match the changing requirements at grassroots level and to raise the production base to a higher and sustainable level. It will necessitate a careful identification of the problems confronting dairy sector and their proper analysis and appropriate policy action. The present study is a humble effort in this direction.

Objectives of the Study

The focus of the study is to provide a better understanding of the prevailing dairy production, processing and marketing systems in mountain areas. However the study will focus on following objectives:

6. To study the growth trend and dynamics of population of milch animals in Himachal Pradesh,
7. To analyse the dairy production systems in the state,
8. To study the processing and marketing systems of milk and milk products in the state.
9. To analyse the consumption, consumer behaviour and preferences towards dairy products,
10. To examine the role of women and contribution of natural resources based inputs in dairy enterprise.

Chapter-2

RESEARCH METHODOLOGY

The issues of dairy holder can be broadly categorised into two aspects viz. production and marketing/consumption. Both of these aspects need in-depth analysis so that clear picture regarding the important issues could emerge. This required a selection of such an area where both the issues could be simultaneously studied. Accordingly, a milkshed area comprising of two districts viz. Shimla, and Kangra were identified and selected for the study. This selection had an advantage of representing low and mid hill areas and different marketing systems. On the other hand Shimla and Palampur cities represent very good markets for studying the urban consumption of dairy products.

Sampling design

The following sampling design was adopted:

Consumer preference survey: In order to study consumer preference for dairy products, Shimla and Palampur cities were purposely selected on the basis of expert advice from the officials of Himachal Pradesh State Co-operative Milk Producers' Federation (Milkfed), existing information as well as personal observations. A sample of 60 households from different localities of Shimla city and 30 households from Palampur city was drawn randomly. Thus, the study is based on the responses of 90 sampled urban households representing different types of localities, income groups, occupation and backgrounds. Further, the sample was divided into three income groups viz. low income group (LIG), middle income group (MIG) and High income group (HIG). The income classification was followed because the earlier studies indicated that consumption of dairy products is directly related with income levels. The details of this classification have been presented in Table - 2.1. The data pertaining to family size, income, occupation, consumption pattern of dairy products, sources, prices, tastes and preference, etc. was collected on a well-designed, pre-tested questionnaire by personal interview method.

Table-2.1: Classification of sampled urban households.

Income groups	No. of Households	Income Range Rs/Month
LIG	30	< 30000
MIG	30	30000 to 60000
HIG	30	> 60000
Total	90	< 30000 to > 60000

Dairy farmers survey: As stated earlier the milk shed area comprising two districts were selected. In the selection of this milk-shed, low and mid hill zone get due representation, Shimla

being located in mid hill zone and Kangra in low hill zone. The further selection of dairy holders was done in such a manner that different marketing systems prevalent for disposal of milk get due representation. This step would have broadened the scope of study as in addition to existing milk production system in different areas, the different marketing systems will also be evaluated. This problem was discussed with the officials of milkfed and animal husbandry departments. After due consideration Tara Devi area comprising of villages Phayal, Mohunag, Malog etc. and village Badhal, Kotla, Koyal and Kepu in Rampur area were selected in district Shimla. Tara Devi area represents the situation where the producers have very good access to urban consumption centre viz. Shimla city and hence represents the marketing channel where milk is being directly sold to the consumers. Rampur area does not have any urban consumption centre nearby and hence direct sale to consumers cannot be done in large majority of cases. In order to tackle this problem and due to good extension provided by milkfed and by private milk dairy, this area represents the situation of poor accessibility and represents the both marketing systems cooptative as well as private marketing system. Beed, Chogan and Gunkhetar villages in Palampur area were selected in districts of Kangra. The selected number of sampled dairy farmers is given in Table-2.2.

Table-2.2: Number of sampled dairy holder farmers

Milkshed Areas	No. of Dairy Farmers
Shimla	75
Kangra	75
Total	150

Field data collection: The data was collected through the personal interview with the respondents. For this purpose the villages were visited by the study team and interacted with dairy producers in the selected milk shed areas The data collected pertains to the family size, income, operational land holding, cropping pattern, consumption pattern, livestock composition, production characteristics, grazing and feeding, dairy input costs, cattle diseases and mortality, production and utilisation of milk, marketing channel, constraints in dairy farming and role of women in dairy enterprises, etc.

Secondary data collection: The data collected from primary sources was supplemented by data from published /unpublished sources of Milkfed, Department of Animal Husbandry, Directorate of Land Record, Punjab Milkfed, Haryana Milkfed, private dairies inside the state, wholesalers of packed milk like Vita, Verka, Milk Time, Amul etc.

Analysis of data: Mainly tabular analysis was followed. However, compound growth rates were calculated in order to present trends, wherever necessary.

Reference period: The field survey pertaining to agriculture year 2013-14

Chapter-3

AGRO-CLIMATIC FEATURES AND DAIRY PRODUCTION SYSTEMS IN HIMACHAL PRADESH

Physical features and livestock rearing in Himachal Pradesh

Himachal Pradesh is almost entirely mountainous with altitude ranging from 350 meters to 6975 meters above mean sea level. It lies between latitude 32^0 22'40" N to 30^0 12'40"N and longitude 75^0 45'55"E to 79^0 04'20"E. Physiographically, the state divided into four agro-climatic zones based on altitude. The details are given below:

Sub-mountain and low hills sub-tropical zone: The area in this zone is situated up to 650 meters above mean sea level with an average rainfall of 1000 mm. This zone is located in the Shiwalik belts of Himachal Pradesh and occupies approximately 25 per cent of the geographical area and 38 per cent of the cultivated area of the state. The population pressure is the highest in this zone. The main crops cultivated in this zone are wheat, paddy, maize, sugarcane, soyabean, pulses, oilseeds and barley. Citrus, mango and litchi are important fruit crops.

Mid hill sub-humid zone: The elevation of this zone varies from 651 meters to 1800 meters above mean sea level. The annual precipitation in this area varies from 1500 mm to 3000 mm, 70 per cent of which is received during monsoon season. This zone comprises 41 per cent of the total cultivated area. The texture of soils of this zone varies from loam to clay loam. These are deficient in nitrogen and phosphorus with poor water and nutrient holding capacity. Soils are acidic in reaction and respond to liming. Soil conservation and water management are the main problems in this zone. Although this zone receives the maximum rainfall, the agriculture still suffers from losses every now and then due to low water holding capacity of the soils and erratic distribution of rainfall. The main crops cultivated in this zone are wheat, paddy, maize, seed potato, sugarcane, pulses and oilseeds. Stone and citrus fruits also occupy considerable area. Forestry and pastures constitute an important component in this zone. This zone is milk-shed area wherein a number of chilling plants and milk processing plants have been installed.

High hills temperate wet zone: The altitude of this zone ranges from 1801 meters to 2200 meters above mean sea level and covers 18.4 per cent of the total cropped area of the State. The soils are shallow in depth, acidic in reaction and silt loam to loam in texture. The soils are deficient in nitrogen and phosphorus. Terraced farming is practised in this zone. The main crops are wheat, maize, paddy, barley, pulses and oilseeds. Mostly rain fed farming is practised. Soil erosion, low fertility and inadequate water management are the main problems. The average rainfall is about 1000 mm, which is mainly received during monsoon months. This zone is suitable for raising off-season vegetables and seed production of temperate vegetables. Apples, other

temperate fruits and nuts are important horticultural crops grown in this zone. Sheep and milch cattle dairying also supplement the income of the farmers in this zone.

High hills temperate dry zone: The area in this zone is situated above 2201 meters above mean sea level. This zone remains covered with snow for nearly 5-6 months a year i.e. from December to April. The rainfall is very low (about 25 cm) and the temperature remains low throughout the year. The soils are sandy loam in texture and neutral to alkaline in reaction and low in fertility. Practically no crop can be raised without irrigation. Gravitational channels (kuhls) are the only source of irrigation in this zone. The soil erosion and water management are the main problems in this zone. Potato, barley, wheat, buckwheat, peas, minor millets, temperate vegetables and dry fruits are the main crops. Sheep and goat rearing is the main source of income. The flocks migrate to low hills in winter due to snowfall in this zone

Population of Himachal Pradesh

According to 2011 census the population of the state is 6.86 million with a density of 123 persons per sq.km. The highest density is in Hamirpur district, 407 persons and the lowest in Lahaul-Spiti with only 2 persons per sq.km. About 90 per cent of the population lives in rural areas. There were 30 per cent workers during 2011 and sex ratio was 972 females to 1000 males. The decennial growth rate of population was 12.90 per cent during 2001-2011. Among total population the percentage of Scheduled Caste (S.C) and Scheduled Tribe (S.T) population was 25.19 and 5.71 respectively. About 5 8 per cent of total workers were cultivators and 5 per cent were agricultural labourers.

Livestock population in Himachal Pradesh

According to 2007 livestock census, total livestock population in the state is 5.22 million. Out of these 2.27 million were cattle and 0.76 million buffaloes. About 0.90 and 1.24 million were sheep and goats respectively. Crop-livestock farming system is generally practised.

Changes in livestock population and composition

The composition of animals indicates substantial inter and intra-districts variations due to differences in climate and availability of fodder resources. Cows are numerically predominant among milch animals due to extensive grazing facilities available in hilly areas, but because of higher productivity, if possible, buffaloes are preferred over them especially in districts that falls in low and mid hills of the state.

As compared to 1997, in 2007 the proportion of cattle in total livestock declined from 43.80 in 1997 to 43.50 percent in 2007 and that of buffaloes increased from 14.29 in 1997 to 14.60 percent 2007 in the State (Table 3.1). Among cattle, cross-bred cows were preferred by the farmers over indigenous cows due to higher milk productivity. Therefore, the proportion of

crossbred cows has increased from 8.35 in 1997 to 12.50 percent in 2007 while the proportion of indigenous cows decreased from 32.02 in 1997 to 28.30 percent in 2007. Buffaloes were 14.29 per cent in 1997 which increased to 14.60 percent in 2007. The population of sheep declined from19.88 percent in 1997 to 17.28 percent in 2007. Hence, farmers have reduced numbers but increased quality of cattle to obtain higher milk yields.

Table- 3.1: Livestock composition in Himachal Pradesh

Particulars	1997 Census		2003 Census		2007 Census	
	Number	Percentage	Number	Percentage	Number	Percentage
Cross bred cattle	538402	11.78	650743	12.67	792981	15.20
Bulls	156614	3.43	134779	2.62	141065	2.70
Cows	381788	8.35	515964	10.04	651916	12.50
Indigenous	1463424	32.02	1545795	30.10	1476197	28.30
Bulls	772639	16.90	790356	15.39	742280	14.23
Cows	690785	15.11	755439	14.71	733917	14.07
Total cattle (C.B.+Ind.)	2001826	43.80	2196538	42.77	2269178	43.50
Buffaloes	652373	14.29	773229	15.05	761589	14.60
Male	43820	0.96	47140	0.92	58179	1.12
Female	608553	13.31	726089	14.14	703410	13.48
Sheep	908831	19.88	996027	19.39	901299	17.28
Goats	946529	20.71	1115587	21.72	1240836	23.79
Horses & Ponies	22026	0.48	17144	0.33	13155	0.25
Mules	24404	0.53	23938	0.47	18985	0.36
Donkeys	6639	0.15	8859	0.17	7376	0.14
Camels	168	0.004	137	0.003	56	0.001
Pigs	4670	0.10	2795	0.05	2493	0.05
Yaks	2548	0.06	1590	0.03	1705	0.03
Others	731	0.02	200	0.004	14	(Neg.)
Total livestock	4570745	100.00	5136044	100.00	5216686	100.00

District wise productive milch animals

According to the Census of 2007, the state had 3030767 milch animals. In the state, out of total milch animals, 74.87 percent were cattle and 25.13 percent were buffaloes (Table3.3). The proportion of crossbred and indigenous cows in cattle was 14.32 and 16.45 percent respectively. It may be seen from the table, that 10.43 percent cross bred cows were in milk as against only 0.96 percent indigenous cows. It is also indicated from the table that about 11 percent buffaloes were in milk. The proportion of indigenous cows was higher, 5.57 percent, among dry animals while 3.08 per cent crossbred cows and 3.75 percent buffaloes were dry. Livestock population in Himachal Pradesh increased with the rate of 1.41 percent per annum during 1997 to 2007(Table 3.1).

The perusal of table 3.3 indicates that out of total twelve districts, in nine districts, cattle population dominated. In three districts viz Bilaspur, Hamirpur and Solan buffaloes dominated with 65.37, 77.34 and 70.05 percent respectively. Table further indicates that in districts Hamirpur,

Kinnaur and Lahaul & Spiti the percentage of crossbred cows was higher than that of indigenous cows.

Census wise productive and unproductive milch animals

The percentage of cows in productive milch animals (cows and buffaloes) population during 1982 was about 62 per cent, which increased to 66 per cent in 2007(Table-3.4). The share of crossbred cows in total milch animals increased from 4.18 per cent in 1982 to 31 per cent in 2007. On the other hand indigenous cows decreased from 57.58 per cent in 1982 to 34.33 per cent in 2007. The share of buffaloes in total milch animals has decreased from 38 to 34 per cent over this period of 25 years. The population of productive milch animals shows an annual growth of 0.75 per cent during 1982-92, which decreased to (-)0.74 percent during 1992-97 and increased significantly to 3.47 percent during 1997-2003, which was significantly higher in cows than buffaloes and again decreased to 1.11 percent during 2003-2007. In case of cows, crossbred animals increased by 7.04 per cent annually during 2003-2007 while indigenous cows showed declining trend of (-) 0.77 percent during 1982-92 and thereafter increased annually by 2.72 percent during the years 1997-2003. During the period of 2003-2007 indigenous cows decreased at the rate of (-) 0.84 percent annually. The growth was higher in case of crossbred cows and buffaloes. It has been observed in the 2007 Livestock Census that 6.49 percent of the total milch animals were not calved. This population of unproductive milch animals is a bottleneck in the development of the dairy enterprises in the state.

Table- 3.2: District wise milch animals in H.P as per Census 2007.

