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THE ECONOMICS OF MILK PRODUCTION AND MARKETING IN LESOTHO SURVEY RESULTS

by

MOTSAMAI MOCHEBELELE

RESEARCH REPORT NO. 28



Institute of Southern African Studies

National University of Lesotho

P.O. Roma 180 – Lesotho

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CHAPTER I

RESEARCH PROBLEM AND SURVEY PROCEDURE

1.1 Problem Statement

There is a long history of animal husbandry in Lesotho. Basotho are traditional livestock holders with experience of deriving both social and economic benefits from livestock. Open pasture grazing, with limited supplemental feeding, has been and continues to be the predominant practice of animal husbandry. Livestock are kept by households in the lowlands during winter months to feed on crop residues in the fields. In summer the animals are driven into the highlands of the country to make way for planting in the lowlands where most of the crop farming is practised. During the summer months, and planting period, it is common practice for households to leave behind some cattle which will make a span to work in the fields. This seasonal movement of livestock between the lowlands and the highlands is referred to as transhumance, and it has been practised throughout the history of Lesotho's livestock economy. This seasonal movement has profound implications for the development and implementation of the proposed, new range management policies under debate.

In general, the traditional animal husbandry system is characterized by extensive production practices, extensive management styles, and low returns from animal sales and sales of by-products. There is, however, evidence of attempts to improve animal husbandry through the use of a systematic range management and supplemental feeding.

Within the diverse livestock economy, the dairy sub-sector, notably, has some of the prosperous enterprises where significant measures are being taken to improve management. The zero grazing practice is on the increase with concentrate feed to improve

production and returns on time and funds invested. Many farmers have abandoned the practice of open pasture grazing for dairy cows. The Government has taken cognisance of this fact by, initially, limiting promotion of dairy enterprises to the lowlands, where access to feed, veterinary services and other support services is relatively easy compared to the mountain areas.

A number of questions emerge in the quest to study the methods through which farmers can be enticed to adopt a better husbandry and management in dairy farming. What are the policy scenarios and measures that would entice Basotho farmers to transform traditional methods of livestock management, dominated by transhumance, into modern dairy farming? What are the relevant and distinct characteristics of various types of farmers in Lesotho? Which groups of farmers tend to be more responsive to change as engendered by the dairy extension staff? What are the various supplementary feeds used by farmers? What are the common features of farmers who are more adaptive to advanced methods of husbandry? Furthermore, a fundamental question, and perhaps more difficult to answer is, what are the prospects of future expansion and sustainability of dairy farming in Lesotho, given that Lesotho's dairy industry is underdeveloped? Would the potentially high returns from dairy farming lure farmers into specialized dairy enterprises in place of mixed livestock farming? In order to address these broad questions, it is necessary to comprehend fully the characteristics of farmers and their herd composition by type of animals managed.

These questions motivated and preempted the desire to engage in this research of the economics of milk production and marketing in Lesotho.

It is a documented fact that while the livestock economy enjoys a predominant contribution in social and economic value, its

contribution to the formal marketing channels is insignificant. This is primarily because the volume of trade and transactions made through the informal sector is substantial (Swallow et al., 1987). Mochebelele (1988), taking cognisance of a point made by Swallow et al., further argues that besides wool and mohair, dairy farming has a good potential to grow rapidly, and to increase the output from the livestock economy which will be marketed through the formal marketing channels.

Unlike most African economies, Lesotho never experienced the development of large scale dairy enterprises. In most African economies, such as Zimbabwe, Swaziland and Kenya, commercial dairy farming was introduced during the colonial era. At independence, these economies already had sustainable, large scale dairy production enterprises owned by white settlers who had acquired large tracts of land. In these economies, the indigenous farmers were marginalized to the small land holdings. Some degree of self-sufficiency in milk production was accomplished with imports being used to make up for shortfall. After independence, these economies were preoccupied with the redistribution of land and revision of land tenure systems. But it is worth noting that, despite public awareness and outcry, the structure has not changed to any measurable degree even in Swaziland and Zimbabwe where dairy farms remain large and under the ownership of former white settlers and their successors. In some cases, large local dairy operations owned by some sectors of African farmers also emerged.

By comparison, dairy units in Lesotho are primarily small, and they are mainly operated on the basis of household ownership. Although the household is a decision making body, the household head's decisions normally prevail. Little has been done to study the Lesotho dairy industry, its problems and prospects in the context of developments facing livestock and range management. Mochebelele (1987) analysed a number of policy issues relating to

trade of milk between Lesotho and South Africa. But the study falls short of the data and analysis on the production and marketing aspects at the farm level. This area remains less understood, and warrants investigation.

1.2 Objectives of the Study

The overall purpose of the study is to highlight the common features that characterize different groups of dairy farmers in Lesotho and study their production costs and management pattern including their marketing channels. The specific objectives of the study were:

- (a) to examine the demographic and ecological characteristics of the household units engaged in dairy farming;
- (b) to examine the herd composition and distribution patterns of dairy cows;
- (c) to evaluate various economic parameters related to management and husbandry adopted by dairy farmers; and
- (d) to examine production and marketing operations in the dairy system.

1.3 Hypotheses of the Study

Based on a priori conditions, and review of literature on Lesotho's livestock economy and further study of dairy industries in other African countries, the following hypotheses were derived:

1. that Basotho farmers demonstrate rationality by having adopted extensive livestock farming and by the same token, they are responsive to market pressures and signals in the context of their environmental, social and economic background;

2. that being rational and positively responsive to market signals, Basotho farmers are capable of improving and adopting better management and husbandry systems in response to the opportunities presented by dairy farming;
3. that dairy farming is a specialized enterprise within the livestock sub-sector, and that farmers using typically traditional types of management are liable to adapt modern management if it is rewarding;
4. that even though exotic dairy cows increase returns from milk sales, they do not fulfil the multiple functions met by cattle in the traditional livestock economy;
5. that the informal channels are still the predominant means for disposing of milk in Lesotho, while the formal distribution channels are less important to the small holder; and
6. that small scale dairy enterprises are an efficient means of producing milk.

1.4 Research Method and Procedure

After numerous meetings with the government dairy staff and other individuals, the research scope and procedure were drawn up, and a questionnaire was designed. A literature search was also carried out on dairy farming in African countries and other parts of the world.

Guided by the acute lack of basic data, lack of knowledge on Lesotho's dairy farming, and its root problems, it became necessary to undertake a broad study which addressed the economics of production, marketing, and management aspects of the

subsystem.

After preliminary investigations, it became apparent that a working formula was necessary in order to define what constitutes a dairy farmer/unit in Lesotho. It was deemed appropriate to define a dairy farmer (farming unit) as an individual (household) that is engaged in milk production and has under his/her (its) management or ownership, at least one universally recognized dairy breed. Amongst the common dairy breeds in Lesotho are Friesian, Jersey and Brown Swiss and to a lesser degree, Guernsey and Ayrshire.

This definition, which was applied in choosing the sample for the survey, had to be further relaxed after the experience gained during pretesting of questionnaires. It was found out that besides farmers who had pure breeds, there were those who had crosses of the above five breeds. In most cases, these crosses were of good quality, with impressive records of milk production. In the light of this, the working definition had to be broadened to accommodate such enterprising farming units and individuals. It would have been inappropriate to neglect such units, given that they are significantly represented in production and marketing of milk.

Several reasons led to the formulation of a working definition for identification of dairy farmers or dairy farming units. Most importantly, it became clear from discussions with dairy staff that there were different perceptions about what constitutes a dairy farmer or dairy farming. This became particularly evident from the districts' dairy officers. The first group held an opinion that a dairy farmer should be someone (household) with at least one Friesian dairy cow. The second group, was of the opinion that a dairy farmer is anyone who engages in milk production, with at least one cow of the five breeds mentioned earlier. This latter group had a much broader, and perhaps more

accommodating definition.

The first of two definitions mentioned above, tends to be accepted because of the current government policy which pronounces Friesian as a recommended choice. The second definition, which is somewhat more liberal, tends to leave the final decision to individual farmers, notwithstanding the emphasis on Friesian. It takes cognisance of the historical developments, that even the other breeds were, at one time, taken to be acceptable. In other words, the presence of Jersey, Guernsey, Ayrshire and Brown Swiss is not accidental, rather, it is a historical phenomenon. It was not until the 1970s that the government pronounced itself specifically on the subject, hence emphasizing Friesian cows.

Having completed preliminary arrangements, students were employed from the National University of Lesotho. Preference was given to third year students in view of equipping them with basic skills, which they subsequently use for their final year dissertations. Before students were taken out to administer questionnaires in the field, they had to undergo basic training. The training involved familiarization with the questionnaire, and exposure to some of the likely problems that may be encountered in the field. This was based primarily on experience gained during the pretesting.

In drawing a sample, a proper representation of the six districts with a concentration of dairy farmers, namely Butha-Buthe, Leribe, Berea, Maseru, Mafeteng and Mhales'Hoek, was desirable. In order to achieve this, a proportional sampling method was adopted in drawing the sample, and farmers were randomly selected from the six districts without replacement using random number tables.

The dairy farmers' population lists were obtained from the

Livestock Division of the Ministry of Agriculture, Cooperatives and Marketing, as well as from districts' dairy offices. Students were also hired to update the population lists by visiting some of the areas. This was because at times, the lists included names of individuals who were no longer in possession of dairy cows, and excluded others who were not registered by the Division but having dairy cows.

A sample of 200 households engaged in milk production was drawn. A breakdown of the population, and sample by district is shown in table 1.1. It is evident that the sample size comprises more than one third of the population, being quite a significant proportion covered.

In terms of distribution, the highest concentration is in Maseru district which contains 48 percent of the farmers followed by Leribe with 17 percent, while Mafeteng and Mochale's Hoek have the lowest concentration, each accounting for seven percent of the total.

Table 1.1 Distribution of Dairy Farmers by District

<u>Districts</u>	<u>Farmers Population</u>	<u>Sample Size</u>	<u>% Sample</u>
Maseru	375	96	48.0
Butha Buthe	80	20	10.0
Leribe	129	34	17.0
Berea	86	22	11.0
Mafeteng	56	14	7.0
Mochale's Hoek	57	14	7.0
Total	783	200	100.0

The survey was carried out during the months of June and July in 1988. Following the completion of field work, a coding framework was designed. The SPSSPC+ software was used for the analysis of data and preparation of tables. The software was

mainly used to make frequency tables and cross-tabulations of several variables.

During the field work, assistance was sought in some instances from the district dairy officers who were very cooperative in locating some of the farmers and respective villages. In most instances, the farmers were not available when their places of residence were visited. Due to absenteeism, quite a number of return visits had to be made hence prolonging the duration of the survey. This was expected given that, in Lesotho, people engage in a multiple of economic activities. In a few instances, replacements had to be made. This mainly involved finding replacements for farmers whose dairy farms had ceased operating.

CHAPTER II

HOUSEHOLD DEMOGRAPHIC DATA AND FARMING HISTORY

This chapter presents the results of the survey relating to the household demographic information and history of the households (farming units). These are presented in tables 2.1 to 2.14. The key variables under evaluation include household heads' marital status, sex, age, education, occupation; number of years in dairy farming, whether the enterprise originated from personal initiatives and investment, or whether it was inherited; and household composition and size. On the basis of these variables, cross-tabulations were carried out in order to show interrelationships.

Presented in table 2.1 is the sex of household heads against their respective marital status. The household heads were predominantly males who account for 93 percent of total, households with female heads merely making up 7 percent. Primarily, the female heads were widows, and no single females invested in dairy farming. By comparison, the bulk of male household heads were married. On aggregate, approximately 91 percent of all household heads (female and male) were married with 8 percent being widowed while less than one percent were not married. It is evident from this analysis that dairy farming is relatively attractive for families rather than single, widowed or divorced persons.

This outcome seems to be primarily explained by the following reasons, but not limited to them. Firstly, the initial capital outlay required to acquire dairy cows, and subsequent support services, is large compared to the traditional livestock. Secondly, the risk and uncertainty involved are a deterrent to new farmers, given their limited financial resources. Lastly, the type of management required becomes a limiting factor for

single investors. They have to divide their labour and time between other economic activities, and this has implications on the management performance. But on the contrary, couples have an advantage of sharing time between other economic activities which may compete with dairy farming.

The breakdown of household heads' ages, with respective marital status are presented in table 2.2. Similar to the marital status, which has been identified as a constraining factor for entry into dairy farming, age also becomes a constraint. It is clear from the table that none of the farming units had household heads below 30 years of age.

Within the age groups presented below, only 3.6 percent of the household heads were in the age group of 31-35. The ratio increases to 11.7 percent and 15.3 percent for the age groups of 36-40 and 41-45 respectively. The peak distribution is reached in the age group of 46-50 where 16.8 percent of the farmers are concentrated, and then declines. For higher age brackets, starting with 51-55, the distribution declines to 14.8 percent and then continues to gradually decrease for the subsequent five age groups. The last age groups of 71-75, and 76 and above, only represent 5.6 percent and one percent of the dairy farmers respectively.