(Number)

Particulars	Bilaspur	Chamba	Hamirpur	Kangra	Kinnaur	Kullu	Lahaul & Spiti	Mandi	Shimla	Sirmour	Solan	Una	Total State
C.B. Male	4064	8884	8873	31755	1719	13967	688	33018	16445	8722	7929	5001	141065
C.B.Female-In Milk	7725	12144	6142	67429	4122	38556	3164	78224	52221	15956	21436	8846	315965
Dry	2550	3666	1306	21070	1708	10732	731	25089	12373	6406	5278	2387	93296
Not calved once	691	936	295	5325	376	2124	86	7753	3533	1482	1703	633	24847
Total Female	10966	16746	7743	93824	6206	51412	3981	111066	68127	23844	28417	11866	434108
Total C.B. M+F (Including Y.S.)	19974	34260	19836	172920	11103	90260	6869	199752	118955	45378	49846	23828	792981
Indigenous- male	28232	129233	11467	128949	3186	45957	1880	155190	75008	97032	48908	17238	742280
Female-In milk	2110	55360	1128	30875	2786	27793	2010	51370	46335	46888	19988	4604	291247
Dry	1175	39034	377	20336	2064	12569	582	30964	23590	25541	10287	2165	168684
Not calved once	196	10023	92	2925	4132	3451	66	6177	4549	5300	1353	261	38525
Total female	3481	104417	1597	54136	8982	43813	2658	88511	74474	77729	31628	7030	498456
Total Ind. M+F (including Y.S.)	33030	282996	13549	207968	10990	110749	5645	286143	185611	217020	94298	28198	1476197
Total Cattle (C.B+Ind.)	53004	317256	33385	380888	22093	201009	12514	485895	304566	262398	144144	52026	2269178
Buffaloes: Male	8095	2830	5242	14154	25	67	0	5655	977	5289	5830	10015	58179
Female-In milk	42363	17003	58764	63234	56	348	0	41313	7406	18287	35993	49347	334114
Dry	14178	7199	13800	25595	20	196	0	11796	1855	9216	13472	16196	113523
Not calved once	3572	1465	3677	5339	0	8	0	2607	291	2080	2337	4368	25744
Total Buffaloes female	60113	25667	76241	94168	76	552	0	55716	9552	29583	51802	69911	473381
Total M+F (including Y.S.)	100069	39434	113921	156093	148	872	0	81643	13793	49829	84071	121716	761589
Total Milch Animals	153073	356690	147306	536981	22241	201881	12514	567538	318359	312227	228215	173742	3030767

Source: Directorate of Animal Husbandry H.P.

Table- 3. 3: District wise milch animals in H.P. as per Census 2007

(Percentages)

Particulars	Bilaspur	Chamba	Hamirpur	Kangra	Kinnaur	Kullu	Lahaul & Spiti	Mandi	Shimla	Sirmour	Solan	Una	Total State
Cattle Cross bred													
Male	2.65	2.49	6.02	5.91	7.73	6.92	5.50	5.82	5.16	2.79	3.47	2.87	4.65
Female in Milk	5.05	3.40	4.17	12.56	18.53	19.98	25.28	13.78	16.40	5.11	9.39	5.09	10.43
Dry	1.67	1.03	0.89	3.92	7.68	5.32	5.84	4.42	3.89	2.05	2.31	1.37	3.08
Not calved once	0.39	0.26	0.20	0.99	1.69	1.05	0.69	1.37	1.11	0.47	0.75	0.36	0.82
Total cows	7.16	4.69	5.25	17.47	27.90	25.47	31.81	19.57	21.40	7.64	12.45	6.83	14.32
Total C.B. (Including young stock	13.05	9.60	13.47	32.20	49.92	44.71	54.89	35.20	37.37	14.53	21.84	13.71	26.16
Indigenous male	18.44	36.23	7.78	24.01	14.32	22.76	15.02	27.34	23.56	31.08	21.43	9.92	24.49
Female-in-milk	1.38	15.52	0.77	5.75	12.53	13.77	16.06	9.05	14.55	15.02	8.76	2.65	0.96
Dry	0.77	10.94	0.25	3.87	9.28	6.23	4.65	5.46	7.41	8.18	4.51	1.25	5.57
Not calved once	0.13	2.81	0.06	0.54	1.86	1.71	0.53	1.09	1.43	1.70	0.59	0.15	1.27
Total female	2.27	29.27	1.08	10.08	40.38	21.70	21.24	15.60	23.39	24.90	13.86	4.05	16.45
Total indigenous (including Y.S.)	21.58	79.34	9.20	38.73	49.41	54.86	45.11	50.42	58.30	69.51	41.32	16.23	48.71
Total Cattle (C.B+Indigenous)	34.63	88.94	22.66	70.93	99.33	99.57	100.00	85.61	95.67	84.05	63.16	29.94	74.87
Buffaloes:													
Male	5.29	0.79	3.56	2.63	0.11	0.03	0	1.00	0.31	1.69	2.55	5.76	1.92
Female (In milk)	27.68	4.77	39.89	11.77	0.25	0.17	0	7.28	2.33	5.86	15.77	28.40	11.02
Dry	9.26	2.02	9.37	4.77	0.09	0.10	0	2.08	0.58	2.95	5.90	9.32	3.75
Not calved once	2.33	0.41	2.50	0.99	0	Neg.	0	0.46	0.09	0.67	1.02	2.51	0.85
Total Buffaloes female	39.27	7.20	51.75	17.54	0.34	0.27	0	9.82	3.00	9.47	22.70	40.24	15.62
Total (including Y.S.)	65.37	11.05	77.34	29.07	0.66	0.43	0	14.39	4.33	15.96	36.84	70.05	25.13
Total Milch Animals	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Directorate of Animal Husbandry H.P.

Table:- 3.4 Productive and unproductive milch animals in Himachal Pradesh

(Percentages)

Milch Animals	1982	1992	1997	2003	2007	Growth rate (% per year)			
						(1982-92)	(1992-97)	(1997-2003)	(2003-2007)
Cows	61.76	59.74	61.25	63.07	66.00	0.40	- 0.26	4.06	2.32
Cross Bred	4.18	10.32	22.05	25.33	31.08	16.55	21.14	6.45	7.04
In Milk	2.91	7.71	16.78	19.29	23.99	18.54	21.91	6.47	7.47
Dry	1.27	2.61	5.27	6.04	7.08	12.02	18.84	6.40	5.64
Indigenous	57.58	49.42	39.20	37.74	34.93	- 0.77	- 4.73	2.72	- 0.84
In Milk	30.60	27.79	27.66	22.05	22.12	- 0.23	- 0.83	- 0.62	1.2
Dry	26.98	21.63	11.54	15.69	12.81	- 1.38	- 9.73	10.72	- 3.69
Buffaloes	38.24	40.26	38.74	36.93	33.99	1.32	- 1.47	2.52	- 0.96
In Milk	21.89	27.67	28.96	26.91	25.37	3.59	0.16	2.84	- 0.39
Dry	16.35	12.59	9.78	10.01	8.62	- 1.72	- 5.04	3.94	- 2.52
Milch animals In Milk	55.40	63.16	73.41	68.25	71.48	2.26	2.38	2.05	2.35
Dry	44.60	36.84	26.59	31.75	28.52	- 1.12	- 6.10	7.37	- 1.55
Total Milch Animals	100.00 (10,08,168)	100.00 (10,84,063)	100.00 (10,43,692)	100.00 (12,60,738)	100.00 (13,16,829)	0.75	- 0.74	3.47	1.11
Milch animals not calved even once									
Cows (CB)	5.73	9.63	18.98	23.97	29.09	8.38	- 1.71	19.85	4.84
Cows (Ind.)	65.82	61.06	51.21	39.06	40.76	0.14	- 12.22	5.39	0.66
Buffaloes	28.45	29.31	29.81	36.96	30.15	1.26	- 10.56	19.20	- 4.94
Total	100.00 (98,614)	100.00 (1,07,812)	100.00 (50,028)	100.00 (86,811)	100.00 (85397)	0.93	- 10.72	12.25	- 0.41
Total Livestock Population (Million)	4.99	5.09	4.58	5.14	5.22	0.20	-1.0	1.22	0.16

Note: Figures in parentheses are the total number.

Source: Directorate of Land Records, Himachal Pradesh, Shimla.

Milch animals in lactation

It may be seen from the Table-3.5 that the percentage of the crossbred cows in lactation according to Census of 2007 was about 77 per cent as against of about 63 per cent in case of indigenous cows. This clearly indicates the added benefit of rearing the crossbred cows. The percentage of buffaloes in lactation was about 75 percent.

Table -3.5: Milch animals in lactation as per Livestock Census of 2007

(%)

Season	Cows		Buffaloes
	Cross-bred	Indigenous	
Summer	78.93	58.34	74.71
Rainy	86.66	67.92	78.52
Winter	66.41	63.98	70.83
Overall	77.20	63.32	74.64

Source: Directorate of Animal Husbandry, Himachal Pradesh, Shimla.

Average daily milk yield

The average daily milk yield of crossbred cows during whole lactation period is 4.61 litres, which is 67 per cent higher than the indigenous cows' yield of 1.5 litres. Yield of buffalo was 3.27 litres per day during 2012-13 (Table-3.6).

Table-3.6: Average daily milk yield (2012-13)

(Litres/Day)

Particulars	Cows			Buffalo
	Cross-Bred	Indigenous	Difference (%)	
In Milk	4.61	1.50	67	3.27
Milch	3.55	0.94	74	2.44

Note: In milk are the cows currently in lactation and milch animals are total number of cows**.**
Source: Directorate of Animal Husbandry, Himachal Pradesh, Shimla.

Annual milk production

The annual milk production in H.P. is continuously rising mainly because of rise in the number of milch animals and to some extent due to increase in productivity. The positive change in composition of milch animals towards cross bred/improved breeds is also a contributing factor. The gross milk production in the state increased from 869.510 thousand tonnes during 2004-05 to 1138.612 thousand tonnes during 2012-13 (Table-3.7).

Share of dairy species in total milk production

It is clear from the table 3.8 that the share of crossbred cows in milk production increased continuously and the shares of both indigenous cows and buffaloes were decreasing during the period of 2004 to 2012-13. The average daily milk yield of crossbred cow during whole lactation period was 4.61litres, which was 67 per cent higher than the indigenous cow's yield of 1.5 litres. Yield of buffalo was 3.27 litres per day in the state.

The gross milk production in the state increased from 869.510 thousand tonnes during 2004-05 to 1138.612 thousand tonnes during 2012-13. Cows and buffaloes were the main milch animals contributing about 96 percent in total milk production. The contribution is of buffaloes milk in total milk production declined from 39 per cent during 2004-05 to 35 per cent during 2012-13 (Table-3.8). On the other hand the share of cows increased from 57.50 per cent to 60.68 per cent during this period. The main reason for the opposite trends has been the rise in number of crossbred cows having higher milk yields. But this practice is not so prevalent in case of buffaloes. It may be mentioned here that goats are reared mainly for mutton and milk is used only for home consumption.

Per capita milk availability

Although the per capita milk availability in the state has risen from 0.392 litres per day to 0.455 litres per day during 2004-05 to 2012-13 (Table-3.8), it still remains very low as compared with many other neighbouring states like Punjab, Haryana etc. but higher than the national average of about 0.290 litres.

Table- 3.7: Average daily milk yield per animal and total milk production

	Daily milk yield (in gms.)			Total milk production (In '000 tonnes)					
Year	Cow	Buffalo	Goat	Cow			Buffalo	Goat	Total
				Cross bred	Indigen -ous	Total			
2004-05	2527	2695	440	277.900	222.093	499.993	339.461	30.056	869.510
2005-06	2536	2746	499	295.572	210.021	505.593	335.065	28.356	869.014
2006-07	2509	2719	532	280.107	219.898	500.005	345.186	27.204	872.395
2007-08	2672	2704	548	333.359	173.974	507.333	337.378	28.755	873.466
2008-09	2837	2649	527	367.266	161.095	528.361	327.511	28.128	884.000
2009-10	2828	3334	450	362.534	150.070	512.604	300.307	23.043	835.954
2010-11	3095	3554	488	399.875	142.225	542.100	340.448	24.452	907.000
2011-12	3261	3423	504	524.569	155.402	679.971	389.968	49.927	1119.866
2012-13	3263	3563	501	531.533	159.433	690.966	398.806	48.840	1138.612

Table-3.8: Per capita milk available and percentage share of different animals in total milk production

Year	Daily Per capita milk Available (In Ltrs.)	Percentage Share of different Animals in total milk production					
		Cow (C.B.)	Cow (Local)	Total	Buffalo	Goat	Total (In '000 Tonnes)
2004-05	0.392	31.96	25.54	57.50	39.04	3.46	869.510(100.00)
2005-06	0.392	34.01	24.17	58.18	38.56	3.26	869.014(100.00)
2006-07	0.393	32.10	25.21	57.31	39.57	3.12	872.395(100.00)
2007-08	0.394	38.17	19.92	58.08	38.63	3.29	873.466 100.00)
2008-09	0.398	41.54	18.22	59.77	37.05	3.18	884.000(100.00)
2009-10	0.377	43.37	17.95	61.32	35.92	2.76	835.954(100.00)
2010-11	0.409	44.09	15.68	59.77	37.53	2.69	907.000(100.00)
2011-12	0.447	46.84	13.88	60.72	34.82	4.46	1119.866(100.00)
2012-13	0.455	46.68	14.00	60.68	35.03	4.29	1138.612(100.00)

Source: Directorate of Animal Husbandry, Himachal Pradesh, Shimla.

Utilisation pattern and marketed surplus of milk

The study of utilisation pattern of milk reveals that at overall level 79.83 per cent of cows' milk is marketed; this percentage for buffaloes is 76.47 (Table-3.9). About 17 per cent of cows' milk and 18 per cent of buffaloes' milk is consumed within the households. The rest of the milk is converted into cheese, curd, butter, clarified butter and khoya. The seasonal variations in each of the above heads have also been presented in this table. The high proportion of milk sold indicates the adequate marketing facilities prevailing in the state.

Table-3.9: Utilisation pattern of milk produced in H.P. (2011-12)

(%)

Season	Cow Milk			Buffalo Milk		
	Sold	Consumed	Converted	Sold	Consumed	Converted
Summer	79.88	16.39	3.73	75.20	19.10	5.70
Rainy	80.45	16.04	3.51	79.50	15.77	4.70
Winter	68.75	26.86	4.39	75.30	14.90	9.80
Overall	79.83	16.29	3.88	76.47	17.64	5.89

Source: Directorate of animal Husbandry, Himachal Pradesh, Shimla.

Dairy production systems

The socio-economic features of dairy farmers interviewed are summarised in Table-3.10. The farm size varies from 0.15 hectare to 1.57 hectares. Family size ranges between 4.00 to 5.75 persons per family.

Table- 3. 10: Socio-economic profile of sampled dairy farmers under different marketing systems

Particulars	Milkfed	Pvt. Dairy	Through Trader	Direct sale	Self Processing
No. Of Household	35	35	30	40	10
Family size	4	5.75	5.7	4.71	4.5
Literacy of head (%)	100	75	100	76	25
Holding Size(Ha.)	0.72	1.30	0.93	1.57	0.15
Cultivated land	0.32	0.88	0.48	0.74	0.15
Grass Land	0.40	0.42	0.45	0.87	0.00
Cropping pattern (%)					
Cereals	50	84	0.48	34.49	100
Pulses	12.50	0.00	0.00	1.30	0.00
Oilseeds	0.00	0.00	0.00	0.00	0.00
Vegetables	0.00	0.00	0.00	18.16	0.00
Fruits	37.50	14.00	0.00	32.43	0.00
Fodder Crops	0.00	2.00	0.00	13.62	0.00

Source: Own Survey

There is prevalence of cross-bred cows among the dairy farmers under different marketing systems. The farmers prefer to rear improved/ crossbreed animals on their farms because of milk yields. The farmers preferred to rear crossbreed cows beside of Jersey and Holstein cows. It is observed that the local cows were not reared for commercial purpose (Table 3.11). The buffaloes were observed only under private dairies and self processing marketing systems. The numbers of adult milch animals per farm varied between 0.5 and 3.24.

Table-3. 11: Per farm number of dairy animals under different systems

Milch Animals	Milkfed	Pvt. Dairy	Through Trader	Direct sale	Self Processing
Cows-Local	0	0	0	0	0
Young stock	0	0	0	0	0
Cows-X Bred	1	0.63	1.33	0.77	0
Young stock	0	0.25	1.33	0.24	0
Jersey	0	0.50	0	1.88	0
Young stock	0	0.25	0	0.29	0
Holstein	0	0.93	0	0.59	0
Young stock	0	0.50	0	0.47	0
Buffaloes	0	0.19	0	0	0.50
Young stock	0	0	0	0	0
Total					
Milch	1	2.25	1.33	3.24	0.50
Young stock	0	0.75	1.33	1.00	0

The X-bred cows are either purchased from neighbouring states of Punjab and Haryana or are the result of artificial insemination (AI). Some proportions of these are also the result of natural breeding and some are purchased from the local sources. The buffaloes are seen under two marketing systems involving private Dairies and self processing. Buffaloes dominate in self processing system on the sampled farms. Total numbers of dairy animals were highest under the marketing systems involving direct sale (4.27), private dairy (3.25) and through traders (2.66), (Table-3.12).

Table- 3.12: Livestock composition on sampled farms

(Number/Farm)

Livestock	Milkfed	Pvt. Dairy	Through Trader	Direct sale	Self Processing
Cows-Local	0	0	0	0	0
In Milk	0	0	0	0	0
Dry	0	0	0	0	0
Preg. Heifer	0	0	0	0	0
Calves	0	0	0	0	0
Heifer	0	0	0	0	0
C.B. Cows	1.00	0.63	1.33	0.77	0
In Milk	1.00	0.50	1.33	0.65	0
Dry	0	0.13	0	0.12	0
Preg. Heifer	0	0	0	0	0
Calves	0	0	0.33	0	0
Heifer	0	0.25	1.00	0	0
Jersey	0	0.50	0	1.88	0
In Milk	0	0.50	0	1.53	0
Dry	0	0	0	0.35	0
Preg. Heifer	0	0	0	0	0
Calves	0	0	0	0	0
Heifer	0	0.25	0	0.24	0
Holstein	0	0.93	0	0.59	0
In Milk	0	0.93	0	0.53	0
Dry	0	0	0	0.06	0
Preg. Heifer	0	0	0	0.24	0
Calves	0	0	0	0	0
Heifer	0	0.50	0	0.24	0
Buffaloes	0	0.19	0	0.18	0.50
In Milk	0	0.19	0	0.18	0.50
Dry	0	0	0	0	0
Preg. Heifer	0	0	0	0	0
Calves	0	0	0	0	0
Heifer	0	0	0	0	0
Others	0	0	0	0	0
Total	1.00	3.25	2.66	4.27	0.50

Production of milk on dairy farms

The quantity of milk produced and its disposal in different marketing situations are analysed and the results are presented in table-3.13. The analysis indicates that direct sale of milk to the consumers and milk processing is the best scenario. Under these situations, the total milk production and consumption as well as sale are the highest ensuring high nutritional intake of family members and cash earning. However, these situations cannot be replicated in all areas due to their location vis-à-vis consumption centres, low production level etc. Under such a situation cooperative marketing or marketing through traders are the alternatives. Under both situations the total production and sale of milk are lower indicating the not so good financial status and nutritional intake of families.

Table-3.13: Per farm per day production and utilisation of milk

(Milk in Litres, Value in Rs.)

Particulars	Milkfed	Pvt. Dairy	Through Trader	Direct sale	Self Processing (Paneer)
Total Milk Production	5.67	20.28	11.76	25.20	2.54
Summer	5.00	18.80	10.66	23.88	2.30
Rainy	6.50	22.03	13.67	26.53	2.87
Winter	5.50	19.91	10.94	25.20	2.44
Consumed by Family	1.50	2.57	2.38	4.21	0
Summer	1.50	2.50	2.30	4.00	0
Rainy	1.50	2.41	2.33	4.12	0
Winter	1.50	2.80	2.50	4.50	0
Sold	4.17	17.71	9.38	20.99	2.54
Summer	3.50	16.30	8.36	22.53	2.30
Rainy	5.00	19.59	11.33	22.41	2.87
Winter	4.00	17.11	8.44	21.08	2.44
Value of Milk	62.5(15)	366.24(20.68)	187.60(20)	615.43(29.32)	457.2(180)
Summer	52.5(15)	337.08(20.68)	167.20(20)	660.58(29.32)	414.00(180)
Rainy	75(15)	405.20(20.68)	226.67(20)	657.11929.32)	517.00(180)
Winter	60(15)	353.83(20.68)	168.80(20)	618.07929.320	439(180)

* Farm Gate Price.

Production traits

The production traits of dairy animals are closely inter-woven with the success of dairy enterprise. Therefore, the production traits such as age at first calving, lactation length, dry period, intercalving period, average lactation yield and average daily milk yield per milch animal of different

breeds have been studied in the selected milk shed area. Besides this, some ancillary parameters viz. breed wise number of in-milk/milch animals, conception rate, which have a crucial role in the economics of milk production, have also been worked out.

Age at first calving: Delayed maturity of the animals is one of the major factors responsible for the uneconomic nature of dairying. Earlier an animal attains the age of maturity and calves; the repayment for unproductive period form date of birth to the age at first calving, begins. The production traits of cows and buffaloes reared in low land and high land areas in milkshed area of Himachal Pradesh have been presented in Tables-3.14 and 3.15. The cross-bred, Jersey and Holstein heifers have their first calving much earlier i.e. by 13th month as compared to local cow heifers. The age of first calving, on an average, of a crossbred heifer varied from 36 months to 45 months whereas for local cow heifer the period was 54 to 59 months. The age at first calving amongst the Murrah graded and a non-descript buffalo was almost the same i.e. from 54 to 60 months. Among the cattle and buffaloes, the lowest age at first calving of cross-bred heifer indicates that cross-bred cows are most economical as compared to local cows and even buffaloes.

Lactation length, dry period and calving internal: Longer the dry period smaller the advantage to a breeder pursuing dairy farming, because the dry animal is to be fed and maintained during this unproductive period. On the contrary, a lower calving interval is considered more profitable. The calving interval of crossbred cow was estimated to be 360-450 days, of which for 336-360 days it remained in milk and rest of was dry period. It is observed that crossbred cow has the longest lactation period, shortest dry period, as well as short inter calving period and lowest age at first calving as compared to local cow.

The inter calving period of Murrah graded as well as non-descript buffaloes was 450-480 days and 480 to 600 days respectively, which are very high as compared to cows. Similarly 120-150 days dry period in Murrah graded and 150-210 days in non-descript buffaloes are estimated. The results show that there is great variation among these traits of the Murrah graded and non-descript buffaloes.

Milk yield: The milk yield in crossbred cow, Jersey and Holstein cows was 8-15 litres per day which was much higher than that of local cow yield of 0.5-2 litres per day. In case of buffalo, the milk yield was 6.5 litres/day. The milk yield in non-descript was 4.67 litres/day (Table 3.15).

Table- 3.14: Productive performance indicators of cows in H.P.

Indicators	Unit	X-Bred		Jersey		Holstein	
		Recommended	Actual	Recommended	Actual	Recommended	Actual
Puberty Age	Months	30	16-48		20-36		13-36
No. of Lactation	No.	6	6-10		7-12		5
Heat Period	Days	75-90	90-180		30-90		45-90
Conception Rate	%	65-70	70-100		80-95		85-100
Calving Interval	Days	375-390	360-450		300-360		315-360
Lactation Period	Days	255-265	336-360		270-285		300-315
Dry Period	Days	120-125	24-90		30-75		15-45
Milk Yield	Ltrs./Day	8	8.44		10.97		15.43

Table-3.15: Productive performance indicators of buffaloes in H.P.

Indicators	Unit	Graded		Hill (Local)	
		Recommended	Actual	Recommended	Actual
Puberty Age	Months	36	48-60	N.A.	55-65
No. of Lactations	No.	10	3	N.A.	3
Heat Period	Days	100-110	150-180	N.A.	180-300
Conception Rate	%	55-65	80-90	N.A.	80-95
Calving Interval	Days	430-440	450-480	N.A.	480-600
Lactation Period	Days	290-310	330-390	N.A.	330-440
Dry Period	Days	120-150	120-150	N.A.	150-210
Milk Yield	Ltrs./Day	7	6.5	N.A.	4.67

Breeding management

The breeding management was observed to differ at different locations under study. At villages located around Tara Devi A.I. is done to the tune of 100 per cent. The farmers were observed to increase the Jersey inheritance up to 67 per cent. The facility of A.I. is freely available at their doorstep at a very nominal rate of Rs.25 per A.I. Still a few farmers complained that sometimes the desired semen is not available and they have to wait for a few days for A.I. On the other hand, in other areas under study, where buffaloes are mainly reared, the breeding management is not so good. These areas are not very conveniently located and the facility of A.I. is not available at doorstep. There is a provision of buffalo bull for natural service.

Feeding management

In Himachal Pradesh, dairying is practised generally within the framework of mixed farming. Agriculture cannot provide sufficient food even to its human population, and the livestock population also compete with them for the limited land resources. In this competition food production always gets preference neglecting the equally important segment of fodder production. Therefore, dairy animals mostly depend on grass and grazing dairy animals include (I) farmers own land, (ii) village common range or grazing land, and (iii) government owned land including areas held by the forest department. The small land owned by farmers present the most difficult problem as they are in constant use for crop production, which is given priority over fodder production.

Owned land and forests are the main sources of fodder, both fulfilling 77 per cent and 14 per cent of the average fodder demand respectively (Table-3.16). The common land resources and market were other sources of fodder. From each of these two percent and seven percent of average demand was satisfied.

Table- 3.16: Sources of fodder fed to milch animal

(%)

Owned land	Common land	Forest	Market	Total
77	2	14	7	100.00

Dairy cattle are grazed and stall fed and the extent of stall-feeding is dependent on the breed, age and lactation stage of animals. Maximum grazing is observed in dry and adult female not calved even once (85 per cent). About 75 percent dairy cattle are both grazed and stall-fed while only 25 per cent are stall-fed only. There is no dairy animal, which depends on grazing alone. Grazing among buffaloes is practised very rarely due to hilly strips and heavy body weight of the buffaloes. Moreover the buffalo are still better cared for as compared to cattle.

There is a vast deference in feeding practices between the cow and buffalo and within cows, between the breeds. The crossbred animals are being given more feed. It is observed that among the young stock of cattle the female calves of crossbred and male calves of graded cows are better fed than other categories. This trend is obviously because of the fact that whereas female cross-bred (cross with jersey and Holstein) are maintained for replacement of milch stock, the graded male cow calves (Mostly Haryana graded) are preferred for draught power. Among the young stock of buffaloes the Murrah graded are better fed than the non-descript buffaloes. In the age group of 6-12 months the more quantity of roughage is given to male calves than female as the female are also fed milk in this age group. The calves of Murrah graded are better fed than non-descript buffalo calves.

The green fodder includes local grass, biul, kachnar, ban, barseem, oat, cow pea and leaves of other fodder trees and weeds in crops. Local green grasses available during rainy season only. Green tree leaves are fed during winter and summer season. The cultivated fodder is becoming popular in the milkshed area.

Hay (dry local grass), throughout the year except rainy season and wheat bran constitutes major proportions of the concentrates fed to milch animals. Crossbred cows are fed more concentrate than graded and non-descript cows. Cottonseed and gram are fed to animals in milk only. Oil cakes are not popular in the area except for buffalo feeding. The production of cattle feed in the state is very low (Table-3.17). The production of cattle feed was 16860 tonnes in the year of 2013-14. The quality of cattle feed available in the market is poor and prices are high. As a result the use of cattle feed is very low and consequences are poor milk yield and animal health.

Table-3.17: Annual cattle feed production in Himachal Pradesh

Location of the plant	Annual Quantity of Cattle feed processed (Tonnes)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Parwanoo	425.05	404.78	420.01	467.82	573.08
Jachh	8001.4	13653.50	9977.38	3165.40	16287.40
Total	8426.45	14058.28	10397.39	3633.22	16860.48

Source: H.P. Agro-Industries Corporation Ltd., Shimla

Animal health management

The diseases like foot and mouth disease, milk fever, indigestion, skin diseases, problems in teat and udder, cyst formation in ovary, retention of placenta are the common diseases found in the study area. It was also reported that when the jersey strain in the crossbred cows exceeds 50 per cent, the quantity of milk in the udder becomes in excess and when it is milked the animals become deficient in calcium. This causes fever in the cows. The cyst formation in the ovary was also reported to be the problem of jersey strain in excess of 50 percent in crossbred cows.