The following deductions are made on the basis of data presented: firstly, that marriages and financial stability tend to occur when couples are in their 30s. During this period, couples begin to seek opportunities for investment, and they have a reliable flow of income which induces them to take risks in anticipation of high returns. Secondly, between 46-50 these families have reached maturity, and this is why in their late 40s, most families have dairy cows which are primarily kept for economic purposes. Thirdly, the reasons advanced earlier, which include capital constraint and management, contribute to the nature of

distribution which has been detailed.

Table 2.3 shows the distribution of household heads by marital status giving some insights on the pattern of education of farmers. A small number, about 3 percent, did not have any formal education. The majority of farmers had gone through, or at least had some primary education. Approximately, 42 percent of the farmers had acquired some basic primary education between standard 1 and standard 6. About 22 percent of these heads had actually attempted Junior Certificate education forming just about half of those who dropped out at primary school level. Next, in a descending order, were the 11.8 percent of the household heads who had a university education, followed by the college education candidates. Finally, there was an insignificant number of some who went through technical school.

In table 2.4, the various occupations of household heads are identified by levels of education attained. An outstanding feature is that the majority of these dairy farmers, 33 percent, are civil servants with most of them having Junior Certificate education (20 percent), followed by University Education (13 percent) and Std1 - Std6 education (12 percent). Approximately, 28 percent were fulltime farmers, followed by 14.4 percent of them who are self-employed in other forms of economic activities. The a priori expectation was that families with mine worker remittances have better opportunities for investment, spawned by high mine wages. But, on the contrary, data show that only 10.3 percent of the household heads were employed in the South African mining industries. Also, the number of farmers employed in the private sector in Lesotho (8.8 percent) was higher than those working for parastatals, and the private sector in the RSA.

Presented in table 2.5 is the sex of the household heads by their form of occupation. It is demonstrated that, while most of the male household heads are employed by government, the majority of

female household heads are full time farmers, and they have limited employment opportunities compared to men.

Tables 2.6 and 2.7 show the household head occupation against age and household head education against age respectively. Reported in table 2.8 are the household heads' ages in relation to the number of years for which dairy farming had been practised. These table highlights the pattern and the rate of entry into dairy farming by different age groups of farmers. The majority of farmers first acquired dairy cows in the 1980s, where 52.9 percent had only come into dairy farming during the last 5 years. Cumulatively, the data show that close to 80 percent of them embarked on dairy farming during the ten-year period from 1978 to 1988. This is consistent with the short history of dairy farming in Lesotho, where significant growth can be traced to the beginning of the last decade. During the 1970s, the first milk processing plant was build. It became the first major landmark for the development of the modern milk marketing system in Lesotho.

Experience and perfection in any trade are gained with time, and through practice. Judging by the average time (1-5 years) in which most farmers had been in dairy farming, one may conclude that this sub-sector is dominated by novices. However, this conclusion cannot be safely made. Basotho are natural livestock holders, and this is in their favour. From an alternative perspective, Mochebelele and Ranko (1990), note that individuals who are good in traditional animal husbandry do not necessarily make good dairy farmers. It turns out that veteran, traditional farmers are less receptive and more suspicious of new ideas.

Reported in tables 2.9 and 2.10 are the household heads' educational background and occupation against the number of years in dairy farming (farm age) respectively.

Presented in table 2.12 is the information relating to whether the farm was initially started by the owner or inherited, against the number of years of ownership by the present owner(s). In Sesotho custom, the eldest son normally inherits the property and responsibilities when parents die. In some cases, wealth is distributed to children by the close relatives of the family. In a similar manner, livestock is also inherited by members of the family, usually by the eldest son. Inheritance of livestock is therefore, a very important feature of Sesotho custom. The table shows that the majority of the farmers (96.4 percent) actually started fresh on their own, while 3.6 percent of them inherited the enterprises. Further, it is evident that the majority of farmers started dairy enterprises within the last ten years. In tables 2.13 and 2.14, the household head occupation and levels of education, are cross tabulated against the mode of entry into dairy farming (self-started or inherited) respectively.

Table 2.1 Marital Status and Sex of Household Head

Sex	Marital Status				Total	%
	Single	Married	Divorced	Widowed		
male	1	180	1	3	185	93
female	-	1	1	13	15	7
Total	1	181	2	16	200	
%	.5	90.5	1.0	8.0		100.0

Table 2.2 Age and Marital Status of Household Head

Age	Marital Status				Total	%
	Single	Married	Divorced	Widowed		
31-35	1	6	-	-	7	3.1
36-40	-	22	1	-	23	11.1
41-45	-	30	-	-	30	15.1
46-50	-	29	-	4	33	16.8
51-55	-	24	-	5	29	14.8
56-60	-	23	-	1	24	12.2
61-65	-	19	1	3	23	11.2
66-70	-	14	-	1	15	7.7
71-75	-	10	-	1	11	5.6
76-100	-	1	-	1	2	1.0
Total	1	178	2	16	197	
%	.5	90.4	1.0	8.1		100.

Number of missing cases 3

Table 2.3 Education and Marital Status of Household Head

Education	Marital Status				Total	%
	Single	Married	divorced	Widowed		
no education	-	6	-	-	6	3.1
std1-std6	-	71	1	9	81	41.5
Std7	-	8	-	2	10	5.1
JC	-	42	-	2	44	22.6
COSC	-	19	-	1	20	10.3
Tech School	-	1	-	-	1	.5
Agric college	-	5	-	-	5	2.6
Other college	-	3	-	2	5	2.6
Univ Education	1	21	1	-	23	11.8
Total	1	176	2	16	195	
%	.5	90.3	1.0	8.2		100.0

Number of Missing Observations = 5

Table 2.4 Occupation and Highest Education of Household Head

Occupation	Education									Total	%
	No Education	Std1-Std6	Std7	JC	COSC	Tech School	Agric College	Other College	Univ		
None	-	1	1	1	-	-	-	-	-	3	1.5
Farmer	1	32	2	8	6	-	1	1	3	54	27.8
Lesotho Govt	-	12	4	20	9	-	3	3	13	64	33.0
Private Sector Les	-	4	-	7	3	-	-	1	2	17	8.8
Parastatal Les	-	-	-	1	-	-	-	-	2	3	1.5
Self employed	1	14	2	7	1	1	-	-	2	28	14.4
Retired	-	2	1	-	-	-	1	-	-	4	2.1
RSA Mines	4	15	-	-	1	-	-	-	-	20	10.3
RSA Private sector	-	-	-	-	-	-	-	-	1	1	.5
Total	6	80	10	44	20	1	5	5	23	194	
%	3.1	41.2	5.2	22.7	10.3	.5	2.6	2.6	11.9		100.0

Number of Missing Observations = 6

Table 2.5 Sex and Occupation of Household Head

Sex	Type of Occupation									Total	%
	None	Farmer	Lesotho Govt	Private Sector	Para-statal	Self-employed	Retired	RSA Mines	RSA Private		
Male	-	51	60	17	3	29	4	20	1	185	93.0
Female	3	5	4	-	-	1	-	1	-	14	7.0
Total	3	56	64	17	3	30	4	21	1	199	
%	1.5	28.1	32.2	8.5	1.5	15.1	2.0	10.6	.5	100.0	
Number of Missing Observations =				1							

Table 2.6 Occupation and Age Structure of Household Head

Occupation	Household Head Age										Total	%
	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-100		
None	-	-	-	1	-	-	1	-	1	-	3	1.5
Farmer	-	4	5	7	10	6	8	7	7	2	56	28.6
Lesotho Govt	4	10	9	11	11	8	6	3	-	-	62	31.6
Private Sector Les	1	2	2	2	2	3	-	3	2	-	17	8.7
Parastatal Les	1	-	1	-	-	-	-	-	-	-	2	1.0
Self Employed	1	2	9	4	4	3	5	2	-	-	30	15.3
Retired	-	-	-	1	-	1	1	-	1	-	4	2.0
RSA Mines	-	5	4	7	2	3	-	-	-	-	21	10.7
RSA Private Sector	-	-	-	-	-	-	1	-	-	-	1	.5
Total	7	23	30	33	29	24	22	15	11	2	196	
%	3.6	11.7	15.3	16.8	14.8	12.2	11.2	7.7	5.6	1.0		100.0
Number of Missing Observations =	4											

Table 2.7 Highest Education Attained and Age Structure of Household Head

Education	Household Head Age										Total	Z
	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-100		
No Education	-	1	-	1	2	1	-	-	1	-	6	3.1
Std1-Std6	-	6	11	16	12	11	12	8	3	1	80	41.7
Std7	-	-	3	3	1	-	1	1	1	-	10	5.2
JC	4	4	5	6	10	2	5	4	2	1	43	22.4
COSC	-	3	4	2	2	5	2	1	1	-	20	10.4
Technical Schl	-	-	-	1	-	-	-	-	-	-	1	.5
Agric College	1	1	-	1	-	1	-	-	1	-	5	2.6
Other College	-	1	-	2	-	-	-	1	1	-	5	2.6
Univ Education	2	7	4	-	2	3	3	-	1	-	22	11.5
Total	7	23	27	32	29	23	23	15	11	2	192	
Z	3.6	12.0	14.1	16.7	15.1	12.0	12.0	7.8	5.7	1.0		100.0
Number of Missing Observations -			8									

Table 2.8 Age of Household Head and Years in Dairy Farming

Household Head Age	Years in Dairy Farming							Total	%
	1-5	6-10	11-15	16-20	21-25	26-30	31-40		
31-35	7	-	-	-	-	-	-	-	3.6
36-40	13	9	1	-	-	-	-	23	11.7
41-45	18	5	5	2	-	-	-	30	15.3
46-50	16	11	3	1	1	-	-	32	16.8
51-55	12	7	1	3	3	1	-	27	14.8
56-60	14	2	3	2	1	1	-	23	12.2
61-65	10	5	6	1	-	-	-	22	11.2
66-70	7	4	-	-	3	1	-	15	7.7
71-75	2	3	1	1	2	-	1	110	5.6
76-100	2	-	-	-	-	-	-	2	1.0
Total	101	46	20	10	10	3	1	191	
%	52.9	24.1	10.5	5.2	5.2	1.6	.5		100.0
Number of Missing Observations =				9					

Table 2.9 Household Head Highest Education by Years in Dairy Farming

Education	Years in Dairy Farming							Total	%
	1-5	6-10	11-15	16-20	21-25	26-30	31-40		
No education	4	1	-	-	-	-	1	6	3.2
Std1-Std6	44	22	5	4	3	2	-	80	42.3
Std7	3	2	3	1	1	-	-	10	5.3
JC	23	12	3	1	2	1	-	42	22.2
COSC	6	6	4	2	1	-	-	19	10.1
Technical Sch	1	-	-	-	-	-	-	1	.5
Agric College	4	1	-	-	-	-	-	5	2.6
Other College	1	1	-	-	1	-	-	3	1.6
Univ Education	12	3	3	2	2	1	-	23	12.2
Total	98	48	18	10	10	4	1	189	
%	51.9	25.4	9.5	5.3	5.3	2.1	.5		100.0

Number of Missing Observations = 11

Table 2.10 Occupation of Household Head and Years in Dairy Farming

Occupation	Years in Dairy Farming							Total	%
	1-5	6-10	11-15	16-20	21-25	26-30	31-40		
None	1	-	2	-	-	-	-	3	1.6
Farmer	24	17	2	6	3	3	1	56	29.0
Lesotho Govt	29	13	9	4	5	-	-	60	31.1
Private Sector Les	11	3	-	-	1	-	-	15	7.8
Parastatal Les	2	-	-	-	-	1	-	3	1.6
Self Employed	15	9	5	-	1	-	-	30	15.5
Retired	2	1	1	-	-	-	-	4	2.1
RSA of Mines	16	5	-	-	-	-	-	21	10.9
RSA Private Sector	-	-	1	-	-	-	-	1	.5
Total	100	48	20	10	10	4	1	193	
%	51.8	24.9	10.4	5.2	5.2	2.1	.5		100.0
Number of Missing Observations =		7							

Table 2.11 Household Head Age by Total No. of Children

Head Age	Number of Children in the Household				
	None	1-4	5-9	10-14	Total
31-35	-	6	1	-	7
36-40	-	13	8	2	23
41-45	-	18	11	1	30
46-50	-	21	12	-	33
51-55	1	17	11	-	29
56-60	2	18	3	1	24
61-65	2	16	5	-	23
66-70	2	10	3	-	15
71-75	2	5	3	-	10
76-100	1	1	-	-	2
Total	10	125	57	4	196
%	5.1	63.8	29.1	2.0	100.0

Number of Missing Observations = 4

Table 2.12 Method of Acquiring Farm and Years in Dairy Farming

Farm	Years in Dairy Farming								
	1-5	6-10	11-15	16-20	21-25	26-30	31-40	Total	%
Self Started	97	46	19	10	10	4	1	187	96.4
Inherited	4	2	1	-	-	-	-	7	3.6
Total	101	48	20	10	10	4	1	194	
%	52.1	24.7	10.3	5.2	5.2	2.1	.5		100.0

Number of Missing Observations = 6

Table 2.13 Method of Acquiring Farm and Occupation of Household Head

Farm	Occupation									Total	Z	
	None	Farmer	Lesotho Govt	Private Sector Lesotho	Parastat Lesotho	Self- Employed	Retired	R S A Mines	R S A Private			
Self-Started	3	53	63	16	3	30	2	21	1	192	96.5	
Inherited	-	3	1	1	-	-	2	-	-	7	3.5	
Total	3	56	64	17	3	30	4	21	1	199		
Z	1.5	28.1	32.2	8.5	1.5	15.1	2.0	10.6	.5		100.0	
Number of Missing Observations =			1									

Table 2.14 Method of Acquiring Dairy Farm and Household Head Highest Education

Farm	No Educ	Education							Total	%	
		Std1-6	Std7	JC	COSC	Tech School	Agric College	Other College			Univer Educ
Self-Started	6	79	9	42	20	1	4	5	22	188	96.4
Inherited	-	2	1	2	-	-	1	-	1	7	3.6
Total	6	81	10	44	20	1	5	5	23	195	
I	3.1	41.5	5.1	22.6	10.3	.5	2.6	2.6	11.8	100.0	
Number of Missing Observations =										5	

CHAPTER III

LIVESTOCK INVENTORY AND COMPOSITION

The main purpose of this chapter is to present and describe the levels of herd inventories held by the households. For cattle, these are broken down into two main groups namely, improved cattle and other cattle. "Improved" is used as qualifier to identify the cattle which are of recognized dairy breeds. These are generally accepted as genetically superior milk producers. These are further broken down into cows, heifers, calves, steers, oxen and bulls. The second main group "other cattle" refers to those cattle which belong to nondescript cattle and crosses which are not dairy breeds. These were also further broken down into the sub-groups as outlined above (e.g. heifers).