Most of these diseases are treated in consultation with the veterinary doctors. Some of the diseases like indigestion are treated at farm itself by using the traditional method. One of the small dairy holders, an ex-service man was found to be treating his crossbred cow by feeding her alcohol in the form of rum. Majority of the farmers reported that the desired medicines were always in short supply with the Department of Animal Husbandry and were also not available in the open market which in any case was not easily approachable. This forced them to employ the traditional methods, which don't offer good results with the crossbred cows.

Credit and Incentives

The status of resources at the command of small dairy holders makes the provision of credit for purchase of milch animals and bulls for breed development, a basic necessity. This provision has been created with commercial banks. The loan is also available under Rural Development Programme, but this loan is also arranged by authorities from the commercial banks. The National Bank for Agriculture and Rural Development (NABARD) has a special scheme for dairy development, which is also in operation in the state. Under the scheme the NABARD refinances the commercial banks, the amount disbursed for the purpose. On the other hand credit requirement for this purpose has been taken care of by various externally funded programmes like National Watershed Development Project for Rainfed Areas (NWDPRA), Integrated Watershed Development Project for Hills (IWDP), funded by World Bank, Indo-German Changer Project (IGCP) funded by GTZ etc. However, these programmes/projects cater to the needs of only those farmers who are located in their area of operation. No such provision has been created by Dairy Co-operative Societies (DCS). In addition to the facility of loan, there is also a provision of subsidy on the loan amount. The extent of subsidy varies as per socio-economic status of the beneficiary.

Economics of milk production

The cost of production of milk per litre is worked out by dividing net maintenance cost (Total maintenance cost minus value of dung produced) by the milk yield per milch animal. It was estimated to be Rs 13.33 for cross bred cow, Rs.11.34 for Jersey, Rs.10.94 for Holstein cows whereas average price per litre of milk was Rs 20. The net gain per litre of milk of X- bred cow, Jersey and Holstein produced thus came out to be Rs. 6.67, Rs. 8.66 and Rs. 9.06 respectively. The average price of milk per litre was taken similar to X- bred cow. Consequently, the gain per day was estimated to be Rs.57.63, Rs. 93.87 and Rs.139.80 for cross bred, Jersey and Holstein cows respectively. Cost of production of milk of buffalo was relatively higher than that of improved cows and it was Rs. 17.13 and Rs. 21.02 for graded and local respectively. Due to Higher percentage of fat in buffalo milk, the prices were also higher than that of cows. On an average, price was Rs. 25 per litre. Net gain per litre of milk was higher than local cow but lesser than X-bred i.e. Rs. 7.87 and Rs. 3.98 for graded and local buffalo respectively. The per day gain was Rs. 55.19 and Rs. 18.58 respectively which was also higher than the local cows but lower than the improved cows (Table-3.18 and 3.19). It may be concluded from the analysis that cost of production of buffalo milk is higher than cows and returns per litre and per day are lesser than that of X- bred cow and Higher than the local cow. Hence, X- bred cow is more profitable than buffalo and local cow.

The cost of production of milk on paid out cost was also estimated and the cost was Rs 4.29, 4.03 and 3.98 per litre in case of X-bred cow, Jersey, Holstein , Rs 4.16 and 4.70 per litre in case of graded and local buffaloes. (Table-3.18). The net gain per litre of milk produced was higher in case of buffalo but per day net gain was higher in case of cows.

The operational cost was also estimated for different animals and presented in Table 3.20. Per litre of milk cost was Rs.1.54, 1.02, and Rs. 0.71 for cross bred, Jersey and Holstein cow respectively. This figure was Rs. 2.63 and Rs.4.50 for graded and local buffaloes respectively. Net gain per litre was estimated to be Rs.18.46, Rs.18.98 and Rs.19.29 for cross bred, Jersey and Holstein cows respectively. For graded and local buffalo, it was estimated Rs.22.37 and Rs.20.50 respectively. Consequently net gains per day per animal were Rs.159.49, Rs. 207.64 and Rs. 297.64 for cross bred, Jersey and Holstein cow respectively. The net gain per day per buffalo was Rs.145.41 and Rs.92.25 for graded and local respectively.

Table-3.18: Per day maintenance cost of milch animal

(Rs./Animal)

Particulars	Cows			Buffalo	
	Cross bred	Jersey	Holstein	Graded	Local
A**. Variable cost**					
I. Green fodder	20.00	19.00	24.00	24.00	25.00
Airdrie fodder	21.25	25.62	27.25	22.50	20.00
III.Concentrates	30.77	36.89	49.64	22.36	18.36
IV.Manual Labour	42.00	43.00	55.00	38.00	29.00
V.Veterinary Expenses	4.30	4.10	8.20	3.70	2.70
VI.Miscellaneous Exp.	2.00	3.25	3.50	1.00	0.90
Sub-Total	120.32	131.86	167.59	111.56	95.96
B**. Fixed Cost**					
I.**Interest on the value of**					
I.Milch Animal	6.00	8.00	15.00	9.00	8.00
II.Cattle Shed	1.31	2.29	2.32	0.78	0.94
III.Equipment	0.10	0.25	0.32	0.10	0.17
Sub-Total	7.41	10.54	17.62	9.88	9.11
II. Depreciation On					
I.Milch Animal	6.00	8.00	15.00	9.00	8.00
II.Cattle Shed	1.31	2.29	2.32	0.78	0.94
III.Equipment	0.10	0.25	0.32	0.10	0.17
Sub-Total	7.41	10.54	17.62	9.88	9.11
Total Maintenance Cost(A+B)	135.14	152.94	202.83	131.32	114.18
Value of Dung	20.00	30.00	34.00	20.00	16.00
Net Cost	114.14	122.94	168.83	107.32	98.18
Milk Yield/Day(Litre)	8.64	10.97	15.43	6.50	4.67
Cost/Litre (Rs.)	13.33	11.34	10.94	17.13	21.02

Table-3.19: Economics of milk production

(Rs./Day/Animal)

Particulars	Cows			Buffalo	
	Cross bred	Jersey	Holstein	Graded	Local
Maintenance Cost	135.14	152.94	202.83	131.32	114.18
Value of Dung	20.00	30.00	34.00	20.00	16.00
Net Maintenance cost	115.14	122.94	168.83	111.32	98.18
Milk Yield (Litres)	8.64	10.97	15.43	6.50	4.67
Cost/Litre Milk (Rs)	13.33	11.24	10.94	17.13	21.02
Price of Milk Per Litre (Rs)	20.00	20.00	20.00	25.00	25.00
Gain Per Litres (Rs)	6.67	8.66	9.06	7.87	3.98
Gains/Day (Rs)	57.63	93.87	139.80	55.19	18.58

Table-3.20: Operational cost in milk production

(Rs./Litre)

Particulars	Cows			Buffalo	
	Cross bred	Jersey	Holstein	Graded	Local
Fodder	4.77	4.07	3.32	7.18	9.64
Concentrate	3.56	3.36	3.22	3.44	3.93
Veterinary Expenses	0.50	0.37	0.53	0.60	0.58
Miscellaneous	0.23	0.30	0.23	0.15	0.19
Total Cost	15.64	13.94	13.14	20.20	24.45
Value of Dung	2.31	2.74	2.20	3.08	3.43
Net Cost	13.32	11.20	10.94	17.12	21.02
Yield	8.64	10.94	15.43	6.50	4.67
Cost/Lit	1.54	1.02	0.71	2.63	4.50
Net Gain/Lit	18.46	18.98	19.29	22.37	20.50
Net Gain/Day	159.49	207.64	297.64	145.41	92.25

Chapter-4

MARKETING AND CONSUMPTION OF DAIRY PRODUCTS

This chapter describes projection of demand for milk, trends in marketing of milk through different channels, role of Himachal Pradesh Milk Federation (milkfed) in marketing and processing of milk in the state. The supplies of milk from outside agencies to the urban centres have been discussed in this chapter.

Projections of demand and supply of milk: The supply of milk in Himachal Pradesh largely comes from the milk produced within the state. Some of it has to be supplied to National Milk Grid (NMG), 4958 thousand litres during 2013-14 as some portion of milk cannot be marketed, as it does not meet the standards as laid down by Prevention of Food Adulteration Act (PFAA). On the other hand, the standardised and pasteurised milk in polypacks finds its way to the state from neighbouring states of Punjab and Haryana. The projections of demand and supply of milk have been based on the expected increase in population calculated on the basis of decennial growth rate in this respect and the growth rates of demand and supply calculated on the basis of last 9 years. The projections have been made year-wise from the year 2010-11 to 2029-30 on the basis of annual compound growth rate of demand for milk during the period of last 9 years. Human population has been anticipated to increase from about 68 million during 2010-11 to about 100 million during 2029-2030 (Table-4.1). Milk production during this period increased from 907 million litres to 1181 million litres per annum. This calculation is based on the annual compound growth rate (CGR) of 0.22 per cent. Thus, whereas the population is likely to increase by 31 per cent the milk production will be 23 per cent lesser during this period indicating lesser per capita availability in future as compared to present.

On the demand side, two types of demands have been considered, the nutritional demand and economic demand. The nutritional demand has been calculated on the basis of minimum consumption of 250 grams of milk per day per capita based on the recommendations of Indian Council of Medical Research (ICMR). On this basis the demand for milk was 907million litres during 2010-11 and hence a surplus of about 280 million litres was observed. The nutritional demand for milk is likely to increase to 1181 million litres during 2029-30 indicating surplus milk to the tune of 269 million litres per year.

The economic demand based on the factors listed above was observed to be higher than the nutritional demand indicating higher per capita intake of milk as compared with ICMR recommendations. The future demand of milk has been based on the current increase in State Domestic Products (SDP) of 8.8 Percent per annum during 2004-05 to 2012-13 and income elasticity of demand for milk at 0.69 percent. The income elasticity has been worked out on the

basis of quick survey based on 90 urban and rural households of the state. It was observed that on the basis of economic demand of 935 million litres during 2010-11, which is likely to increase to 2623 million litres during 2029-2030. This clearly indicates that the domestic supply will not be able to keep pace with requirements and the gap between demand and supply would continuously widen from 28 million litres to 1441 million litres during projection period. This deficit in supply of milk is likely to be met by importing milk from neighbouring states, the current imports being 28.70 million litres per annum.

This scenario makes apparent that the state would remain a milk deficient state in near future. The growing percentage of deficit in future puts the state in very difficult position. There is every likelihood that import from other states would increase. The problem is likely to be further compounded by quality aspect of milk. The poor availability of fodder in many areas, decreased milch animal population and predominance of local breeds, results poor milk(in both quality and quantity) which is low in fat percentage (2-3%) and hence cannot be marketed as per provisions of PFAA which makes 4.5% fat and 8.5% SNF a minimum requirement. The commercialization of agriculture towards vegetable and fruit crops reduced the availability of crop by-products to animals. Moreover, average land holding in the state is decreasing due to increase in human population resultantly decrease in livestock holding. The dairy development programmes in future should therefore, concentrate on improvement of milk quality as well as its quantity.

Table- 4.1: Projections of milk production, nutritional requirement and economic demand for milk in Himachal Pradesh

Year	Projected population*	Milk production**	Nutritional requirement***	Economic demand****	Surplus/deficit	
					Nutritional	Economic
2010-11	6864602	907.00	626.395	935.7	280.605	-28.7
2011-12	7001894	1119.866	638.923	987.867	480.943	131.999
2012-13	7141931	1138.612	651.701	1042.94	486.911	95.672
2013-14	7284770	1141.117	664.735	1101.088	476.382	40.029
2014-15	7430465	1143.627	678.030	1162.478	465.597	-18.851
2015-16	7579074	1146.142	691.590	1227.287	454.552	-81.145
2016-17	7730655	1148.663	705.422	1295.710	443.241	-147.047
2017-18	7885268	1151.190	719.531	1367.949	431.659	-216.759
2018-19	8042973	1153.722	733.921	1444.215	419.801	-290.493
2019-20	8203832	1156.260	748.600	1524.733	407.66	-368.473
2020-21	8367909	1158.803	763.571	1609.740	395.232	-450.937
2021-22	8535267	1161.352	778.843	1699.486	382.509	-538.134
2022-23	8705972	1163.906	794.420	1794.236	369.486	-630.33
2023-24	8880091	1166.466	810.308	1894.268	356.158	-727.802
2024-25	9057693	1169.032	826.514	1999.877	342.518	-830.845
2025-26	9238847	1171.603	843.045	2111.375	328.558	-939.772
2026-27	9423624	1174.180	859.905	2229.088	314.275	-1054.91
2027-28	9612096	1176.763	877.104	2353.364	299.659	-1176.6
2028-29	9804338	1179.351	894.646	2484.568	284.705	-1305.22
2029-30	10000424	1181.945	912.539	2623.088	269.406	-1441.14

**On the basis of annual population growth 2%; **Based on ACGR 0.22 %; ***Based on per capita per day minimum requirement of 250 gms of milk as recommended by Nutritional Advisory Committee of ICMR, New Delhi*

*****Based on annual growth in State Domestic Product (SDP) 8.08% & Income elasticity of demand for milk 0.69*

Milk Supply in the state through formal channels

There are two separate scenarios of formal milk marketing in the state. The milk produced within the state is processed by both milkfed and private dairies, which was about 57 percent of the formal demand during 2013-14. Milkfed procured 39 percent milk in the state, of which about 20 per cent (4958460 litres) was supplied to National Milk Grid (NMG). As such the H.P. milkfed meets out about 19 percent of total demand being fulfilled through formal channels and private dairies meet out about 18.34 percent demand of the state. Rest of the milk (i.e. 43 %) finds its way from Punjab and Haryana. The milk federation/Unions of Punjab accounts for about 13 per cent and Haryana about 6 per cent of total milk marketed. The rest of milk (about 24%) is being supplied through private dairies, milk brand 'Super' being most prominent among them. Thus, the total milk marketed in the state through formal channels, about 43 per cent is supplied by neighbouring states of Punjab and Haryana (Table-4.2).