The inventories are organized on the basis of a twelve month period, with beginning stock, purchases and herd reduction rates in the form of sales, slaughter and deaths.

3.1 Inventory of Improved Cattle

3.1.1 Composition of Herd

The inventory of improved cattle are contained in tables 3.1 to 3.6, where table 3.7 provides a summary. Out of the total number of improved cattle, adult cows constitute the highest proportion. This outcome, perhaps, reflects the farmers' desire to keep a productive herd as opposed to a herd which does not yield immediate benefits in terms of milk production.

The steers, oxen and bulls are the least represented subgroups, reflecting on the tendency to dispose of them at the earliest opportunity in order to control herd size and costs. This further reflects on the fact that most households which are in dairy

farming, tend to rely on machinery and vehicles as substitutes for draft power. Even more important, the male off-springs of exotic cows lack endurance which is paramount in making a good span. The population of calves which includes male and female calves is third. This shows that farmers generally keep heifers for the replacement of older cows.

In all cases, whether one takes into consideration adult cows, heifers, steers, calves, oxen or bulls, the most common size of holding is 1 animal per household. During the first entry into dairy farming, it is also clear that farmers need time to learn and adapt before expanding their herds. A number of reasons lead to this tendency. Two most obvious reasons are: firstly, the relatively high prices of improved cattle, and, secondly, the general tendency for own capital financing makes it incumbent upon farmers to accumulate savings before the actual purchasing takes place.

3.1.2 Herd Size Management and Off-Take

After acquiring the starting herd, with time, some farmers expand their herd sizes, while, for other reasons, others may close down. These factors, together with sales, slaughter and deaths have an influence on the herd composition, herd size and the growth of the entire dairy farming sub-sector in Lesotho.

For this reason, the off-take rates provide a vital parameter in assessing the likely directions of Lesotho's dairy industry and its future development. Off-take rates are a measure of herd reduction, and were calculated for cows, heifers, calves, steers, oxen and bulls separately.

Sometimes, off-take rates are calculated to reflect sales, slaughter and deaths lumped together. For the purpose of detailed analysis, off-take rates reflecting all three parameters were

computed. These were further disaggregated into sales off-take, and off-take accounted for by slaughter and deaths together (table 3.7).

Sales off-take is calculated as a ratio of total sales to total cattle population (beginning stock, purchases, sales, slaughter and deaths). Similarly, slaughter plus deaths off-take rate is a ratio of the total herd population.

The population of oxen is very low, perhaps because some of them are sold at earlier stages as steers. The off-take rate for oxen is also the lowest (11 percent). This means that households are reluctant to sell oxen once they have matured even though they maintain numbers at low levels.

Adult cows with a total off-take rate (13 percent) had the next lowest rate of reduction. This was almost equally divided between sales (6.5 percent) and slaughter plus deaths (6.7 percent). The sales off-take rate for heifers is much higher than that of adult cows, while the slaughter plus deaths rates are not much different. Bulls have the highest total off-take rate of approximately 37 percent. Out of this, sales off-take accounted for almost 36 percent. In all, the results indicate that there is a very high reluctance amongst farmers to keep bulls in their herds. The likely reasons for this high incidence of bull sales are, the high costs of maintaining grade bulls, and the expanding use of artificial insemination even though it is still highly underutilized country wide.

In general, with the exception of adult cows, sales off-take rates are higher than the slaughter and deaths rates taken together.

3.1.3 Further Details on Adult Dairy Cows

Out of the total herd of improved cattle, more details were sought

with respect to adult dairy cows after adjusting for sales, slaughter and deaths. This information include ownership of adult dairy cows by breed, stock of lactating and dry cows, origin where cows were acquired, mode used to acquire cows and their condition (pregnant etc.) when they were bought.

Ownership of Dairy Cows by Breed

The distribution of adult dairy cows reflects the already mentioned government policy which favours the Friesian breed (figure 3.1). Friesian cows make up 74.3 percent of total dairy cows. Other improved cows which include Guernsey, Ayrshire and crosses between different dairy breeds constitute the second highest proportion of 12.2 percent. The high representation of good crosses of cows shows that it would be inexpedient for national dairy policy to disregard them. Less attention has been given to this reality, perhaps because an open recognition would create a false impression amongst farmers that cross breeding is encouraged. As a result, government officers, in their endeavour to attain success in the promotion of pure breeds, tend to disregard this fact.

Jerseys, which used to be very popular because of their high fat content in milk, make up 9.3 percent of total adult cows. Less emphasis has recently, been placed on Jerseys primary because they are generally low milk producers. The government policy tends to favour high total production per cow as opposed to total production per herd. In this way, it is envisaged that dependence on imports of milk can be reduced, and this will generate income for farmers within Lesotho. The payment scheme at the dairy plant is based on a uniform price per litre. This discriminates against those breeds like the Jersey with higher fat content. Because of this indiscriminate pricing, even in the absence government intervention, the incentive is for profit motivated farmers to favour Friesian. It is conceivable that, as the industry becomes

more commercialized, the numbers of Jerseys will further decline unless the milk pricing system changes to take into account a variability in milk composition.

Whereas the butterfat content in a Jersey milk is about 4.49 percent, the Friesian has 3.55 percent. Neitz (1987), notes that, butter percentage is partly a hereditary characteristic and this causes the difference in average butterfat percentage between different breeds..... There is a common tendency within breeds for high milk producers to give milk with a low fat content.

The Brown Swiss constitute approximately 4 percent of all adult dairy cows. However, this figure may underestimate the actual share of Brown Swiss since the Quthing district where Brown Swiss are mostly found, was not included in the survey. But this may not be a gross underestimation because, recently, a large number of Friesian cows have also been purchased by farmers in that district.

The average number of dairy cows is two per household. However, the majority of households owned one dairy cow. The households with only one cow constitute approximately 67 percent of the total, while those with two cows make up 19 percent. The remaining proportion of farmers owns an average of three to five cows. This distribution also has policy implications for the market share in the industry.

Distribution of Dairy Cows by District

Meanwhile, more dairy development has been experienced in Maseru district which has 48 percent of dairy farmers, and where more than half (54.3 percent, see figure 3.1) of the adult dairy cows are found. Approximately 17 percent of dairy cows are in Leribe district, whose dairy farmers make up 17 percent of the total number of farmers. Mafeteng and Mohales'Hoek, jointly share 10.5 percent of the dairy cows, and Berea 10 percent.

Principal Sources of Dairy Cows

In order to assess the potential for self-reliance in the supply of dairy cows, it was imperative to find out from where, and how cows were acquired. As demonstrated in figure 3.2, approximately 23 percent of cows are bought directly from RSA by farmers. Other cows, approximately 25 percent of them are still bought from RSA, but through the Livestock Division of the Ministry of Agriculture which is an official agent. This is meant to facilitate proper selection of grade cows by experienced personnel. This channel also helps farmers to take advantage of the revolving fund scheme. In total, just less than half (48 percent) of dairy cows are imported from RSA. A rapid increase in accumulation of dairy cows occurred mostly from 1985. Cows bought since 1985 constitute about 72 percent of the total adult cows.

Besides imported dairy cows, some are bought from local farms (12.7 percent), some are acquired through a mafisa practice (.08 percent), while others are raised on the farm (38.5 percent). Mafisa is an arrangement of prolonged livestock exchange between households. Swallow et al (1987) view it as "an expanded form of borrowing and lending of livestock". In this relationship, the "borrower" becomes the manager of livestock and derives a mix of economic, social and cultural benefits. In the case of cattle, the obvious economic benefits include draught power and milk. Kimble (1979) details how the Mafisa system was used by King Moshoeshoe I and chiefs, who owned livestock, in relation to their subjects.

Whereas the mafisa practice is common in the traditional livestock system, it is clear that where commercial motives prevail as a reason for keeping livestock, the practice is almost nonexistent. Even though breeding is a crucial element in determining the ultimate milk production potential of a calf, it was found that a

high number of cows are raised by individual farmers. The key factor which follows a selective breeding is calf raising and feeding. These factors need a commitment by government to train farmers in calf raising. This is envisaged to be the ultimate answer to the question of self-reliance on supply of dairy cows. This calls for immediate attention in view of the fact that 52 percent of dairy cows are raised locally.

Sources of Finance

In Mochebelele and Ranko (1990) it was argued that farmers rely heavily on self-financing to start projects. This is further confirmed here that, 66 percent of the dairy cows were bought by farmers with their own savings, while 34 percent were bought on credit. For cows bought on credit, the main sources of partial funding were the Lesotho Agricultural Development Bank, the revolving fund which is administered by Livestock Division, and the Lesotho Distance Teaching Centre.

Farmers generally tend to buy cows which are in-calf. Approximately 87 percent of purchased cows were in-calf. This, as argued by the Ministry of Agriculture (personal discussion with Mr Montsi, Chief Dairy Officer), is used as a precautionary measure against purchasing cows which have fertility problems. Secondly, it is a cost effective measure in that farmers realize almost immediate returns from investment when a cow calves. Immediate calving gives new farmers an instant cash flow, and improves their standard of living. This translates into an incentive for them to maintain high feeding standards. Of the remaining 13 percent of cows bought, 12 percent were purchased while in milk, and one percent were dry at the time.

Apart from culling ratios or off-take rates, some of the key factors which are influential in determining the profitability in dairy farming are the ratio of lactating cows to total number of

cows, the herd ratio, and calving interval. From the survey, it was found that 70 percent of the 396 adult cows were in milk (table 3.17). Some research show that for a commercial dairy enterprise, a ratio of 80 percent of cows in milk to 20 percent of dry cows is considered a favourable ratio (Backeberg 1980). This ratio becomes more unfavourable when calving interval widens. In Lesotho, a majority of farmers encounter cash flow problems when their cows are dry. It was mentioned earlier that 67 percent of the farmers own only one cow. Even though hard data do not exist, an observation was made during the survey that, for a one-cow farmer, there is a tendency to avoid costs, and be less affectionate to a cow when it is not in milk. The results of this are the poor condition of a cow, irregular feeding and lack of veterinary attention. The cows ultimately fail to pick up and come back into condition even after calving when feeding improves. This has contributed to the generally poor condition and low milk productivity.

3.2 Inventory of Other Cattle

In addition to improved dairy cattle, farmers also have other cattle. In most cases, farmers had these nondescript cattle before they acquired improved dairy cows. Details are presented in tables 3.8 to 3.14.

3.2.1. Composition of Herd

Similarly, as with the improved herd, adult cows make up a higher percentage of the total herd of other cattle owned by households. Whereas, with improved herd, the calves made up the second highest number, in this case they rate third. Oxen are second to cows in numbers. In the improved herd, oxen were the least significant. This strongly suggests that off-spring of improved dairy cows do not make good draught animals, hence why they are not as important compared to indigenous breeds of oxen.

Of the total cattle (improved plus other), it is clear that the improved cattle make up a very high proportion (77 percent) of the total herd managed by the households who are engaged in dairy farming. This may be indicative of the fact that farmers are responding positively to the call to substitute their less productive, indigenous cattle, with productive and income earning dairy cows.