The milk supplied by outside agencies makes a difference of only 2.52 per cent in per capita milk availability (Table-4.3). In absolute terms it increased from 455 ml per day to 466 ml per day.

Table-4.2: Milk marketing through formal channels in Himachal Pradesh (2013-14).

Particulars	Qty In 000 MT	% Of Total
Procured By H.P. Milkfed	25.95	38.77
Private Dairies within H. P.	12.27	18.34
- Mount Kailash	4.9	7.32
-Kamdhenu	3.2	4.78
-Jagriti Manch	0.73	1.09
-Loose Milk	3.44	5.14
Sub-Total	**38.22**	**57.11**
Milk supplied by outside agencies		
-Punjab Milkfed/ Unions	8.62	12.88
-Haryana Milkfed/ Unions	4.18	6.25
Sub-Total	**12.80**	**19.13**
Private dairies out of H.P.		
- Super Milk	12.40	18.53
-Relaince	2.90	4.33
- Others	0.60	0.87
Sub-Total	**15.90**	**23.75**
Total Outside Agencies	28.70	42.89
Total Marketed	**66.92**	**100.00**

Table-4.3: Per capita milk availability[1] in Himachal Pradesh (2013-14)

Source Of Milk	Litres/Day
Milk Produced In The State	0.455
Including Out Side Milk	0.466
% Increase due to out side milk supply	2.52

Milk Marketing Systems

Marketing channel is a sequence in which the product moves from producer to consumer through various intermediaries and functionaries in the market. Various middlemen and related agencies are involved in the purchase and sale of milk and its products as they move from producers to consumers. They buy and sell for their own gain. The retailer buys milk and its products for re-sale directly to the ultimate consumers. Milk wholesalers are the local buyers or rural assemblers who buy milk and its products in the producing area directly from farmers and transport the products to urban centres where these are sold to other wholesalers and processors. These may be "full time" wholesalers who handle many different products or those who specialise in handling a limited number of products. Wholesalers and retailers secure their incomes from the margin between the buying and selling prices. Milk processors and manufactures primarily exist to undertake some action on milk to change its form (into butter, ghee, curd, khoya etc.). They often act as their own agents in the milk producing areas and undertake the wholesaling of their finished products to retailers. Many milk processors attempt to reach the ultimate consumers through advertising.

During 2013-14 about 1138.612 thousand tonnes of milk was produced in the state, which resulted in marketed surplus of about 984.558 thousand tonnes of milk. The disposal of milk through self was predominant accounting for 41.41 per cent disposal followed by sale through private dairy 34 per cent and the 1.1 per cent procured by H.P. milkfed and 6.2 percent milk convert into cheese etc.(Table-4.4).

Table-4.4: Marketed surplus of milk in Himachal Pradesh (2013-14)

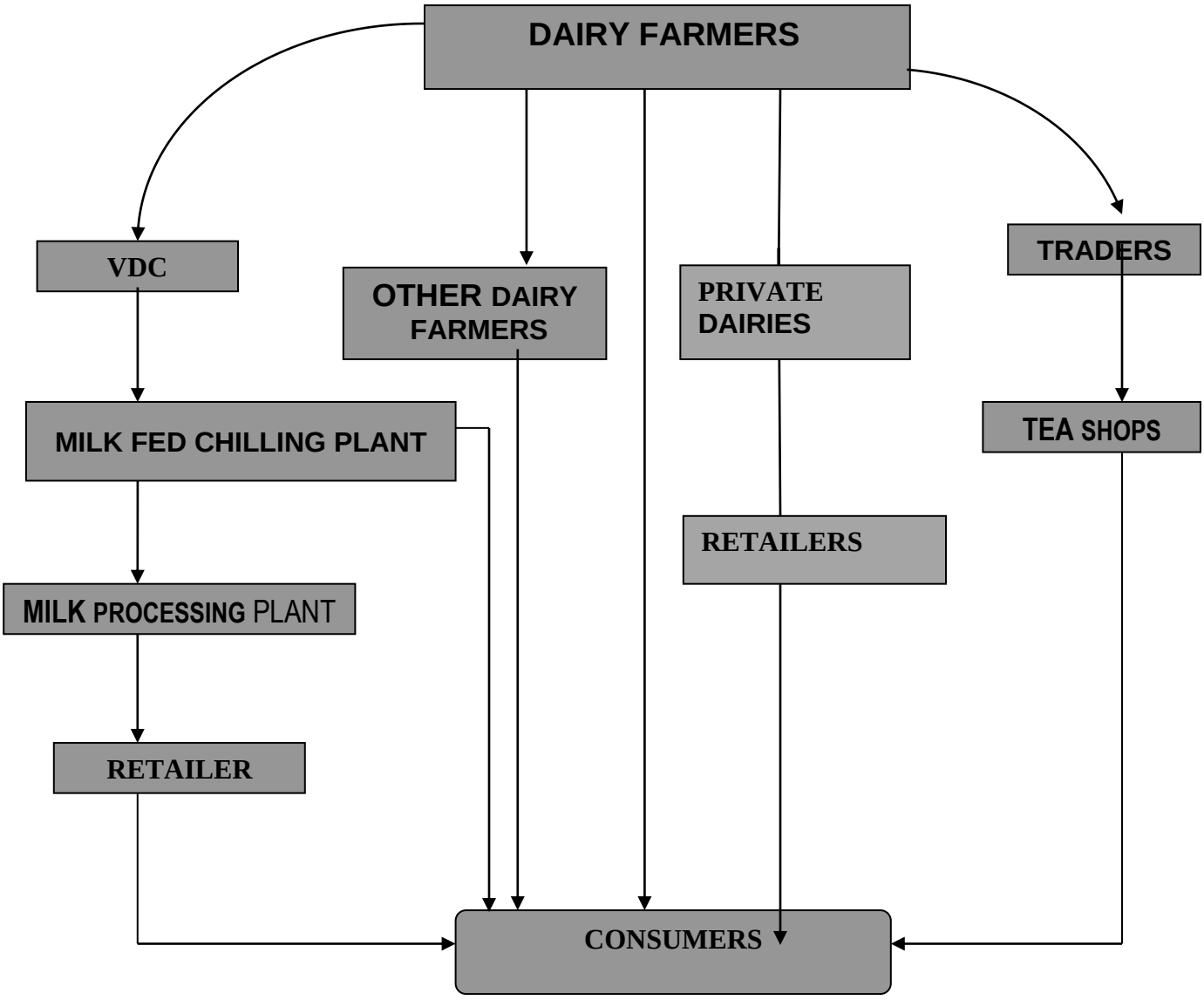
Particulars	Quantity, ('000MT)	%
Total Milk Production	1138.612	100.00
Home consumption	154.054	13.53
Marketed Surplus	984.558	86.47
Sale Through Traders	42.041	3.69
Self Marketed	471.505	41.41
Procured By H.P. Milkfed	12.504	1.10
Sale through Pvt. Dairy	388.014	34.078
Convert into Paneer etc	70.593	6.20

Source: Department of Animal Husbandry, Government of Himachal Pradesh, Shimla.

[1] Milk availability is calculated by dividing the milk produced within the state by the total population and in the second case the milk being brought in from outside the state is also added to the existing production.

The field survey revealed that there are five types of milk marketing channels (Fig-6) in Himachal Pradesh: (i) Producer- Consumer, (ii) Producer-other producer-Consumer, (iii) Producer-Trader-Consumer, (iv)Producer-Milkfed-Retailer-Consumer. (v) Producer-private dairies-Retailer-Consumer. Functioning of each of them is described below:

MILK MARKETING CHANNELS IN HIMACHAL PRADESH



Producer-consumer channel: This marketing channel is the most favourite with the dairy farmers whose villages are located near to towns. Since there is no middleman involved, farmers receive full price paid by consumer. Milk is distributed door to door in the morning to a set number of households and prices are collected once at the end of the month. Since milking of the animals is

done twice in a day - in the morning and in evening - the evening milk is mixed with the morning produced before selling. Some of the farmers keep refrigerators for this purpose, while others keep it cool during night by putting the milk container with its mouth covered with cloth in the water pot at airy open place. On an average, 21-23 litres of milk is supplied by each dairy farmer to its customers. From the farm milk is carried in plastic cans, which are further put in sling bags or haversacks. In most cases farmers carry milk by bus or motor cycle, but those milkmen who do not have other means may make it on foot. Public transport buses ply especially in the morning and evenings, to the major villages in periphery of cities to provide transport to daily commuters (employees, students, etc.) to towns. Some of the persons attend their jobs as employees and also carry the milk for sale. They have regular customer households. When farmers have shortfall of milk production on their farm they purchase it from other farmers in the village so as to maintain the regular level of supply to their customers. Some of these milkmen also sell fresh vegetables from their own farm in small quantities to the milk consumer households. Households make payments for milk on monthly basis but for vegetables and other fresh farm products payments are made instantly. During 2013-14 per litre retail price of milk ranged from Rs. 30 to 35 for cow's milk and Rs. 40 to 45 for buffalo milk. Per litre purchase price of milk in villages was about Rs. 30 for cow milk and Rs. 40 for buffalo milk.

Producer-other producer-consumer channel: This channel is almost similar to the one described above except that the milk vendor in addition to his own produced milk also buys milk from some other producers, who have very small quantity of marketable surplus and don't find it feasible to sell it themselves in city. Milk is also procured from such farmers who don't have enough manpower available with them to undertake the marketing activity themselves. The payments for such milk purchases are normally on monthly basis.

Producer-trader-consumer channel: In those villages, which do not have easy access to towns, the role of milk traders has gained importance. Farmers sell milk to trader who in turn sells it direct to consumer. This is the most prevalent milk marketing channel in Himachal Pradesh. Small milk producers bring their surplus milk to the nearby road head where trader waits for them. After measuring and checking milk's viscosity by lactometer for each farmer, milk is put in a bigger container. The price was Rs.20 per litre as a flat rate for the milk. Traders after mixing this milk sell it at a price ranging from Rs. 25 to 30 per litre to the shopkeeper or to final consumer. Depending on the size of business, a trader may hire 1-2 persons for helping him. Payments to the farmers are normally made at the end of each month. However, a loan advance may be given by the traders to the needy farmers for purchase of milch animals; cattle feed or even for consumption purposes. The amount of loan advance is adjusted in the subsequent milk payments to the farmers. But traders generally play safe while advancing such loans and they do not

encourage indiscriminate loans, and restrict the amount of loan to the maximum of 70-80 percent of the monthly milk payment to a farmer. After collecting milk the trader carries it to the town either on bus or on motorcycles. Milk is sold door to door to the regular customer households and teashop owners in the city. This method is popular in those villages, which are away from urban consumption areas. Normally, each trader collects milk from 20-30 small dairy farmers and retails this milk to teashop owners and about 50-60 households. The quantity of milk handled by each trader is between 300-500 litres per day. Since milk is collected once in the morning only, evening milk is also mixed with it after it has been kept at farm over night as air-cooled or after boiling and removing cream from it.

Producer-Milkfed (through VDCs)-retailer-consumer channel: In order to provide an efficient marketing channel to small dairy farmers of such areas where there is no marketing outlet the Government of Himachal Pradesh has encouraged formation of Village Dairy Co-operative Societies (VDCs). The structure of the dairy co-operatives consists of Primary Milk Producers Societies at the village level and Milk Supply Union at the district level. In Himachal Pradesh dairy co-operatives are organised at village level and the milk is supplied to Himachal Pradesh State Co-operative Milk Producers' Federation (Milkfed). The VDCs are concerned with: i) helping the members to increase milk production; and ii) arranging for its profitable sale in the consumer markets through Milkfed.

The Milkfed was established in January 1980 for implementation of the Operation Flood-II project in Himachal Pradesh on 'Anand Pattern', which envisages developing the dairy sector through development of co-operatives in the rural areas. The Milkfed has established 8 dairy processing plants and 23 milk-chilling plants in various parts of the state. During the year 2013-14, Milkfed had 807 village dairy co-operatives through which 37098 farmer members were selling their milk (Table-4.5). It handled 25.954 million litres of milk, which was procured through VDCs of the state.

Milkfed is engaged in milk procurement, processing and distribution to urban centres in Himachal Pradesh. Milk of dairy plants is further processed for ghee and pasteurised fluid milk (Table -4.5). During 2013-14 quantity of total milk processed by Milkfed was 25.954 million litres (Table-4.6). Milk collected from farmers at various VDCs is transported to the nearby milk chilling centres for cooling so that later on it could be safely transported, without deterioration in its quality, to dairy plants located at a considerable distance. The total capacity of milk chilling plants in the state is 85,500 litres per day (Table 4.7).

Table-4.5: The achievements of H.P. Milkfed during last five years

#	Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
1	Organized societies	639	681	740	765	807
2	Membership	28704	29861	34586	35153	37098
3	Milk procured (lac ltrs.)	167.15	201.29	225.49	252.07	259.54
4	Milk marketing (lac ltrs.)	65.86	68.43	88.5	93.94	95.04
5	Ghee sold (MT)	116.185	189.51	255.67	266.00	253.02
6	Paneer sold (MT)	52.38	46.55	41.82	53.35	47.97
7	Butter sold (MT)	13.28	15.57	18.69	22.83	24.53
8	Dahi sold (MT)	174.46	153.81	136.62	185.892	153.94
9	Cattle feed (qtls)	30077.5	38183.5	35216	39054.5	35837
10	Procurement Price	14.80	15.80	16.80	17.80	18.80

Under this marketing channel members of VDCs bring milk to the collection centre at pre-fixed time in the morning where the vehicle of Milkfed comes for procurement. Milk is measured and checked for viscosity before it is accepted. The milk thus collected is first transported to chilling centre and then to dairy processing plant. After standardisation and pasteurisation milk is packed in 500 ml and 1000 ml polypacks. These polypacks are transported to retailers for sale to the consumers. The chilled loose milk is also sold to the consumers by the Milkfed through its mobile tankers at some specified places and time in some cities/towns.