3.2.2. Herd Size Management and Off-take

With the exception of adult cows and bulls, the off-take rates for improved cattle are higher than the off-take rates for other cattle. The implication of this is that, the stock of other cattle is already low among dairy farmers, and at this low level, farmers become more reluctant to completely phase out these indigenous cattle from their herd. At the same time, there is a general unwillingness to expand stock of these nondescript animals.

The incidence is perhaps also explained by the desire to meet some perceived requirements in view of minimizing risk and losses which could be associated with exotic dairy animals. In other words, even though these farmers may be realizing the benefits of dairy farming, they still have to meet other objectives which cannot be directly related to profit making in obvious financial terms. The off-take rates due to sales, are much higher than the joint off-take rates of slaughter and deaths.

3.3 Inventory of Other Livestock

The inventory of other livestock is included to show the multiplicity of livestock enterprises, giving an indication of the level of diversification of economic activities.

In table 3.15, the number of sheep, goats, horses and donkeys owned by households are presented. The small stock, made up of sheep and goats, are popular, with the former being owned by relatively high number of households and in larger numbers. Approximately 35 percent of these dairy farmers had sheep, with the majority of them managing flocks of one to ten sheep. Goats were owned by about 16 percent of the dairy farmers, most of whom also, owned flocks between one and ten goats.

Horses and donkeys, which are generally used for transportation are owned by 14 percent and 10 percent of the households, respectively.

As for poultry, only commercial chicken enterprises were considered in the survey. Data is presented in table 3.16 below. Very small numbers were engaged in poultry farming. Of those who did, the majority had hens which were more than 100 in numbers.

3.4 Cattle Pricing

3.4.1 Purchasing and Sale Prices of Improved Dairy Cattle

Within the context of this study, attempts were made to seek purchase and (re)sale prices of cows. It was generally expected that farmers would purchase cows at relatively low prices and attempt to bargain for higher prices when they sell their own stock.

There is a wide variability in prices of cows which were purchased by farmers. The average price for cows was M1571.00 with a standard deviation of M444.00, and M825.00 for heifers with a standard deviation of M530.00 (table 3.17). A number of factors lead to the wide variability in purchase prices of animals. Some cows were old and had been bought before a rapid increase in

prices which resulted from inflation. This tends to reflect low prices while in fact prices for cows today average M2000.00 per head. Secondly, the low prices may also result from some of the cows which were bought from local farmers at lower prices. Prices of cows bought from local farmers tend to be low. This reflects on relatively poor quality of animals traded amongst farmers. Comparison between prices of adult cows and heifers has to be treated with caution. It became clear during the survey that some farmers treated in-calf heifers as adult cows. It is conceivable therefore, that this may have led to underestimation of the actual level of prices for heifers in the market. Purchasing of calves, steers, oxen and bulls is generally uncommon as shown earlier.

In general, farmers sell cows and heifers at prices much lower than what they pay to purchase some. The average sale price for cows is about 62 percent lower than the acquisition price, and the standard deviation is less than half of the standard deviation for purchase prices. In other words, sale prices of cows are much more stable, but at low levels when farmers trade amongst themselves or sell to local marketing channels, such as the National Feedlot and Abattoir Complex (table 3.18). Similarly, farmers sell heifers at low and stable prices compared to prices at which they buy them. The sales prices are 26 percent lower than purchase prices which are also subject to a wide variation. It is clear, therefore, that prices of exotic dairy cows purchased from RSA are more responsive to market inflationary pressures than prices of cows traded locally.

It is apparent that the demand for bulls is quite high judging by the price levels. The prices received by dairy farmers average M809.00 even though variability is high. Similarly, dairy farmers fetch high prices from sales of oxen with an average price of M750.00 and a standard deviation of M71.00.

3.4.2 Purchasing and Sale Prices of Other Cattle

As has been witnessed, dairy farmers generally show a tendency to slow down accumulation of cattle which contribute marginally or which do not contribute to dairy farming. The average price at which they purchased other heifers is M450.00, which is 45 percent lower than the price at which they buy improved heifers for milk production (Table 3.17).

Average sales prices for these cattle vary from M287.00 for heifers to as high as M692.00 for bulls. Similar to the case of improved bulls, sales prices of nondescript bulls are also high. However, the number of bulls sold is low mainly because of castration and the demand for draught power for which oxen are better than bulls.

Dairy Cows by Breed



Dairy Cows by District



Figure 3.1 Dairy Cows by Breed and District
(In Percentages)

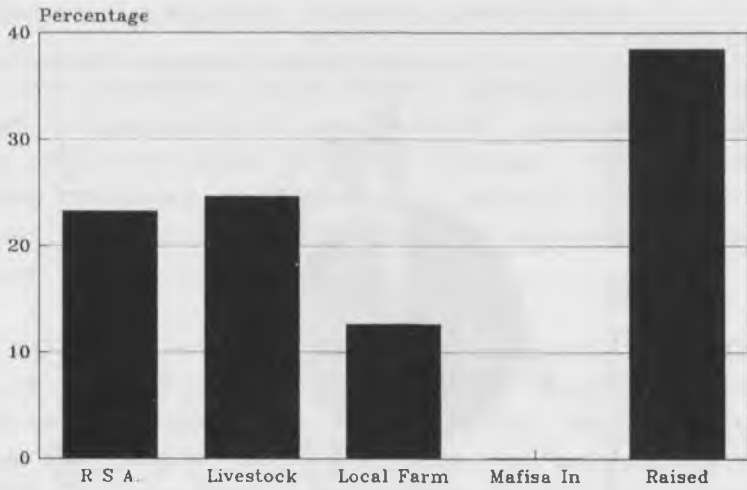


Figure 3.2 Origin of Dairy Cows Owned by Farmers

Table 3.1 Inventory of Improved Cows by Households

No. of Cows	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	86	28	17	5	23
2	47	6	5	-	-
3	20	3	1	-	1
4	11	2	-	-	-
5	4	1	-	-	-
6	2	-	-	-	-
7	1	-	-	-	-
8	1	-	-	-	-
9	1	-	-	-	-
None	27	160	177	195	176
Total	200	200	200	200	200
Tot Animals	340	62	30	5	26
Off-take rate =13%					

Table 3.2 Inventory of Improved Heifers by Households

No. of Heifers	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	40	1	12	-	6
2	13	1	3	-	1
3	3	-	-	-	1
4	3	-	1	-	-
14	-	-	1	-	-
15	1	-	-	-	-
None	140	198	183	200	192
Total	200	200	200	200	200
Tot Animals	102	3	36	-	11
Off-take rate =31%					

Table 3.3 Inventory of Improved Calves by Households

No. of Calves	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	64	3	8	-	15
2	32	-	13	-	-
3	21	-	3	-	1
4	6	-	-	-	-
5	3	-	-	-	1
6	1	-	-	-	-
7	-	-	-	-	-
8	-	-	-	-	-
9	1	-	-	-	-
None	72	197	176	200	183
Total	200	200	200	200	200
Tot Animals	245	3	43	-	23
Off-take rate =	21%				

Table 3.4 Inventory of Improved Steers by Households

No. of Steers	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	11	-	4	1	2
2	5	-	-	-	1
3	1	-	-	-	-
4	2	-	-	-	-
None	181	200	196	199	197
Total	200	200	200	200	200
Tot Animals	32	-	4	1	4
Off-take rate =	22%				

Table 3.5 Inventory of Improved Oxen by Households

No. of Oxen	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	10	-	2	1	1
2	6	-	-	-	-
3	2	-	-	-	-
4	1	-	-	-	-
None	181	200	198	199	199
Total	200	200	200	200	200
Tot Animals	32	-	2	1	1
Off-take rate = 11%					

Table 3.6 Inventory of Improved Bulls by Households

No. of Bulls	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	31	-	8	-	1
2	4	-	5	-	-
3	1	-	1	-	-
None	164	200	186	200	199
Total	200	200	200	200	200
Tot Animals	42	-	24	-	1
Off-take rate = 37%					

Table 3.7 Improved Livestock Inventory-Summary for a Twelve Month Period

Improved Cattle	Number of Animals						Sales Offtake %	Slaughter & Deaths Offtake %	Total Off-take %
	Beginning Stock	Purchase	Sales	Slaughter	Deaths				
Cows	340	62	30	5	26	6.5	6.7	13	
Heifers	102	3	36	-	11	23.7	7.2	31	
Calves	245	3	43	-	23	13.7	7.3	21	
Steers	32	-	4	1	4	9.8	12.2	22	
Oxen	32	-	2	1	1	5.6	5.6	11	
Bulls	42	-	24	-	1	35.8	1.5	37	

Table 3.8 Inventory of Other Cows by Households

No. of Other Cows	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	25	-	2	3	2
2	12	-	2	1	1
3	4	-	2	-	-
4	1	-	-	-	-
9	1	-	-	-	-
None	157	200	194	196	197
Total	200	200	200	200	200
Tot Animals	74	-	11	5	4
Off-take rate	=21%				

Table 3.9 Inventory of Other Heifers by Households

No. of other Heifers	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughters	Deaths
1	4	1	1	-	1
2	4	-	1	-	-
3	4	-	-	-	-
4	1	-	-	-	-
None	187	199	198	200	199
Total	200	200	200	200	200
Tot Animals	28	1	3	-	1
Off-take rate	=12%				

Table 3.10 Inventory of Other Calves by Households

No. of Other Calves	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	18	-	1	-	1
2	5	-	-	-	-
3	2	-	1	-	-
4	2	-	-	-	-
None	173	200	198	200	199
Total	200	200	200	200	200
Tot Animals	42	-	4	-	1
Off-take rate =11%					

Table 3.11 Inventory of Other Steers by Households

No. of Other Steer	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	6	1	3	-	1
2	3	-	-	-	-
3	2	-	-	-	-
4	1	-	-	-	-
None	188	199	197	200	199
Total	200	200	200	200	200
Tot Animals	22	1	3	-	1
Off-take rate =15%					

Table 3.12 Inventory of Other Oxen by Households

No. of Other Oxen	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	4	-	4	-	1
2	8	-	-	-	-
3	6	-	-	1	-
4	1	-	-	-	-
5	1	-	-	-	-
6	1	-	-	-	-
None	179	200	196	199	199
Total	200	200	200	200	200
Tot Animals	53	-	4	3	1
Off-take rate = 13%					

Table 3.13 Inventory of Other Bulls by Households

No. of Other Bulls	Number of Households Reporting				
	Beginning Stock	Purchases	Sales	Slaughter	Deaths
1	9	-	3	-	-
2	3	-	-	-	-
3	1	-	-	-	-
4	1	-	-	-	-
None	186	200	197	200	200
Total	200	200	200	200	200
Tot Animals	22	-	3	-	-
Off-take rate = 12%					

Table 3.14 Other Livestock Inventory-Summary for Twelve Months

Other Cattle	Beginning		Purchase	Sales	Slaughter	Deaths	Sales	Slaughter	Total
	Stock						Offtake	& Deaths	Off-take
							%	%	%
Cows	74	-	11	5	4	11.7	9.6	21	
Heifers	28	1	3	-	1	9.1	3.0	12	
Calves	42	-	4	-	1	8.5	2.0	11	
Steers	22	1	3	-	1	11.0	3.7	15	
Oxen	53	-	4	3	1	6.5	6.5	13	
Bulls	22	-	3	-	-	12.0	0	12	

Table 3.15 Inventory of Other Livestock Besides Cattle

No. of Animals	Number of Households Reporting			
	Sheep	Goats	Horses	Donkey
1 - 10	45	16	28	20
11 - 20	14	9	-	-
21 - 30	1	1	-	-
31 - 40	4	2	-	-
41 - 50	2	2	-	-
=> 51	3	1	-	-
None	131	169	172	180
Total	200	200	200	200

Table 3.16 Households by Commercial Chicken Enterprises

No. of Chicken	Number of Households Reporting	
	Layers	Broilers
16	1	-
25	-	1
37	-	1
95	1	-
98	-	1
=> 100	6	3
None	191	194
Missing Cases	1	-
Total	200	200

Table 3.17 Average Purchase Prices of Cattle (in Maloti)

<u>Livestock</u>	<u>Improved Cattle</u>	<u>Other Cattle</u>
Cows	1571	-
Heifers	825	450
Calves	300	-
Steers	-	400
Oxen	-	-
Bulls	-	-

Table 3.18 Average Sale Prices of Cattle (in Maloti)

<u>Livestock</u>	<u>Improved Cattle</u>	<u>Other Cattle</u>
Cows	600	570
Heifers	614	287
Calves	409	300
Steers	598	467
Oxen	750	472
Bulls	809	692

CHAPTER IV

ASPECTS OF DAIRY HUSBANDRY AND MANAGEMENT

There are a number of ways by which farmers acquire expertise and develop their skills in respect of modern dairy farming. Some copy from other farmers or learn from their own experiences. However, there are fundamental dairy management aspects which because of their nature, cannot simply be copied. It was articulated in Mochebelele and Ranko (1990) that farmers who already have some preconceived perceptions of dairy farming are often less adaptive and do not turn out to be progressive farmers. The essence of this chapter is to highlight several management related aspects which impinge upon, and are essential for modern dairy farming.