Table-4.6: Capacity utilisation of Milkfed and private milk processing plants in Himachal Pradesh

Name of District	Name of Milk Processing Plant	Capacity (Litres/ day)	Average Handling (Litres/ day)	Capacity utilization (%)
Sirmour	MPP Nahan	5000	4000	80
	MPP Kafota	5000	400	8
Shimla	MPP Rohru	5000	2300	46
	MPP Dutt Nagar	20,000	40,000	200
	Powder Plant at Dutt Nagar	5 MT/day	5 MT/day	100
Una	MPP Lal Singhi	5000	600	12
Chamba	MPP Chamba	5000	400	8
Kangra	MPP Kangra	20,000	3000	15
Mandi	MPP Mandi	20,000	35,000	175
Total		85,500	85700	100.23
Private milk processing plants				
Shimla	Mount Kailash	20000	20000	100
Bilaspur	Kamdhenu Hitkari Manch	10000	10000	100
Solan	Jagriti Mahila Milk plant	2000	2000	100
Total		32000	32000	100

Table-4.7: Capacity utilisation of Milkfed milk chilling centres in Himachal Pradesh

Name of District	Name of chilling centre	Capacity (Litres/ day)	Average handling (Litres/ day)	Capacity utilization (%)
Sirmour	Sarahan	2000(BMC)	2000	100
	Bagthan	10000	2000	100
	Renukaji	1000(BMC)	300	30
	Rajgarh	2000+2000	4500	112.50
	Maryog	1000	300	30
Shimla	MCC Kepu	22,000	35,000	159
	MCC Kotkhai	5000	-	0
Kangra	MCC Darkata	2000	300	15
	MCC Milwan	2000	500	25
	MCC Jalari	500	300	60
	MCC Bangana	2000	0	0
	MCC Bindra Ban	500	700	140
	MCC Chauntra	2000	150	7.50
Mandi	MCC Bilaspur	1000	450	45
	MCC Karsog	2000	2500	125
	MCC Kunnu	2000	1500	75
	MCC Kataula	2000	2000	100
	MCC Bhambla	500	80	16
	MCC Mohal	5000	6000	120
	MCC Geon	2000	200	10
	MCC Seraj	5000	7000	140
	MCC Sindhyani	2000	750	375
	MCC Kotli	5000	5800	116
Total		85,500	72330	85

Producer-private dairies- retailer-consumer channel: In the marketing of milk the private dairies also functioning in the state. The private dairies assemble the milk from farmers through its milk assemble centre at village level. After processing the milk is sold through retailers to the consumer. The farmers bring milk to the milk collection centre in the morning, where the vehicle of dairy cows for procurement. The milk is measured and checked for viscosity before it is accepted. After pasteurisation, the milk packed in 500 ml polythene pouches and sold through retailers in the cities. The private dairies procured more than 18 per cent milk of the total marketed milk as may be seen in Table 4.2.

Milk processing

It has been observed that the commercial milk processing in the selected milk shed area is almost non-existent. The milk produced is either sold or is retained for the domestic consumption. Whatever processing is done is for the domestic consumption. For this purpose the milk is converted into ghee (clarified butter) by traditional methods. The milk processing for the

commercial purpose is done only by Himachal Pradesh Milk Producers' Co-operative Federation (Milkfed).

The H.P. Milk federation is engaged in milk procurement, processing and distribution to urban centres. The Milk is collected from farmers at various centres operated by dairy co-operative societies and then transported to the milk chilling centres before processing it. The Federation has five milk processing plants of which three located at Chakkar in Mandi district, Dhagwar in Kangra district and Duttnagar in Shimla district, have a capacity of 20,000 litres per day each while the capacity of fourth dairy plant at Rohru in district Shimla has a capacity of 5000 litres per day during 2013-14. At Duttnagar powder milk plant is also in functioning with the capacity of 5000 litres per day (Table-4.8).

Table-4.8: Locations and capacity of milk processing plants in Himachal Pradesh (2013-14)

Location of plant	Capacity litres/ Day	Milk Handled(million litres)	Capacity Utilisation (%)
Chakkar	20000	35000	175
Dhagawar	20000	08000	40
Duttnagar	20000	35000	175
Rohru	5000	05000	100
Powder plant Duttnagar	5 000	050 00	100
Total	70000	88000	126

All the milk, received at the processing plants, is standardised, pasteurised and packed in polythene pouches. These plants produce standardised milk (containing 4.6% Fat & 8.6% SNF), toned milk (containing 3.1% fat & 8.6% SNF), double toned milk (containing 1.6% fat & 9.1 % SNF) and skim milk (containing 0.1% Fat & 9.1 % SNF), depending upon the requirement and preference of milk consumers. Milk plant, Dhagwar has also facilities to produce sterilised flavoured milk and ice cream.

Milk marketing cost and price spread

Price spread is the difference between the price paid by the ultimate consumer and the price received by the producer. It normally reflects the extent of the services given, and their costs such as the cost of labour, transportation cost, equipment's cost, spoilage, degree of risk involved in marketing, etc.

Market middlemen (functionaries or institutions) move commodities from producers to consumers. Every function or service involves cost. To remain in the trade, the intermediaries or middlemen make some profit after meeting the cost of the functions performed by them.

Marketing margins vary due to differences in producing point, commodity, marketing channel, market and time of sale.

On the basis of a field survey, price spread and marketing margin for milk have been estimated and results are presented in Table-4.9. Obviously producer's share in consumer's rupee was comparatively higher in case of direct sale and in self processing systems as compared to other channels prevailing in the state. On an average, producer's net share in consumer's rupee was 88.4 per cent (11.4% being the cost of marketing - transportation, labour cost) in case of sale of milk directly to consumers. The producer's share in consumer's rupee was 48.38 percent in case of sale through VDCs (Milkfed), and 66.67 per cent in case of sale through traders. The cost incurred by Milkfed on transportation, chilling and handling of milk accounted for 34.52 per cent and margin was 8.39 percent of consumer's price. Traders' milk marketing costs (which include transportation cost, handling cost and other expanses such as deprecation on utensils etc.) constituted 16.46 per cent of consumer's price. In case of private dairy system the producer share in consumer's rupees was 55 per cent and the marketing cost incurred was 3.88 per cent.

Table-4.9: Price spread in marketing of milk through various channels In Himachal Pradesh.

(Rs./Lit.)

Particulars	H.P. Milk Federation		Private Dairy		Through Traders		Direct Sale		Self Processing (Paneer)	
	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
Net Price Received by Producer	15	48.38	22	55	20	66.67	26.52	88.4	169.3	94.06
Cost Incurred on										
Transportation	0		0		2.33	7.76	0.62	2.06	8.9	4.94
Chilling	2	6.46	1.00	2.50	0		0		0	
Handling/distribution	0		0		2.4	8	2.46	8.2	1.3	0.72
Others	0.70	2.25	0.55	1.38	0.2	0.67	0.4	1.33	0.5	0.28
Sub-Total	1.57	8.71	1.55	3.88	4.94	16.47	3.48	11.6	10.7	5.94
Margin/Profit	0		0		5.06	16.87	0		0	
Consumer Price	31	100	40	100	30	100	30	100	180	100

* The co-operative's commission @ 2 paise per litre charged has been deducted from the prices on the basis of fat and SNF percentage.

** This also included 3% of the value of milk given as bonus to co-operative by Federation.

In case of toned milk, producers share in consumer's rupee was 49.94 per cent and rest were the costs incurred on transportation, establishment, processing, packing and marketing etc. The retailer's margin was 5.5 per cent and total marketing costs accounted for 33.61 per cent of consumer's price. Urban milk market is highly competitive in Himachal Pradesh as packed milk is also supplied from public sector and private milk plants from neighbouring states of Haryana and Punjab. Therefore, equitable prices are fixed by them for all brands of milk marketed in the state. The retail price of standardised milk is Rs.41 per litre and toned milk is sold at Rs. 48 per litre. Milkfed's total cost of toned milk comes to Rs. 32.08 (89.11%) and the margin was 10.89 percent

of the price Rs.36 per litre. The establishment cost (over head cost) alone was 16.11 per cent, which is the major cost followed by processing cost (10.72%) bear by the Milkfed (Table- 4.10).

Table- 4.10: Price spread in marketing of toned milk in Himachal Pradesh.

Cost Items	Rs/Litre	% Of Consumer Price
Procurement Price	17.98	49.94
Transportation	2.35	6.53
Processing Cost Packing Cost Marketing Cost	3.86	10.72
Establishment/over head Cost Administrative Cost	5.80	16.11
Repair And Maintenance	0.04	0.11
Interest	-	-
Depreciation	0.05	0.13
Retailer Margin	2.00	5.55
Total Cost	32.08	89.11
Consumer Price	36.00	100.00
Federation Margin	3.92	10.89

Source: Himachal Pradesh Milkfed, Totu, Shimla.

Chapter-5

CONSUMER BEHAVIOUR RELATING TO MILK CONSUMPTION AND MILK PRODUCTS

In this chapter the consumption of dairy products in urban area has been analysed. The consumer behaviour and preference of different dairy products, problem in FWM, packed milk are also analysed in this chapter.

Per capita expenditure on food, milk and milk products

The demand for milk and other dairy products in Himachal Pradesh, as in other states of India, is increasing at a rapid rate due to many factors such as population growth; increasing urbanisation, increase in income level, increasing awareness about the nutritive value of milk, changes in tastes and preferences, vegetarianism, etc.

Table-5.1: Proportion of per capita monthly total expenditure on milk and milk products (2011-12)

(% age)

Items of commodity	Himachal		J & K		Punjab		Haryana	
	38th	68th	38th	68th	38th	68th	38th	68th
A. RURAL								
1.Cereal & Cereal substitute	25	16.10	32	19.25	14	11.73	19	10.57
2.Milk & Milk Products	16	23.97	11	19.64	18	32.30	25	41.87
3.Eggs,Meat & Fish	1	5.25	4	11.38	1	1.25	1	1.72
Total per capita/month in Rs.	150.81 (100.00)	962.32 (100.00)	129.27 (100.00)	963.02 (100.00)	170.52 (100.00)	1032.87 (100.00)	151.78 (100.00)	1133.34 (100.00)
B. Urban								
1.Cereal & Cereal substitute	13	13.64	22	17.84	12	12.22	14	9.43
2.Milk & Milk Products	14	20.56	13	20.42	16	30.33	17	30.24
3.Eggs,Meat & Fish	2	4.80	6	10.82	1	1.83	1	1.38
Total per capita/month in Rs.	258.62 (100.00)	1382.21 (100.00)	155.29 (100.00)	1188.48 (100.00)	185.20 (100.00)	1145.00 (100.00)	186.86 (100.00)	1497.72 (100.00)

Source: The data is obtained from the N S S Report No. 555,(Page 48- 60), Level and Pattern of Consumer's Expenditure, 2011-12,(68th round Survey).

The National Sample Survey Organisation (NSSO) initiated surveys to collect information on consumer expenditure on different food items mainly to examine the variations in different consumption patterns across region/states. The consumption pattern of milk and milk products in H.P. and major northern states has been analysed by using NSSO data of 38th round (1998) and 68th round (2011-12). The share of milk and milk products in total monthly per capita consumption expenditure (Rural and Urban) for H.P. and other northern states of India has been presented in Table-5.1. The proportion of per capita monthly expenditure for consumption of milk and milk products in H.P. was 16 per cent in 1998, which increased to 24 percent in 2011-12 in rural sector. In Punjab, share of milk and milk products in total expenditure has increased from 18 to 32 per

cent. The proportion of milk and milk products in Haryana increased from 25 per cent in 1998 to 42 per cent in 2011-12. During the period 1998to 2011-12 the proportion of expenditure on milk and milk products by urban households, it is observed that it increased in all State. This clearly indicates that in Himachal Pradesh, the proportion of total expenditure on milk and milk products was relatively higher in rural than urban areas. Further, it is clear from the table that milk and milk products were recorded second priority in the consumer's expenditure in both the rural and urban areas of the states in 1998 while milk and milk products have become first priority in consumer's expenditure in 2011-12 (Table 5.1).

Preference and consumer behaviour survey

Preference and consumer behaviour differ in different regions and across different occupations due to socio-economic factors and food habits. However, no systematic studies in this direction have been carried out in the field of consumer preference, awareness and packaging with regard to various dairy products in Himachal Pradesh and elsewhere in the country. Keeping in view the importance of such studies, a consumer survey in urban area in Himachal Pradesh viz. Shimla city was conducted with following results.

Average family size is 3.82 persons per family (Table-5.2), which increased with the income level. Out of total persons 28 per cent were non-vegetarian. On an average the family income is Rs.48000 per month.

Table-5.2: General features of sampled urban households.

Particulars	Lig	Mig	Hig	All
No. of H.H.	30	30	30	90
Average family size	3.60	3.75	4.50	3.82
Adult	2.40	2.00	2.00	2.18
Children	1.20	1.75	2.50	1.64
% of Non-Veg. In Total Persons	30	28	22	28
Average Monthly Income (Rs./H.H).	220000	45000	75000	48000

Purchase of dairy products: Monthly quantity of various dairy products purchased by sampled urban households is presented in Table-5.3 wherein it may be observed that average quantity of milk purchased by urban households was 85 litres per month which ranged between 60 litres in case of low income group (LIG) to 120 litres in case of high income group (HIG) households. The quantity of other dairy products purchased was 1.36 kg ghee, 0.58 kg butter, 0.61kg cheese and 1.43 kg curd per month. On an average, a household is spending 11.50 per cent of total income on dairy products. The share of total income spent on dairy products is relatively Higher (15.40%) among LIG Households than HIG (8.6%) households.

Table-5.3: Average monthly quantity of dairy products purchased.

(Qty./H.H.)

Particulars	Lig	Mig	Hig	All
Milk (lit)	60	75	120	85
Ghee (kg)	1.60	1.75	2.00	1.36
Butter (kg)	0.50	0.60	0.75	0.58
Cheese (kg)	0.30	0.80	1.00	0.61
Curd (kg)	1.30	1.50	1.60	1.43
% of income spent on dairy products	15.40	10.50	8.60	11.50

Consumption of dairy products: The pattern of consumption of fresh milk and pack milk among different income group households has been presented in Table-5.4. It may be seen from the table that out of total milk purchased (85 kg) by a household, nearly 80 per cent is loose whole milk and remaining 20 per cent is pasteurised packed milk. The proportion of total quantity of loose whole milk consumed directly by family member is 65 percent, 13 per cent is converted to curd, and the milk is not used for extracting butter and for cheese. Nearly 23 per cent fresh milk is being utilised for tea/coffee. The quantity of milk used for tea/coffee is directly related with income level.