4.1 The Role of Government

It is usually argued that private concerns fail to play a meaningful role where benefits gained from an activity cannot be directly internalized by individuals. The usual argument is that public goods and public services need the involvement of government. These goods and services cover a wide spectrum such as electricity supply, roads, health, education and many others. Social goods, or goods the benefits of which are primarily external, are likely to be undersupplied unless provision is made by the public sector. This argument usually forms the premises for government participation.

The market economy, when a given set of conditions is met, enables and facilitates an efficient use, and allocation of resources in providing for private goods. It is required under the circumstances that consumers reveal their preferences by bidding for what they want. Producers, as they attempt to maximize profit, will produce commodities which correspond to the

consumers' preferences at least the cost. However, this is an idealized role of the market system.

In practice, a number of factors arise which are not adequately accommodated within the idealized market system. For example, consumers and producers may lack sufficient information. In some circumstances, externalities exist so that consumption benefits cannot be limited to, and be charged to a specific consumer, and, similarly, economic activity may result in a social cost which cannot be charged to a single producer. There are many such factors which constitute the definition of public or social good.

As in many other economic and social sectors, the government of Lesotho has and continues to participate directly and indirectly in the development of dairy industry in Lesotho. Since independence, government participation has largely been indirect. Many projects, which were primarily funded through foreign assistance, were conceived. Even though almost all these projects did not specifically concentrate on dairy development, a number of them had a provision for dairy farming. Among some of their key roles were to facilitate acquisition of exotic cows, and provide extension services and training. Training is one of the typical social goods which are supplied by government either directly or through project personnel. Training courses of these nature are organized and subsidized by the public sector.

4.2 Economics of Herd Management

Three major management aspects merit attention in an investigation into the commercialization of a dairy enterprise, namely, the herd ratio, the calving interval, and the conception rate of cows. Even though these are three separate management aspects, they are interrelated and should be considered jointly.

Herd Ratio

The herd ratio refers to the ratio of the number of adult cows, both dry and lactating, to the total number of animals in the dairy herd. The concept "dairy herd", in this context, embodies only female stock, that is cows, heifers and heifer calves. The herd ratio is particularly important if farmers raise heifers from birth to maturity. The significance of this lies in that the herd ratio has to stabilize at a high level in order to maintain net cash income flow at high level. The income from milk sales needs to be high enough to cover all farm costs, where, normally, feed is the single most regular and costly item. Expenditure on roughage and concentrates costs between 45 percent and 65 percent of total costs of production (Neitz, 1980). It is conceivable that, for dairy farming under a zero grazing system, the expenditure is even higher.

In South Africa, optimum herd ratios are at least 67 percent for a Friesian herd, and 75 percent for Jerseys. Even though these figures are based on larger stock units, they provide a useful reference point. Two main factors affect the optimum herd ratio. These are the off-take rate and the rate of replacement of adult cows. For example, where cows are replaced after four lactations, the effect on herd ratio will vary from a stock unit where replacements are made after longer periods, for example, at the sixth or seventh lactation.

In Lesotho, the survey results show that the herd ratio is approximately 60 percent. By comparison, this is lower than the South Africa ratio for both Friesian and Jersey. This raises a cause for concern that the net cash income from dairy farming in Lesotho is lower than its potential. This implies that farmers tend to keep a relatively high proportion of uneconomic animals in their herds. Their presence raises production and management costs which are paid for by the productive herd. Under the

circumstances, the question is whether farmers should be raising their own heifers for herd replacement and for expansion of herd sizes, or should they be offered the choice of imported cows.

In the light of Lesotho's lack of pasture, and the growing zero-grazing system, the concept of herd ratio has even more profound implications. A sub-optimal herd ratio results in a prohibitive feeding cost which becomes a serious management problem. As will be shown, most of the supplemental feed used by farmers is purchased.

Calving Interval

Milk production, amongst other factors, is dependent upon the calving intervals of cows. A high herd ratio does not, therefore, guarantee a high income from milk sales. Cow fertility and feeding are two of the key factors which subsequently influence calving intervals. Under good husbandry and high breeding performance, a cow should normally have 300 to 305 days of lactation period, and 60 days of rest during which it builds up body condition before calving.

In dairy farming, it is a generally accepted norm that an average calving interval of 365 days is optimal. Notwithstanding fertility and pregnancy problems, the reinsemination period would have to be performed within 60 to 85 days after calving in order to achieve an optimum inter-calf period of 11 to 12 months. There is research evidence that it becomes increasingly difficult for cows to conceive after 90 to 100 days from calving date (Bosman, 1987). This necessitates careful management to ensure proper record keeping and heat observation on the part of a farmer. Heat observation, is a decisive factor on the conception rates, and can lead to avoidance of long reinsemination periods. If for example, the calving interval is prolonged while the dry period lengthens then the enterprise becomes uneconomic to

operate.

In Lesotho, based on the survey results, the calving intervals are very irregular and long. These, of course, vary widely between cows and between herds under different management systems. The intervals vary from 12 months to 36 months. A high ratio of cows, approximately 46 percent, achieved an optimal calving interval of 12 months. The average calving interval, however, is much longer, being approximately 16 months. This mean that, the national dairy herd calving interval is 4 months longer than the ideal inter-calf period which is considered economic.

Some cows had a dry period well in excess of 6 months compared to 2 months which is considered adequate for a cow to rest before calving. The average length of time during which the cows are not in milk is certainly too long and poses questions regarding the quality of management and efficiency in the dispensation of breeding services.

In summary, the dairy herds in Lesotho are characterized by prolonged calving intervals, which together with long dry periods suggest a need for the continual and intensive training in dairy management.

Breeding and Conception Rate

For breeding, farmers either use bull service, artificial insemination or both methods. The choice usually depends on convenience. Out of 200 farmers who were interviewed, 64 percent of them had never used artificial insemination in their herds. During 1987 however, more than 30 percent of cows and heifers were artificially bred. These included cows which had failed to conceive before, and were being repeated.

The incidence of cows and heifers which failed to conceive through artificial insemination was high. The conception rate at the first insemination for heifers, and reinsemination for adult cows is low, making up 44 percent. In view of this low level of conception rate, out of every 100 cows bred, 66 are expected to be reinseminated at least once more before they conceive. After repeated reinsemination and failures, some farmers develop resentment against artificial insemination, and unwillingly resort to bull service.

The low success rate of conception through artificial insemination has financial implications for farmers. The most obvious is breeding cost, but, more importantly, it leads to prolonged calving intervals and low returns from milk sales over the productive life span of cows. The conception rate is perhaps one of the paramount reasons for calving intervals and dry periods of cows being much longer than normal. When asked as to how government can assist to improve dairy farming in Lesotho, approximately 19 percent of farmers mentioned improvement of breeding services as the most important factor. Of this 19 percent, 12 percent specifically mentioned artificial insemination while 7 percent explained that bull service centres should be established in their locations.

Besides biological factors such as infertility, a number of other factors related to management are responsible for the low conception rates when artificial insemination is used. These management factors include:

- (a) failure to observe cows on heat in time. Cases were reported where farmers suspected that they failed to alert the AI technician in time because they were uncertain whether cows were on heat, this leads to untimely breeding of cows;

- (b) failure on the part of technicians to turn up on time. Several farmers expressed their concern that technicians miss the peak period of cows on heat because of transportation problems. Transport for technicians is provided by the government. It is imperative that the government needs to have transport ready for technicians at all times, including weekends and holidays. Failure to provide a properly coordinated transport system will lead to a continued sub-optimal breeding success;
- (c) low conception rates arising from undernourished cows. There is a high incidence of poorly fed dairy cows. The bulk of feed used by farmers is purchased from private and government outlets which have to make profit. Some farmers do grow their own fodder, but often this is not enough. Where own fodder production is insufficient to meet demand, and where costs of purchased fodder (e.g. Lucerne, eragrostis) are perceived to be prohibitive, cows are frequently undernourished;
- (d) competence and adequate training of technicians. Apart from biological and physical problems which are expected to occur in breeding, it is not unlikely that some failures result from inadequate training of AI technicians. It would be difficult to establish a direct link, however, in the light of apparent poor performance of AI conception rates, all factors need attention.

These factors lead to low conception rates, and to loss of faith in artificial insemination. It is important to note that the above list is not exhaustive, but highlights major, potential causes of poor performance. Unless breeding services are improved to cover all dairy development areas, there is a very strong possibility that increased, and indiscriminate cross breeding will take place.

Under normal circumstances, where the farmers did not use AI, they serviced cows with improved bulls. During the period of one year, approximately 57 percent of farmers had bred at least one cow with an improved bull. When compared to AI, a natural bull service has a much higher conception rate of approximately 74 percent. This clearly shows that farmers are likely to lose faith in artificial insemination even though it has a number of advantages since it provides a wider choice of semen. Farmers may take exception to the Ministry of Agriculture if they perceive failures in AI as primarily a result of incompetence of technicians. Mochebelele and Ranko (1990) explored many advantages associated with AI.

The breeding of dairy cattle with scrub and mongrel bulls is sufficiently high to generate concern. Thirteen percent of farmers reported having bred at least one dairy cow with an ordinary scrub or mongrel bull. Taking all factors into account, such as convenience, this ratio of cows bred with nondescript bulls may increase if the AI services do not expand fast enough to cope with demand.

The central argument is that these problems, which have been explored, need to be viewed as signals which show that there is a potential for improvement.

4.3 Basic Record Keeping of Farm Operations

Record keeping is an essential element of business enterprises, and forms the basis for proper planning and coordination of economic operations. Dairy farming is also a business and requires a businessman's approach. As such, records are used to keep track of essential details which guide the manager in making his decisions. These help a farmer to avoid proceeding blindly, making the same errors in judgement in management problems. A

few aspects of record keeping, which were covered in the survey are detailed below. In general, about 80 percent of farmers kept some kind of records for their farm operations, although the system was not extensive. Records disclose facts and enable a farmer to chart his future course of management more accurately. Of the farmers who keep records, 73 percent had developed their own system of records, while 21 percent were using a system which had been developed by the government, and, or projects. The remaining 6 percent used a combination of record system based on personal experience as well as forms acquired through the government/projects.

Breeding Records

It is essential for a dairy farmer to keep breeding and calving date records, otherwise the time of an event is likely to be forgotten. Extensive breeding records' systems are as important to small farmers as they are to large herd owners. As shown in figure 4.1, of the farmers who did keep records, 71 percent maintained breeding records. Even though this is not satisfactory, it is a high ratio compared to other forms of records maintained by farmers. These records should assist farmers in monitoring other management aspects discussed earlier, such as calving intervals and repeated failure in conception of cows. In some instances, farmers kept detailed record forms on which entries were made for each cow. These recording forms had been supplied by the Livestock Division. However, very few farmers had these detailed forms. It was clear that farmers who were supplied with the properly structured record forms to use, invariably kept better and detailed records.

Production Records

It is in the interest of a farmer, and the industry as a whole, to ensure that milk production matches demand in Lesotho. At a

micro level, a farmer should in essence keep track of unusual signs in the herd through the production records. A drop in milk production of a cow may provide an early sign of disease or poor feeding. Despite the fact that the level of milk production is a critical element for maintenance of economic viability of enterprises, few farmers seem to give it the attention it deserves. Whereas it was anticipated that a very high ratio of farmers keep production records, a rather small number, about 54 percent maintained milk production records (figure 4.1).

Milk Sales Records

Sales records provide valuable information used to reconcile revenue with production on the farm after adjusting for milk retained for consumption. Even though it serves the same purpose for farmers who sell in the informal markets, a stronger case exists for farmers who use formal marketing outlets where payments are made in phases. Some farmers have milk delivery arrangements which involve alternating with others. It therefore becomes imperative for them to reconcile production with sales records. It was found in the survey that 51 percent of farmers keep sales records. Whether farmers kept records or not did not have any bearing on whether farmers sold milk through formal or informal marketing channels. It would have been expected that farmers who utilize formal marketing channels must all keep milk sales records.

Feed Records

Every dairy farmer would normally be expected to keep extensive records of feed usage and costs. Feed alone accounts for about 50 percent of total costs of milk production. Cost of feed is a variable factor which warrants continuous record keeping. In principle, a farmer should aim at a low-cost, but high-quality feed in order to increase the margin between production costs and

the price of a final product. When the margin is wide, it becomes more profitable to remain in farming. Ironically, in Lesotho only a few seem to know the importance of keeping track of their feed use and costs. About 26 percent of farmers keep records of feed usage while 30 percent maintain expenditure records on feed.

Factors Affecting Record Keeping

Further information was solicited from about 20 percent of the farmers who did not keep any form of farm records. This was meant to find reasons why records were not kept. Figure 4.1 shows the respective reasons for farmers not keeping farm records. Of the 20 percent of farmers who kept no farm records, about 42 percent stated that their reason for not keeping records is that the exercise is meaningless and is of no value to their enterprises. In many ways, this group adopted a behaviour which is resistant to change. They tend to hold a perspective of "is it worth the effort and time to implement a planned strategy." A further 25 percent were less pessimistic about the importance of record keeping when they reported that they were not aware of the benefits of records keeping. Had they been aware of the benefits, this group would perhaps keep records. Out of the remaining one-third of respondents, 8 percent declared that they lacked skills while 25 percent mentioned other reasons. The bottom line is that many farmers do not keep records because of ignorance which arises from lack of aggressive extension assistance for dairy farming.