Out of total packed milk purchased, 31 percent is consumed directly by the family members, 38 per cent converted to curd and remaining about 31 percent is being utilised for preparing tea/coffee. The quantity and proportion of packed milk utilised for this purpose is inversely related with family income level.

Table-5.4: Milk consumption pattern in urban areas

(Qty In Litres /Month/H.H.)

Particulars	Lig	Mig	Hig	All
A. Fresh milk	36.00	60.00	108.00	68.00
Directly consumed by				
Adult	5.40	6.00	16.00	9.13
Children	14.40	36.00	54.00	34.80
Converted in to				
Curd	3.6	6.00	16.40	8.67
Butter	0	0	0	0
Cheese	0	0	0	0
Use in tea/coffee	12.60	12.00	21.60	15.40
P. Pack/pasteurised	24.00	15.00	12.00	17.00
Directly consumed by				
Adult	4.80	0	0	1.60
Children	7.20	0	4.00	3.73
Converted in to				
Curd	7.20	9.00	3.00	6.40
Use in tea/coffee	4.80	6.00	5.00	5.27

The consumption pattern of other dairy products purchased by sampled urban households has been presented in Table-5.5. It may be observed that 59 per cent of total quantity of ghee purchased was consumed by adult family members and 29 per cent by children. More than 12 per

cent was used during daily prayers and ghee was not used for cooking. Nearly 62 per cent of total butter purchased was consumed by adults and 38 per cent by children in the family. Ninety seven per cent of total quantity of cheese purchased was used for cooking and one percent is consumed as such by adults and 2 percent by children. The curd was mostly consumed directly by family members (70%) and 30 per cent used in preparing meals. The consumption of curd was comparatively higher among adults (45%) and than children (25%).

Table -5.5: Consumption pattern of dairy products in urban households in Himachal Pradesh.

(Percentages)

Particulars	Lig	Mig	Hig	All
1. Ghee				
Consumed Directly by	100.00	100.00	100.00	100.00
Adult	60.00	62.00	55.00	59.00
Children	28.00	28.00	30.00	28.67
Cooking	0	0	0	0
Prayer	12.00	10.00	15.00	12.33
2. Butter				
Consumed Directly By	100.00	100.00	100.00	100.00
Adult	70.00	60.00	55.00	61.67
Children	30.00	40.00	45.00	38.33
Cooking	0	0	0	0
3. Cheese	100.00	100.00	100.00	100.00
Consumed Directly By				
Adult	0	0	4.00	1.33
Children	0	0	6.00	2.00
Cooking	100.00	100.00	90.00	96.67
4. Curd	100.00	100.00	100.00	100.00
Consumed Directly By				
Adult	45.00	40.00	50.00	45.00
Children	20.00	25.00	30.00	25.00
Cooking	35.00	35.00	20.00	30.00

Source: Own survey, 2014.

Purchase Prices of Dairy Products: The average prices of dairy products are presented in Table- 5.6. On an average, price of loose whole milk was Rs.28.83, while for packed milk of cow's and buffalo's it was Rs. 40 and 50 per litre respectively. The prices of dairy's made ghee was Rs. 300 per kg and for home made ghee it was Rs. 500 per kg. The prices of butter, cheese and curd were Rs. 300, 275 and 80 per kg respectively.

Table-5.6: Average purchase prices of dairy products in urban areas of H.P

(Rs./Lit./Kg.)

Dairy Products	LIG	MIG	HIG	ALL
Fresh Milk	30	28	28.50	28.83
Packed Milk	40/50	40/50	40/50	40/50
Ghee-dairy made/home made	300/500	300/500	300/500	300/500
Butter	300	300	300	300
Cheese	275	275	275	275
Curd	80	80	80	80

Brands of packed milk: The various brands of packed milk available in the urban centres of Himachal Pradesh and their preference ranks have been presented in Table-5.7. The Verka brand of packed milk from Punjab, and Vita from Haryana has good market in Himachal and preferred by majority of urban consumers. The Him milk from H.P. milkfed ranked IV in the consuming market due to reported poor quality and foul smell and not preferred by many consumers.

Table-5.7: Preference pattern of packed milk among urban consumers of H.P.

Brand	Processed by	Fat %	SNF%	Price/Pack	Preference Rank
Verka	Punjab Milkfed	4.5	8.5	25	I
Vita	Haryana Milkfed	4.5	8.5	25	II
Milktime	Private Dairy	4.5	8.5	25	III
Him	H.P. Milkfed	4.5	8.5	25	IV
Vatika	Private Dairy	4.5	8.5	25	V
Farmer	Private Dairy	4.5	8.5	25	VI
Super	Private Dairy	4.5	8.5	25	VII
Gau Amirat	Private Dairy	3.5	8.5	20	VIII
Kamdhenu	Private Dairy	3.5	8.5	20	VIII

Note: All these brands are marketed in polypacks of 500 ml.

Reasons for preferring FWM: Reasons cited by consumers for purchasing fresh whole milk and pack milk (Table-5.8) showed that FWM is mostly preferred due to natural flavour (65%), home delivery (72%), and monthly payment (96%). The FWM is better for processing into butter and cheese, is the reason for purchasing it as reported by 29 per cent sample consumers. Old relation of family with milkman is the reason reported by 49 per cent consumer households for purchasing FWM. The milk being good for infants was the reason reported by 15 per cent sample households. The importance of home delivery underlines the consumer convenience service being provided by the milkmen, against which the packed milk market may find difficult to compete.

Reasons for preferring packed milk: The high and consistent quality as prescribed by Prevention of Food Adulteration Act (PFAA) is the reason, which convinced about 78 per cent consumers to buy this milk (Table–5.8). The pack milk is available in 500 ML size, which is easy in handling, and 31per cent of total consumers bought the packed milk only because of this reason. The quality of pack milk remains constant whereas the quality of FWM varies with season, quality of fodder, other practices and also due to integrity of milkmen, many of whom do not hesitate to adulterate it with water were the reasons due to which 93 per cent of total pack milk consumers opted for it. This milk is good for curd making and consumers mostly converted it in to curd was the reason for purchase forwarded by nearly 74 per cent consumers. There is no scope of adulteration in pack milk and hence it is safe was the reason reported by 63 per cent consumers. The non-availability of FWM compelled 18 per cent consumers to purchase packed milk. The family of working couples do not find it convenient to wait for milkman whose normal delivery time varies between 8

AM to 11 AM and hence buy packed milk at their own convenience. This was the case with 10 per cent consumers.

Table-5.8: Reasons for purchasing various types of milk in urban area of Himachal Pradesh.

(% Multiple Response)

Reasons for Preferred Milk Type	LIG	MIG	HIG	ALL
A. Fresh Whole Milk				
I. Natural Flavour	65	70	60	65
Ii in home Delivery	72	70	75	72
III.Monthly payment	95	94	98	96
IV.Good for Butter, Cream Processing	25	30	32	29
V.Old Relation with Milkman	50	45	52	49
VI.Good for Infants	15	13	18	15
Total No. of H.H. Purchasing	10	12	15	12
B. Pack Milk				
I.High Quality	80	78	75	78
II.Easy in Handling	30	35	28	31
III.Good for Curd Making	75	70	78	74
IV.No Adulteration	60	65	63	63
V.Fresh Whole Milk is not Available	16	20	18	18
VI.Constant Quality	94	90	96	93
V.No Family Member to Take Delivery of Fresh Milk	8	10	13	10
Total No. of H.H. Purchasing	20	18	15	18

Source: Own Survey, 2014.

Problems reported in consumption of FWM: Various problems were reported by urban consumers regarding fresh whole milk supplied by milkmen and their responses are summarised in Table- 5.9. It may be observed from this table that diluted milk supplied by the milkmen is the major problem reported by 84 per cent of total consumers of this milk. High prices of such milk are the next problem felt by 72 per cent consumers. In the initial days the milkmen supply good milk but after some time the quality of milk is deliberately deteriorated by addling more water, such problem was reported by 69 per cent consumers. The diluted milk does not curdle properly and 20 per cent consumers complained about it. Low quantity of milk supplied by the milkman was reported by 10 per cent sampled consumers. Low fat in the milk was reported by 8 per cent consumers.

The consumers suggested that there should be quality control on milk supplied by the milkmen (83%). Though there is provision of quality control and officials of Health department check the milk supplied by milkmen in the urban areas, such checking is hardly ever done and is ineffective. The prices of milk are increasing year after year inspite of poor quality of milk. There is no check on prices. It is suggested that there should be some mechanism to control the prices of FWM supplied by milkman in the urban areas (40%). Consumers also suggested that govt/federation should supply the loose/FWM through booths in the city. By doing so quality and prices of milk might be maintained. This was suggested by 45per cent consumers.

Problems reported by packed milk Consumers: The problems faced in consumption of packed milk reported by consumers of this milk have been presented in Table –5.9, wherein it may be seen that offensive smell in the packed milk is the major problem reported by 89 per cent consumers. This may be due to the fact that most of the times; consumer has no way of finding out date of packing as it usually is stamped on pack which is erased during transportation. Thus, he has to rely upon the verbal assurance of retailer about its freshness, whereas it might have gone stale. High price of this milk in comparison to FWM is complained by among 80 per cent consumers. The consumers purchase pack milk from the shops where it is available on cash payment. Most of the shop owners do not sell it on credit. This problem is reported by 56 per cent consumers. Poor keeping quality of pack milk is the problem reported by 20 per cent consumers. Short supply of desired brand of pack milk is reported by 13 per cent consumer in urban areas.

To increase the consumption of pack milk in urban areas the consumers suggested that the supply of desired brand of milk should be maintained. Price control of pack milk is suggested by 65 per cent consumers. The provision of home delivery of this milk is suggested by 45 per cent consumers.

Table-5.9: Problems and suggestion reported by sampled urban household in Himachal Pradesh.

(%, Multiple Response)

Reasons for Preferred Milk Type	LIG	MIG	HIG	ALL
A. Fresh Milk				
1. Diluted Milk	80	85	86	84
2. Quality Deterioration	65	70	72	69
3. Un Hygienic Milk	10	12	15	12
4. High price	75	70	72	72
5. Not good For curd Making	20	22	18	20
6. Desired Quantity Not Available	8	10	12	10
7. Low Fat	3	5	7	8
8. Adulteration	10	8	12	10
Suggestions				
I.Quality Control	90	80	78	83
II. Price Control	40	30	50	40
II.Booths For Loose Fresh Milk	35	45	55	45
B. Pack Milk				
1.Bad smell	90	85	92	89
2.High Price	80	78	82	80
3.Short Supply of Desired Brand	10	12	16	13
4.Available on Cash Payment Only	52	55	60	56
5.Poor Keeping Quality	20	15	25	20
Suggestions				
I. Regulate Supply	15	25	20	18
II.Low Price	70	65	60	65
III.Home Delivery	45	50	40	45

Hence it may be concluded from above analysis that consumption of milk in urban areas is directly related with the income level. Fresh whole milk supplied by local milkman is most preferred milk among all income groups. The main reasons for this pattern are natural flavour, home delivery and low prices. Bad smell and high prices are the main problem in taking packed milk. Major portion of milk purchased is consumed directly and used in preparing tea/coffee. The other dairy products are also being consumed directly.

Public Health Concerns over Informal Milk Marketing

The govt has entrusted the department of Health with ensuring the quality of milk brought through informal channel. For this, health inspectors are authorised to check the quality of milk by taking random samples. These samples are analysed at state level laboratory located at Kandaghat, district Solan. The chief scientist revealed that about 60-65 percent samples meet the laid down standards of 4.5% fat and 8.5% SNF. However, there was an apprehension about the validity of procedure adopted for drawing the sample.

Chapter-6

ROLE OF WOMEN IN DAIRY FARMING

Addressing gender concerns in sustainable management of livestock in mixed crops-livestock farming systems is critical in view of women's significant role in livestock production, management, and marketing. It is believed that without the involvement of women farmers from the very beginning, no livestock development programmes can be expected to succeed. The role of women in various farming activities, work participation of women in smallholders' dairy farming and women participation in decision making in dairy farming are examined and presented in this chapter.

Women's participation in dairy farming

Among different tasks associated with rearing of dairy animals, women's participation was higher in all operations of animals rearing (Table-6.1). The women participation was observed to be equal to males in marketing of milk under co-operative set-up as well as under private marketing systems. In the other system their participation was limited only to about 5 percent.

Table-6.1: Women's participation in rearing of dairy animals

(%)

Operation	Men	Women	Total
Tending of Animal	45	55	100.00
Grazing of Animal	34	66	100.00
Collection of Fodder	28	72	100.00
All Operation	36	64	100.00

Role of women in decision making

The role of women is significant in terms of their work participation in various activities related to livestock rearing. The results show that in the field of animal tending their work participation is higher. But this does not indicate their involvement in taking the decisions regarding various matters related to livestock rearing. To explain this, it is important to study the gender dimensions of decision-making. Keeping in mind the work participation in livestock rearing, major areas were selected for examining the process of decision-making (See Table-6.2). In the process of breed selection, 30 per cent women participated actively and in 45 per cent cases women and men took the decision jointly. However, in 25 per cent cases only men took the decision. Further, the role of women was relatively higher in taking decision regarding type of livestock, selling of livestock and spending of livestock income. In marketing of livestock products and borrowing money the major decision were taken by men. In purchasing and selling of livestock and buying inputs the major decisions were jointly taken.

Table- 6.2: Decision making in livestock rearing

(Percentages)

Activities	Men	Women	Joint
Breed selection	25	30	45
Livestock selection	20	25	55
Input purchase	30	25	45
Credit and investment	55	20	25
Selling of livestock	20	25	55
Purchase of livestock	25	30	45
Marketing of livestock products	70	20	10
Investment of income from livestock	35	55	10

Sources of household income

Income generating sources among the sampled households are livestock rearing, crop husbandry, service in public and private sectors, petty business, wage labour in agriculture and non-agricultural activities and remittances. Livestock rearing seems to be the main source of income among sampled households. Of the total income, 62 per cent was contributed by this source. Cereal crops production contributed 7 per cent to total income of the households while vegetable and fodder crops production provides about 4 per cent and about 2 percent to the total income of the household income. Hence about 75 percent of total income of household was from the farm sector. Further, the income from service in private and public sector was significantly higher, which contributed about 18 per cent to total income. The other sources (business and remittances) of income accounted for about 7.5 per cent to total income of the households in this area. On an average, total income from all sources was Rs. 509486 per households annually (Table-6.3).