The results suggest two main areas which need to be strengthened through extension assistance. Firstly, there is a need to launch extensive educational courses which will help farmers to relate recorded information on farm operations to sound management benefits. Secondly, farmers will have to be supplied with detailed record forms which are easy to fill but comprehensive.

These are two of the major roles which need to be assumed by the government.

4.4 Calf Raising

Calf raising is a specialized dairy practice, requiring a high level of management. Calves today are the adult cows of tomorrow, and the full potential in milk production depends on the level of management and feeding involved in raising them. With proper raising, replacement heifers help to reduce dependence on continual purchasing of heifers whose genetic potential and history is not known to the farmer. Careful breeding can be used as a means for avoiding importation of cows which are potential carriers of diseases such as brucellosis. It is estimated that 20 percent of herds in the RSA are infected.

The age at which a calf reaches its sexual maturity is largely determined by feeding, veterinary attention and environmental factors. It is normally expected that a heifer should calve when it is about 24 months old. These factors, if not followed correctly, can lead to a heifer calving at a much later period. Therefore, growth and maturity are not a voluntary process.

It was found from the survey that Basotho farmers adopt various forms of raising and feeding calves. The majority of farmers were found to adopt traditional means of raising calves. Almost 62 percent of farmers let calves suckle their dams either before milking (7%), or after milking (55%). In figure 4.2, the various methods used to feed calves before weaning are shown. Most of the farmers who let a calf suckle after milking, were found to have the common practice of leaving one of the teats un milked. The practice of suckling calves poses management problems for herd managers, and is generally discouraged in modern dairy enterprises.

Calves which are accustomed to suckling ad lib are difficult to control so that there is a risk of them escaping from their pens and suckle their dams. There is also a risk of them getting either an excess of or less milk than required. But calves which drink milk from buckets are given milk in measured quantities. Approximately 38 percent of farmers fed milk to calves from buckets as recommended by extension advisors. The use of milk substitutes is very limited and farmers rely almost exclusively on whole milk to feed unweaned calves.

There are some differences in times after which calves are weaned. The farmers who let calves suckle tend to wean after a longer period, with an average age of 5 months and a standard deviation of 3 months. The farmers who feed calves from buckets wean them earlier when they are aged 4 months with a relatively smaller standard deviation of 2.5 months.

One of the fundamental management principles is to keep cows at ease during milking in order to fully stimulate the secretion of milk. In a traditional husbandry, an orthodox manner to achieve this is to let calves suckle prior to milking. This practice conditions cows to be less docile and difficult to milk in the absence of their calves. This then becomes a serious management problem and affects efficiency in dairy farming. For herds where calves have a 'free' access to suckling, it is much more difficult to wean calves. But calves which feed on milk from a bucket wean much more easily through a gradual reduction of milk intake. This is complemented by the introduction of dry feed designed to replace milk.

By allowing calves suckle before, and at intervals during the milking period, the less adaptive farmers avoid usage of milking cream. Up to 75 percent of farmers do purchase and use milking cream. The remainder of farmers, approximately 10 percent use

ordinary vaseline as a substitute for milking cream, and 15 percent use neither vaseline nor milking cream to wet and sooth teats.

4.5 Water Supply and Access

Besides availability of feed and other inputs which go with dairying, access to a clean and ready supply of water is important. But the importance of this fact is often undermined. Even though absolute consistency cannot be expected in composition of milk, water constitutes about 87 percent of milk. This shows that there is a positive relationship between availability of water on the farm, and the potential level of milk production in a dairy herd.

Irregularity of water supply was found to be a serious problem during dry winter months when convenient sources of water dry up. Because of this, the principal sources of water tend to vary seasonally. This forces farmers to either draw water for cattle from dams or take them to the streams.

Taps were found to be the most common source of water supply, reported by approximately 78 percent of farmers (figure 4.3). Dam water was next in importance (9.5 percent of farmers), followed by wells 8 percent, and stream\river water 5 percent. As shown in figure 4.3, the regular sources of water supply are within the farm yard or homestead. A lower ratio, 42 percent of farmers reported their regular sources of water supply to be off-yard. In assessing the quality, most farmers, in excess of 90 percent, felt that they had access to water which was free of contamination and pollution.

4.6 Assessment of Government Support

It must be accepted, that within certain limits, farmers have expectations of what the government should do for them. These expectations may not necessarily be accommodated by, or be congruent with the roles that the government has set for itself. Therefore, these expectations reflect upon the difficulties which farmers experience.

In order to get to the heart of these problems, farmers were asked to list in order of priority, four areas where government assistance is sought. The results are contained in Table 4.1.

Table 4.1 Important Areas Which Require Government Attention

	Percentage of Households Reporting			
	Primary	Secondary	Third	Fourth
Increase Milk Price	12.5	8.5	3.0	1.0
Improve Breeding Services	11.0	6.0	5.0	2.0
Provide Bulls	7.0	4.5	3.5	1.5
Provide Credit	6.0	4.5	5.0	1.0
Subsidize Feed Costs	19.5	14.0	4.5	1.5
Improve Vet Services	19.5	12.5	8.5	4.5
Conduct Dairy Courses	8.0	3.0	2.0	0.5
Control Stock Theft	0.5	-	-	0.5
Timely Delivery of Cows	0.5	1.5	-	1.0
Subsidize Cow Prices	4.0	4.5	2.0	1.5
Not Applicable	7.0	31.0	51.0	68.0
No Response	4.5	10.0	14.5	17.0
TOTAL	100	100	100	100

Improvement of, and access to veterinary services is consistently found to be the most pressing demand. Farmers felt that they lose on diseases which are easy to cure if attended to in time. The most common cause of deaths is nyooko (Anaplasmosis) which was reported by the majority of farmers (54 percent). It is important, however, to note that normally, nyooko is one disease which is mistakenly thought to be the cause (Personal discussion

with Mr S. Ramoeketsi- Livestock Division). Mastitis is the second most common disease followed by pink eye. There are other diseases such as black quarter, milk fever and anthrax, but their incidence is insignificant. Abortion was reported by 3 percent of farmers. Brucellosis is normally the major cause of abortion in dairy cows. However, the study could not establish a scientific link between the reported incidence of abortion and brucellosis. It is also suspected that the other cause of abortion is undernourishment and poor condition of cows. It was found, however, that the most common cause of deaths in cows is the consumption of foreign objects such as plastic and metal objects. This arises purely out of poor management where plastic bags and metal objects are not cleared from feed. Other less prominent management related causes of deaths are bloating, old age and chronic mastitis.

Amongst dairy farmers, there is a perception that feed costs should be subsidized by government. This demand was rated as equally important as the need for improvement of veterinary services. The demand for increase in milk price at the dairy plant, and improvement of breeding services were also rated high in the list of priority areas which need government attention.

4.7 Training and Participation in Dairy Courses

Dairy courses organized by the Livestock Division provide a forum for collective group learning of dairy husbandry and management. The outstanding limitation is the lack of broader participation of farmers. It was established in the survey that approximately 60 percent of Basotho dairy farmers had not attended a single training course, neither in person nor in the form of a subordinate assisting in farm operations. This implies that farmers generally rely on their natural husbandry skills which are short of proper management and husbandry in a modern dairy farming.

Many reasons lead to the low participation ratio in training courses. The common denominator seems to be the low value placed on the importance of learning unfamiliar trades. Of the farmers who do not attend courses, the reasons advanced for nonattendance of courses are as follows:

<u>Response</u>	<u>% of Farmers</u>
No time	25.4
Not Informed	33.9
Costly	.8
Of no Value	14.4
Intimidation	7.7
Other Reasons	<u>17.8</u>
	100

It is clear that about 34 percent of farmers could have participated in training courses, but did not do so because of deficiencies in extension services and information dissemination. The 7.7 percent who mentioned fear of intimidation had acquired cows independently without seeking Livestock Division's advice and assistance. They held a perspective that the Division is against this practice and that it would not support their farming enterprises. Through further questioning, it was established that the fears may have been self imposed and were not well founded. It is important, however, to note that these misconceptions are bound to occur if farmers are not given the opportunity to participate in policy debates.

Farm visits is one of the many ways upon which government input in training can be assessed. Even though dairy courses are organized for new farmers, follow up extension visits have merit in monitoring and retraining farmers on the job. Approximately 40 percent of farmers were found to have not been visited even once by the dairy extension officers. These non-visited farmers held an opinion that the Livestock Division seems to place less priority on extension services. It is known, however, that the

Division is not sufficiently staffed, and transport has for a long time been a problem. Where visits were made, farmers had an average of 3 visits annually. Generally, these are farmers who are conveniently located for easy reach by the extension workers. Most visits were made voluntarily by extension officers, even though some were made by invitation.

From farmers who had participated in dairy courses, it became clear that interest is high during the first year in business, where an average of two courses is attended in a year. These courses are run for about 5 working days of the week each. In subsequent years, less emphasis is given to courses, and very few farmers attend. The survey shows therefore, that farmers who are new in dairy farming are the only ones who feel they benefit from courses. Given this situation, follow-up extension visits to farms have a meaningful role to play.

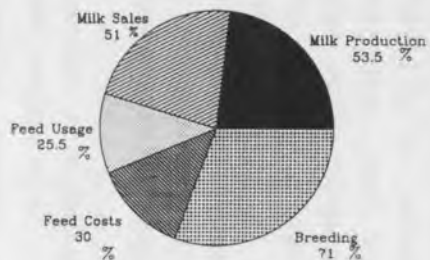
Feeding Regimes for Cows

The composition and quantity of feed given to dry and lactating cows normally differs in a modern dairy enterprise. These factors also vary from one cow to the other, based on productivity. High milk producers are normally given more concentrates while less productive cows are given a proportionately lower quantity of feed. These practices are ideal for relatively sophisticated entrepreneurs. In less sophisticated dairy farming systems, these management traits are expected to be followed less closely.

Despite the increasing zero-grazing system, farmers in Lesotho are not sophisticated enough to know that cows have to be placed under different feeding regimes depending on the level of productivity. Approximately 17 percent of farmers do not change the quantity and feed ration depending on whether cows are in milk or dry. Farmers who are relatively sophisticated, mostly

tend to vary the quantity of concentrate feed to lactating and dry cows, but not the ration itself. In other words, they continue to feed concentrates to dry cows whereas ideally they should cease doing so.

Farmers by Form of Records Kept



Reasons for Not Keeping Records

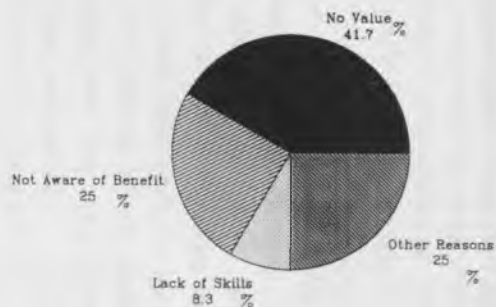
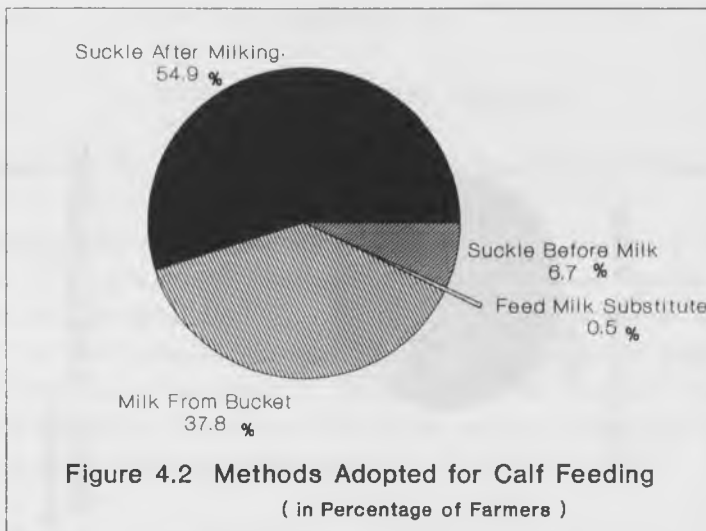
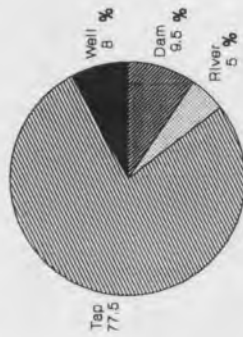


Figure 4.1 Record Keeping By Dairy Farmers
(in Percentages)



Sources of Farm Water



Location of Water



Figure 4.3 Sources of Farm Water and Location
(in Percentage of Farmers)

CHAPTER V

MILK PRODUCTION AND MARKETING

5.1 Marketing Channels Utilized by Basotho Dairy Farmers

The dairy marketing system takes two major forms of marketing channels. They are the formal and informal marketing channels. These two channels differ in their price discovery process as well as in the phases through which the product passes before reaching the final consumer. The thrust of this study is to explore the main features of the milk marketing sub-system without undue emphasis on imports.