Table-6.3: Source wise annual income of sampled farm households.

(Rs./Farm)

Sources Income	Rs.	%
Livestock	316178.0	62.06
Cereals Crops	35988.10	7.06
Vegetables	19458.33	3.82
Pulses & oilseeds	238.10	0.05
Fodder crops	9219.05	1.81
Total farm income	381081.48	74.80
Service	90000.00	17.66
Wage Labour	15547.62	3.05
Business	22857.14	4.49
Total off farm income	128404.76	25.20
Total income	509486.24	100.00

Chapter-7

CATTLE DEVELOPMENT PROGRAMMES AND BREEDING POLICY IN HIMACHAL PRADESH

In the past, there have been considerable efforts in livestock research and development in Himachal Pradesh. Policy approaches have basically centred on the problems of animal breed, animal feed and animal health. The innovations, until now, were designed to address technical/scientific problem and neglected many interrelated socio-economic and biophysical characteristics, more specifically mountain characteristics. Development efforts have been geared towards improving animal breeds to enhance income and livelihood of mountain farmers. Ample experience has been gained in this respect. In this chapter, cattle development programmes, State Breeding Policy and public investment in livestock sector have been reviewed.

Cattle development programmes

New turn to cattle breeding policy was given consequent upon the deliberations of the "High Powered Cattle Breeding Committee" of Indo-New Zealand Livestock Improvement Programme held at Palampur in 1978. The expert opinion favoured exploitation of continuous hybrid vigour with jersey as the exotic breed and step-wise substitution of non-descript inheritance with jersey and Sindhi in the lower hills. For Hight altitudes, use of jersey and selected jersey crossbred bulls with indigenous cows was prescribed. Keeping these advantages in view, jersey bulls and cows were imported from Australia, New Zealand, Denmark etc. under various schemes. The main thrust had been to improve genetic potentials of cattle through, (i) Hill cattle development scheme, (ii) Intensive cattle development project, (iii) Key village schemes, (iv) Indo-New Zealand livestock improvement project, and (v) Indo-German Dhauladhar Project. Indo-German Dhauladhar Project (IGDP) on the other hand has adopted an integrated approach on livestock improvement using frozen semen technique. The intensive Cattle Development Project (ICDP) adopted similar approach by providing inputs on breeding, feeding and disease control in the project area. The total number of AI performed in H.P. was more than 0.3 million in 1996-97 (Table-11). In addition, the Buffalo Breeding Programme is also running in the state but the conception rates of AI in buffaloes are far below that of cows.

The popularity gained by jersey and jersey cross-bred animals is the result of use of latest technology on one hand and about 200 per cent increase in milk yield in first generation cross-bred on the other. The milk production in local cow is 450 kg per year and 3000 Kgs in jersey cow. This factor alone acted as a big booster to the cross breeding programme.

State cattle breeding policy

Among various breeds tried in the state (Holstein Friesians, jersey, Fleckviech, Ayreshise etc.) jersey has been found to be most suitable for cross breeding with hill cattle and this cross breeding has been going on since, 1958. The experience has shown that when the inheritance from jersey goes beyond 50% the level of production decreases, age of maturity increases and the animal becomes more prone to diseases and ticks. Thus, it was decided by Committee on Animal Breeding Policy to restrict the inheritance of jersey to 50 per cent and infuse Red Sindhi blood in addition. The breeding policy decided was:-

Jersey female X Red Sindhi Male, Jersey Male local female:

50%Jersey----------50%Jersey F1
50%Red Sindhi (Male) 50%Local (female)

50% Jersey F2
25% Red Sindhi
25% Local female

50% Jersey F3
37.5% Red Sindhi
12.5% Local (female)

50% Jersey F4
43.75% Red Sindhi
6.25% Local

In this manner jersey inheritance is restricted to 50% level, local blood will decrease with every generation whereas blood from Red Sindhi will increase. After 5-6 generation this breeding programme leads to animals, which are half jersey and half Sindhi. In addition to this, the facility of cow and buffalo bull has been created in areas where it is not possible to provide artificial insemination. The detailed guidelines have been chalked out for maintenance of these bulls so that this facility can be utilised at optimum level by dairy farmers.

The breeding management was observed to differ at different locations under study. At villages located around Tara Devi A.I. is done to the tune of 100 per cent. The farmers were observed to increase the Jersey inheritance up to 67 per cent. The facility of A.I. is freely available at their doorstep at a very nominal rate of Rs.25 per A.I. Still a few farmers complained that sometimes the desired semen is not available and they have to wait for a few days for A.I. On the other hand, in other areas under study, where buffaloes are mainly reared, the breeding management is not so good. These areas are not very conveniently located and the facility of A.I. is not available at doorstep. There is a provision of buffalo bull for natural service. But the buffaloes, which are leased by farmers of Chakki Mor area, are taken back to Punjab for service there. Overall the dairy farmers in such area lacked awareness and natural service was also not performed at right time. This clearly reflected in the state of livestock in such areas.

State support and priorities

Animal husbandry & Dairy development in Himachal Pradesh has undergone tremendous changes during the past three decades. The share of the Animal husbandry & Dairying sector in total plan outlay has hovered between 1.11 per cent in the seventh plan and 2.72 per cent in the fifth plan (Table-7.1). This share was much higher in the 70s as compared to that in the 80s and 90s. The proportion of plan outlay for the Agricultural and Allied Activities the livestock sector accounted for 6.36 per cent in the seventh plan as against the highest proportion of 11.73 per cent in the sixth plan. Decline in the share of Animal husbandry & Dairy is quite visible during the 90s.And it is increased in eighth, ninth and tenth plan up to 13 percent and in eleventh plan it was again declined to 8 percent of the agriculture and allied sector.

Table-7.1: Share of plan-wise outlay and expenditure on animal husbandry and dairying in Himachal Pradesh, 1969-2002

(Per cent)*

Sr No.	Plan	Approved Outlay	Actual Expenditure
1.	Fourth Plan (1969-74)	2.35 (7.93)	2.25 (9.34)
2.	Fifth Plan (1974-78)	2.72(11.07)	2.92(11.22)
3.	Annual Plan (1978-79)	2.69 (11.16)	2.78 (10.93)
4.	Annual Plan (1979-80)	2.40 (10.30)	2.59 (9.41)
5.	Sixth Plan (1980-85)	1.96 (11.73)	1.91 (12.06)
6.	Seventh Plan (1985-90)	1.11 (6.36)	0.99 (5.06)
7.	Annual Plan (1990-91)	1.22 (6.83)	1.37 (7.40)
8.	Annual Plan (1991-92)	1.18 (6.47)	1.39 (6.64)
9.	Eighth Plan (1992-97)	1.37 (7.81)	N-A
10.	Ninth Plan (1997 –02)	1.98(13.37)	N-A
11.	Tenth Plan(2002- 07)	1.29(13.00)	0.34(15.09)
12.	Eleventh Plan (2007-12)	0.85 (8.00)	0.94(7.23)

* Per cent of total Approved Plan Outlay & Actual Expenditure, respectively.
Figures in brackets are % of Total Agricultural & Allied Activities' outlay and Expenditure.

Three broad heads of the Animal husbandry & Dairy sector are: 1 Animal husbandry, 2. Dairying, and 3. Animal husbandry Education. The break up of plan outlays under these components is given in Table-7.2. It may be noted here that prior to sixth plan, the outlay was classified under the first two heads only. As is seen in this table, about 24 percent plan outlay went to animal husbandry component while 1 percent for the dairy component and the 75 percent plan outlays went to agriculture education during the eleventh plan (Table 7.2).

By the Annual plan of 1979-80, these shares were altered to 2/3rd and 1/3rd, respectively. During the sixth plan when the plan outlay was trifurcated with the additional of Animal husbandry Education as the third component, 60% went to Animal husbandry component, 37 percent to Dairying component and 3 percent to Animal husbandry education component. Then onwards the share of animal husbandry education increased at the expense of dairying. In the Eighth plan, 17percent each was being spent on dairying and animal husbandry education, while animal husbandry accounted for the remaining 2/3rd. This may be explained in terms of changing needs of the livestock sector in the state. That is while the requirements of the funds for the upkeep (AH) of the animals in relative terms have either grown or remained constant, those for the dairying have been reduced once sufficient infrastructure in terms of milk chilling and processing plants have been created.

Table-7.2: Share of different components of animal husbandry and dairying in total plan outlay for animal husbandry and dairying

(Rs. Lakh)

Plan	Approved Outlay				Actual Expenditure			
	Animal Husbandry	Dairying	Animal Husbandry Education	Total	Animal Husbandry	Dairying	Animal Husbandry Education	Total
Fourth Plan (1969-74)	175.00 (73.53)	63.00 (26.47)	-	238.00 (100.0)	158.00 (61.72)	98.00 (38.28)	-	256.00 (100.0)
Fifth Plan (1974-78)	440.00 (67.69)	210.00 (32.31)	-	650.00	288.00 (60.89)	185.00 (39.11)	-	473.00
Annual Plan (1978-79)	122.00 (61.93)	75.00 (38.07)	-	197.00	122.00 (64.55)	67.00 (35.45)	-	189.00
Annual Plan (1979-80)	115.00 (65.71)	60.00 (34.29)	-	175.00	145.00 (70.73)	60.00 (29.27)	-	205.00
Sixth Plan (1980-85)	735.70 (60.23)	448.50 (36.72)	37.30 (3.05)	1221.00	814.92 (64.27)	411.21 (32.43)	41.87 (3.30)	1268.00
Seventh Plan (1985-90)	745.00 (56.96)	393.00 (30.05)	170.00 (12.99)	1308.00	824.44 (62.72)	290.38 (22.09)	199.61 (15.19)	1314.43
Annual Plan (1990-91)	256.00 (58.31)	100.00 (22.78)	83.00 (18.91)	439.00	331.99 (64.21)	102.01 (19.73)	83.00 (16.05)	517.00
Annual Plan (1991-92)	282.00 (58.14)	105.00 (21.65)	98.00 (20.21)	485.00	369.00 (65.43)	96.00 (17.02)	99.00 (17.55)	564.00
Eighth Plan (1992-97)	2280.00 (66.38)	570.00 (16.59)	585.00 (17.03)	3435.00	3831.13 (69.53)	792.47 (14.38)	886.41 (16.09	5510.00
Ninth Plan (1997-2002)	8550.00 (75.87)	1340.00 (11.89)	1380.00 (12.24)	11270.00	-	-	-	-
Tenth Plan (2002-07)	14519 (53.15)	1112 (4.07)	11686 (42.78)	27317	12899.1 (99.36)	82.59 (0.63)	-	12981.69
Eleventh Plan (2007-12)	11432 (23.89)	518 (1.08)	35885 (75.02)	47835	12996.0 (95.08)	230.0 (1.68)	442.32 (3.24)	13668.32

Note: Figures in brackets are % of outlay and Expenditure

It may be mentioned here that there is inter alia, sub-optimal use (only 24%) of the present milk chilling facilities in the state by the dairy cooperatives. Growing lack of technical manpower in the field of animal husbandry might have resulted in changing the priorities from the dairying to animal husbandry education in the second half of the 1980s. And it was during this period that first veterinary college in the state was established. At present around 3/4th of the outlay is going for the animal husbandry education component while the remaining is being shared by the other two components, namely Dairying (1%)and Animal husbandry (24P%). This indicates that once having consolidated the facilities for animal husbandry and animal husbandry education in the state, the need to provide better milk collection facilities is being reinforced.

Chapter-8

POLICY ISSUES IN DEVELOPMENT OF DAIRY FARMING SYSTEMS

Reducing farm income inequalities, improving milch animal production efficiency through reduction in numbers and improvement in quality of animals, and meeting feed needs of dairy animals without environmental and natural resource degradation on CPRs are the major policy issues in livestock planning and management in Himachal Pradesh. The following policy issues are emerged from the study for improving the dairy enterprises on smallholder dairy activity in Himachal Pradesh:

- For obtaining higher returns from dairy animals proper breeding, feeding and weaning of livestock is urgently needed. These are presently lacking due to hilly terrain and inaccessible villages.
- The higher growth rates in case of buffaloes and crossbred cow population reflect that the farmers are shifting towards higher milk yielding animals and consumer's preference is shifting towards buffalo milk (High fat milk).
- The training programmes related to livestock are designed for the men whereas women's participation is higher in dairy farming.
- The concentration of buffaloes is higher in low hill areas whereas cows are predominant in mid and high hill areas. The development strategy should address this particular fact.
- The quality of cattle feed available in the market is poor but prices are high. As a result the use of cattle feed is very low, the consequences are poor milk yield and animal health. In order to take care of this problem some of the farmers were observed to purchase cattle feed directly from the manufacturing plants located in neighbouring state. The need is to manufacture feed within the state so that it could be available at affordable prices and having reasonably good quality.
- The unavailability of the improved fodder seed has resulted in negligible area under cultivated fodder crops.
- There is lack of veterinary facilities especially in the remote areas.
- The various development programmes being run by state government or other development agencies or international donor agencies in the field of dairy farming are under different stages of execution. The impact of these programmes should be properly examined for future reference especially in the light of child nutrition, gender implication and income and employment generation.
- Demand and supply projections suggest that excellent opportunities exist for significant growth in small holder dairying with a rise of possibly about 100 percent in milk demand over the next 15 years.
- Training of farmers in integrated dairy development for enhancing supply of milk on farms is very essential. To improve efficiency of milk marketing systems, there is need for training and advocacy of co-operative principles. Existence of a marketing channel is a pre-condition for augmenting surplus milk production. Supply (of a market structure) creates it own demand.

- The price of milk offered by the Milkfed is quite low and reported to be non-remunerative by the farmers. But Milkfed claims that the milk offered for sale is below the standard as prescribed by the PFAA.
- In remote areas of the state there is considerable quantity of milk available for sale but cannot be disposed off, as there are no marketing facilities. In some areas where traders operate the prices offered are low. The dairy farmers located in such areas do not have the knowledge of co-operative milk marketing.