The expression "price discovery" is used in the literature of agricultural economics to mean a process of establishing commodity prices. The process takes place in many ways. It involves numerous alternative physical and institutional arrangements which vary from informal to formal marketing sub-systems of pricing. Buyers and sellers may privately agree on what prices they deem equitable; prices may be established through auctions; a monopolist may set prices that buyers should accept prior to the transaction taking place. Alternatively, monopsonists would strive to dictate prices at which they buy.

5.1.1 Formal Marketing Channels

The formal milk marketing sub-system consists of two sources of milk. Firstly, the Lesotho Dairy Products Company is the only formal marketing channel which purchases raw milk, and performs the three major marketing functions of processing, packaging and distribution. Since the import controls were instituted in 1988, a less fierce competition has ensued. Milk imports constitute the second milk marketing channel which contributes to the supply of milk in Lesotho. The marketing functions in respect of

imports are mainly performed by foreign firms made up of dairy plants, supermarkets and retail shops. The formal marketing channels differ from informal marketing channels in that the former performs marketing operations such as enforcing certain minimum standards of hygiene, processing and packaging of milk which all contribute towards changing the form of a final product.

In dealing with the formal marketing channels, emphasis is placed on utilization of locally produced milk from the farm to the final consumer. Therefore, the sub-system presented in figure 5.1 excludes imports, no attempt being made to present the entire system of milk marketing channels. The area of inquiry is meant to highlight the relative importance of formal marketing channels against the utilization of informal marketing alternatives.

The milk collection centres which have been established since 1987 through the Canada/Lesotho Dairy Development Project perform the vital function of supplying milk direct to the dairy plant. Milk collected at the centres is cooled and stored in bulk before it is transported to the dairy plant in Maseru for processing. Since the collection centres were built, the utilization of formal marketing channels has increased and continues to grow.

Despite the establishment of the dairy plant and collection centres, the volume of milk marketed through formal marketing channels remains low. The survey results established that only 31.2 percent of milk produced by local farmers is marketed through the Lesotho Dairy Products Company (figure 5.1). In other words, a larger share of milk production is retained by households for domestic consumption or sold through informal marketing channels directly from the farms. The survey further established, that the 31.2 percent of milk delivered to the dairy plant comes from 23 percent of dairy farmers. The remaining 77 percent of farmers do not utilize formal marketing channels for

disposal of their produce.

Milk Distribution and Collection

Farmers arrange their own transport to deliver milk to either the processing plant or the collection centres depending on whichever is the most appropriate. The modes of milk delivery involve use of the farmer's own transport, and alternate delivery arrangements between farmers who have vehicles. In cases where alternate arrangements are practised, members agree on fixed times such as a week for each farmer. Deliveries to the dairy plant or cooling centre are made twice a day, immediately after milking. The pooling of transport facilitates a close to optimal use of resources, and provides an effective means of cutting costs. However, it tends to promote efficiency only amongst farmers who have resources. It tends to function effectively where farmers are clustered together around the same location. This becomes practically impossible for sparsely located farmers in the rural areas.

The most common mode of transport arrangement involves independent transport through individual farmers' vehicles. But this is not a very efficient way as all costs are borne by individual farmers. In many ways, the economies of scale benefit farmers who share transport, organized and paid for jointly through the dairy associations. But this method tends to be the exception because of lack of concentration of farmers in most areas. Use of public transport for milk delivery has a number of inconveniences. This transport is unreliable, irregular and leads to late deliveries.

There are various reasons for the utilization of formal milk marketing channels being low. These include lack of organized and efficient means of transport. The problem of transport is further underscored by the economies of scale which do not

justify transporting small quantities of milk to distant collection centres or making direct deliveries to the dairy plant.

Problems do arise in actually moving the product from the collection centres to the dairy plant. Tests made at the dairy plant sometimes lead to rejection of milk on the basis of substandard hygiene and quality controls. In cases where milk is delivered from the collection centres in bulk tanks, losses are larger and affect all farmers in the centre concerned. To avoid the problem of joint liability in losses resulting from a few farmers, it is imperative that all tests be made at the milk collection centres where farmers carry individual liability for their actions and mismanagement. Collective liability of losses arising from bulk deliveries of milk to the plant from collection centres is more likely to promote inefficiency.

As noted by Mochebelele and Ranko (1990), the formal milk marketing channel (milk processing plant) tends to be a residual claimant of milk which cannot be successfully sold at a higher price through the informal marketing channels. In this way, the volume of milk intake at the plant is subject to seasonal variations in demand and supply in the informal marketing channels.

During summer when supply is high, when local supply of vegetables is high and competes with milk, and when the risk arising from perishability of milk is high, there is a general tendency for farmers to deliver more or all milk to the dairy plant. As these factors change, and the demand-supply imbalance in winter changes, a higher ratio of milk tends to be marketed through informal marketing outlets. Larger farmers, who are few in number, are an exception. For the latter group, a "premium" gained from a higher price offered in the informal marketing outlets does not compensate for the inconvenience of irregular

payments and collection of debts from many customers who buy in small volumes. This also becomes time consuming, and complicates financial accounting as well as planning.

In some milk marketing systems, the formal marketing channels adopt a variable price depending on the demand-supply imbalances. In winter when supply is low, it is in the interest of the dairy plants to offer a price premium to induce stable supply and full utilization of processing capacity. In contrast, a lower price would be offered on the basis of excess supply in summer. This option would possibly sustain a high milk intake in the formal markets in winter. It is important, however, to note that the dairy plant is least likely to offer a premium in winter because supply requirements can still be met through import arrangements at lower cost from the RSA. This is the fundamental issue which should predispose the Lesotho Dairy Products Company to continue dependance on imports to meet its capacity requirements.

It is argued that the potential for a higher utilization of formal marketing channels exists, but there are many constraints related to difficult access to the central marketing centres. The increased intake of milk in areas where collection centres have been established clearly supports this perspective, that is, that utilization of formal markets is below potential.

Milk Pricing

In the formal marketing channels, farmers are primarily price takers. There is an unequal bargaining power between the atomistic number of farmers who sell to a single dairy plant which has monopsony power. The milk price is gazetted by the Ministry of Agriculture in consultation with the management of the dairy plant.

Since the milk collection centres were established, a two price

system has been effected. Farmers whose milk is precooled at the collection centres benefit from a price premium of 2 cents per litre. These collection centres have tended to stimulate milk sales from a nuclei of farmers situated in the locality of the collection centres. However, the beneficiaries of these spin-offs from the premium remain limited to a few farmers. At the moment, there are only three milk collection centres operational, one each in the districts of Butha-Buthe, Leribe and Mohale's Hoek.

Whereas farmers have limited influence on the price paid through formal channels, there are some benefits which do not exist in the informal marketing outlets. The formal marketing channels ensure stability in incomes and minimize risk to farmers. This reduces the incidence of daily and seasonal fluctuations in demand for milk which farmers encounter in the informal marketing outlets. The milk collection centres and the dairy plant purchase all milk delivered daily by farmers, giving them a steady and reliable flow of income. Payments to farmers are made at convenient times at fixed periods once or twice a month. Because farmers get a lump sum revenue at fixed times, a measure of systematic planning is ensured in procurement of feed and other farm supplies which require financing.

5.1.2 Informal Marketing Channels

In terms of both the number of farmers, and the volume of trade for locally produced milk, informal marketing channels are of more significance than formal marketing channels. The majority of farmers, 77 percent of the total, rely on informal marketing outlets for sale of their farm produce.

Major Outlets and the Price Discovery Mechanics

The informal marketing outlets can be sub-divided into two main categories. These marketing outlets consist of direct sales from the farm to the final consumer and direct sales to local institutions. In both cases, the transactions between the buyer and the seller take place at the farm gate. As a result these transactions do not normally involve transportation costs. The transactions also eliminate other marketing functions such as processing, packaging, and product differentiation which would otherwise be performed in the formal marketing channels which involve the dairy plant.

The informal outlets account for 50 percent of total milk produced in Lesotho (figure 5.1). Of this 50 percent, 42.3 percent is the share of direct milk sales over-the-fence to final consumers in the neighbourhood. The other share, 7.7 percent of milk sales goes to local institutions. These institutions take many forms. They consist of hospitals, clinics, schools, hotels and restaurants. The share of these institutions is relatively low since they have a general tendency to deal in processed and packaged milk from the formal marketing channels. These institutions also tend to buy in bulk, therefore, individual small farmers often do not meet their requirements.

The milk pricing process in the informal marketing channels is primarily independent, free of legislation, and does not conform or relate to the formal pricing system. In this system, there are many buyers and many milk producing and selling farmers. Without a clear appreciation of the institutional structure within which these farmers operate, one could easily conclude that perfect competition prevails. However, because of tacit collusion, the farmers tend to wield a market power over the consumers.

The most notable institutional structures through which farmers exercise market power are dairy farmers associations and cooperatives. These interest groups tend to foster a uniform, but unlegislated, form of pricing system within their locations and amongst members. It was found in the survey that even farmers who were not organized into associations or any form of groups are generally collusive in asserting power to ensure a high and uniform price in given areas where over-the-fence milk sales are predominant. These prices are higher than the price received for raw milk at the dairy plant, but they stay below the market price of processed milk sold through formal marketing channels.

Because of the power base derived from collusive behaviour, the market structure in the informal markets assumes a monopolistic form. In this market there is an element of demand pull inflation, in that there is too much money, or there is a high demand, chasing a limited supply of milk.

Farmers maximize their returns through milk sale prices which are significantly higher than the delivery price at the dairy plant. Consumers tend to prefer direct sale arrangements with farmers, perhaps influenced by dislike for processed milk and its comparatively high price and this creates artificial market conditions in favour of producers.

To quote Adam Smith (from Gould and Ferguson, 1980. p.210). "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices." By this, Smith attempted to show that the external market controls exercised by farmers are more amorphous than the government regulation. That is, when only a small number of producers are in a certain economic activity, there is a strong desire or incentive for them to act collusively to fix a monopoly

or a near monopoly price. This practice contravenes the universally accepted ideals of perfect competition where all participants, whether demanders or suppliers, regard price as given.

Differences in producer prices reveal the kind of amorphous price discovery process exerted by producers in the informal market outlets. These producers exercise price discrimination between institutions and individual consumers. The sale price to private consumers is approximately 7 percent lower than price charged to institutions. But both prices are maintained well above the delivery price at the dairy plant. However, it is important to note that the informal market price remains competitive in the eyes of a consumer since it is lower than the price of processed and packaged milk sold through formal marketing channels. The high price for processed milk is due to the value added at different stages before reaching the final market place and the consumer. These costs all add up, and are subsequently passed on to the final consumer.

It was not ascertained as to why farmers use price discrimination when selling to institutions and immediate consumers. However, common economic reasoning is suspected to prevail in explaining this tendency. Differences in demand elasticities and the ability of producers to separate markets into sub-markets are the principal causes which lead to price discrimination in monopolistic markets. That is, it is conceivable that farmers judge private consumers as a sub-market different from institutions in purchasing power.

The principal problem with the informal marketing channels is the tendency to restrict expansion. Since farmers do not get contracts and there is no obligation for the customers to buy all milk produced, losses are incurred when demand is low. The situation was mentioned earlier of summer months when supply is

high while effective demand is low. Because of this market insecurity, farmers tend to keep small herds as a means of minimizing risk. Without a guaranteed market, heavy losses are always possible since milk is highly perishable. It is argued, therefore, that without easy access to the dairy plant, and without the establishment of many collection centres, the rural based dairy farmers are less likely to expand their operations. Another alternative solution would be a decrease in prices during summer to stimulate demand. However, prices tend to be sticky and less responsive to demand-supply imbalances in the informal markets.

5.2 Alternative Ways of Milk Disposal

Besides marketing milk for cash income earnings, there are two other main forms of usage. These are retention of milk for household consumption, and retention of milk for maintenance of calves before weaning. Indeed, it was not until the mid-eighties that policy pronouncements emphasized milk as an income earner as against the initial overemphasis of milk production towards meeting household requirements.

Even though these two forms of milk disposal are not income earning, they are cost saving. They account for less than 20 percent of total milk production. Milk retained for home consumption and for herd boys makes up 12.3 percent with calf feeding making 6.5 percent (figure 5.1). It was shown earlier that the use of milk substitutes (milk replacer) for calf feeding is not common, rather, farmers tend to raise calves on 'whole milk' from their farms.

5.3 Alternative Sources of Income in Farming

An attempt was made to solicit household incomes from farmers. The objective was to facilitate classification of households into

high, middle and low income earners for detailed analysis and cross tabulation against other variables. A decision was made to skip the question after realization that responses given were far from genuine. There was a general tendency for farmers to deliberately underestimate their income earnings. The main cause for concern was that the study could influence the government to increase its tax base by taxing farm incomes, or to keep the producer at the dairy plant low.

In view of the apparent sensitivity, farmers were asked a less direct question. That is, to list and rate their four most important sources of household cash income derived from farming besides milk. The results are presented in table 5.1 in order of priority. Food crops are the primary source of household cash income earnings followed by vegetable production. It is clear however, that vegetables dominate as the second, third and fourth most important means of income earning amongst dairy farmers.

Table 5.1 Alternative Agricultural Sources of Cash Income Besides Milk

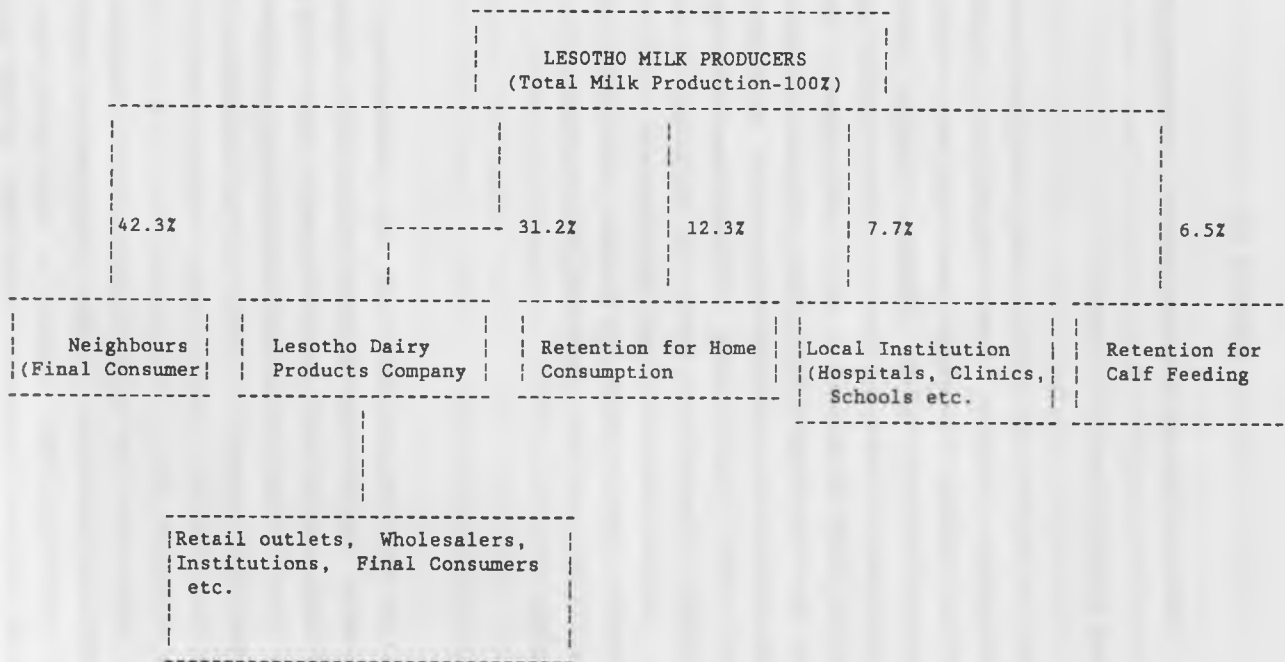
	Percentage of Households Reporting			
	Primary Source	Secondary Source	Third Source	Fourth Source
Crops	53.8	20.0	11.1	16.7
Vegetables	32.5	48.0	33.3	16.7
Fruits	1.7	16.0	11.1	-
Eggs	2.6	-	-	16.7
Broilers	3.4	10.0	22.2	-
Livestock	3.4	2.0	-	33.3
Livestock Products and by-products	-	2.0	22.2	-
Farm equipment	.9	-	-	-
Other	1.7	2.0	-	16.7
TOTAL	100.0	100.0	100.0	100.0

Conclusion

This chapter has sought to argue that both informal and formal

marketing outlets are characterized by unequal market power between buyers and sellers of milk. These imbalances in market power result from institutional structures which prevail in both markets. Differences in producer prices between the two markets are a reflection of unequal market power between the buyer(s) and the seller(s).

Figure 5.1 A Sub-system of Lesotho's Milk Marketing Network



CHAPTER VI

UTILIZATION OF FARM EQUIPMENT, INFRASTRUCTURE AND FEEDS

6.1 Feed Supplies and Utilization

The feeds utilized are broken down into two main groups. The first comprises regular feed which is required for body maintenance, mostly roughage and grains. Included in this category are lucerne, maize stalks, Lehola (panicum species), Teff, *Erograstis curvular* etc. The second group of feeds includes all feed supplements and concentrates. The latter are generally low in crude fiber and moisture content, but high in digestible nutrients. Minerals are also included in this feed category. The subdivision of feeds was made conveniently for presentation. There is no clear-cut division in some cases. For example, grain products and by-products such as yellow meal, brewers grain, hominy chop and wheaten bran could perhaps rightly be classified as low protein concentrates or energy-rich concentrates.

6.1.1 Roughage and Grains

Much against the expectation of the researcher, farmers were found to make limited use of maize stalks as a regular feed. The argument advanced by most dairy farmers was that maize stalks have low nutritional value and are not easily digestible as feed unless they are ground. Lack of palatability in this crop residues is one of the factors which render them not very valuable as dairy feed. The reason for this is that stalks are left to mature and dry up with maize before harvesting. At this stage they are valueless. Indeed farmers who used maize stalks as their principal feed tended to have poor cows. Lucerne was found to be the most commonly used feed by 90 percent of dairy farmers. Amongst the grain by-products, wheaten bran is most

popular, and is utilized by 76 percent of dairy farmers.

It was interesting to find out the principal sources of these feeds. There are many parastatal and private feed suppliers in the country. However, in many instances the original sources of feeds are based in the RSA. In table 6.1, information showing the regular sources is contained. Co-op Lesotho is the most dominant supplier, perhaps, because of its many stores which are conveniently located for both rural and urban farmers. There are 43 depots operated by Co-op Lesotho, and most of these are in the Lowlands. The main competitors of Co-op Lesotho are local stores which also sell dairy feeds. It is conceivable that local stores may not be as competitive as Co-op Lesotho on prices, but they are convenient since a farmer also has access to other household supplies and groceries under the same roof. Where transport arrangements are possible, farmers particularly prefer to make direct importation of feeds from the RSA at low prices. Besides those who imported feeds, the most important factor which seemed to influence the decision as to where feeds are purchased, is convenience in terms of distance. Price differentials between various suppliers were found to be less important to farmers unless purchases were made in bulk.

The unit costs of feeds are presented in table 6.2. In some cases it was problematic to standardize the units of measurement as these tended to vary with farmers. Therefore, some feeds may have been somewhat misrepresented. On the basis of feed quantities utilized per week and the unit costs, the total costs were computed as presented in table 6.3 with corresponding averages.

6.1.2 Minerals and Energy Sources

The types of minerals and energy sources which were found to be commonly used were molasses, calf starter, ordinary salt, bone

meal, rumevite, and dairy meal. With the exception of dairy meal which is used by approximately 80 percent of farmers, the other feeds are used by less than 50 percent of farmers. However, rumevite is relatively popular. Again, Co-op Lesotho and the local retail stores are the major suppliers as shown in table 6.4. The average prices, and total expenditures on these feeds, computed as above, are presented in tables 6.5 and 6.6 respectively.

These costs and the utilization of feed as presented in sections 6.1.1 and 6.1.2 are important for budgeting purpose. That is, they give an indication of what would constitute rationalized budget costs once appropriate assumptions about the nature of other variables have been drawn out.

6.2 Infrastructure

In dairy farming, there are certain minimum requirements of infrastructure which have to be met. Some of these are shelter, a storeroom and a milking parlour. These normally range from simple to more complex designs depending on availability of finances, the sophistication of farmers and the environment. The costs of infrastructure also vary depending on the designs, size and material used.

The survey identified three main forms of infrastructure on the farms, namely, cowshed, kraal and storeroom. Despite the apparently low incidence of farmers who had erected these basic structures, the motivation exists. In most cases, where these structures existed, they had been built and designed specifically for farm operations. It is also common for farmers to convert the dilapidated old houses into a cowshed and a store room. These were particularly difficult to cost. This was not the only case involving the use of old materials since even structures which had been specifically built tended to be made out of second

hand material.

In table 6.7, different forms of structures are presented with the types of material used. Overall, the average cost tends to be higher for a storeroom than a kraal and a cowshed (Table 6.8). The cowsheds generally had a dual purpose since they also served as milking parlours.

6.3 Farm Equipment and Implements

Besides milking cans, which are generally used by all dairy farmers, the data show that the use of other essential milking utensils like milk delivery cans, strip cups, sieves and scales is limited. Perhaps, most farmers did not have delivery cans primarily because dominant sales outlets are within the same locations. However, there are no logical reasons, save deficiencies in management, to account for the low usage of strip cups and milk sieves.

Strip cups fulfil an important management function of determining the development of mastitis in cows. They are obviously not the most efficient means, but they provide small farmers with a simple means of checking for traces of mastitis in milk prior to milking.

Since bacteria is present in milk immediately after milking, use of proper and hygienic milking cans is of paramount importance. On evaluation, it was found that only 38 percent of farmers use the hygienic metal cans which are recommended. The rest use ordinary plastic containers which are less hygienic. Tables 6.9 and 6.10 show the breakdown of milking utensils by type and costs respectively.

Because of the spreading reliance on a zero-grazing system, basic water troughs and feeding bulks are kept. These feeding bulks

and water troughs are mostly custom made using available material. The most common type of custom made troughs and bunks are made from 200 litre drums which are cut into half (Table 6.11). Only a few farmers install specialized feeding troughs and bunks. Because of the diversity of the types of these bunks and troughs costing them was in most cases problematic. Some of them, such as wheel barrows and basins have multiple use. The types and investment value on these items are given in tables 6.11 and 6.12 respectively.

Table 6.1 Regular Sources of Roughage, Grains and By-products

Number of Households Reporting

Supplier	Maize					Yellow Brewers Hominy				
	Lucerne	Stalks	Panicum	Teff	Erograstis	Maize	Meal	Grain	Chop	Bran
Roller										
Mills	9	2	-	5	-	2	3	2	3	11
Store	52	-	-	10	7	5	6	-	2	60
Co-op Lesotho	59	2	-	9	9	7	13	-	-	56
Farmers	6	21	2	3	1	1	3	-	-	1
Feedlot	4	-	-	4	2	-	-	2	2	1
RSA	40	-	2	8	20	-	1	-	-	4
Association	2	-	-	1	-	1	-	-	-	-
Dev.Project	6	1	-	2	-	1	2	-	-	3
Flour Mills	-	-	-	-	-	-	-	-	1	10
Other	11	7	2	5	5	-	2	10	-	5
N/A	10	165	193	152	154	183	170	186	192	48
Missing Cases	1	2	1	1	2	-	-	-	-	1
Total	200	200	200	200	200	200	200	200	200	200

Table 6.2 Unit Price of fodder, grains and by-products

		Number of Households Reporting								
(Maloti)		Lucerne	Panicum	Teff	Erograstis	Maize	Yellow Meal	Brewers Grain	Hominy Chop	Hominy Bran
Price										
	5	27	2	24	37	-	-	8	1	9
6	- 10	157	-	23	6	3	2	1	4	129
11	- 15	2	2	-	-	-	1	-	2	5
16	- 20	-	1	-	-	2	5	-	1	-
21	- 25	-	-	-	-	4	6	-	-	-
26	- 30	-	-	-	-	5	7	-	-	-
31	- 35	-	-	-	-	-	3	3	-	-
36	- 40	-	-	-	-	-	2	-	-	-
41	- 45	-	-	-	-	-	-	-	-	-
46	- 50	-	-	-	-	2	1	-	-	-
None		10	193	152	154	183	170	186	192	48
Missing cases		4	2	1	3	1	3	2	-	9
Total		200	200	200	200	200	200	200	200	200
Average		6.9		5.3	4.3	24.4	25.9	11	10	7.6
Std.Dev		1.4		1.3	1.4	2.8	9.3	16	4.1	1.5

Note: Units of measurement are: lucerne per bale, Panicum per bale, teff per bale, erograstis per bale, maize per bag, yellow meal/bag, brewers grain per bag, hominy chop per bag, bran per bag.

Table 6.3 Total Expenditure on Fodder and Grains used Per Week

		Number of Households Reporting								
Total Cost		Lucerne	Panicum	Teff	Erogras	Maize	Yellow Meal	Brewers Grain	Hominy Chop	Hominy Bran
	10	104	1	27	25	9	13	4	5	115
11	- 20	31	-	9	5	4	4	2	2	20
21	- 30	13	1	5	7	2	4	1	1	3
31	- 40	9	-	2	4	-	2	1	-	-
41	- 50	13	-	-	-	1	-	1	-	-
51	- 60	5	-	-	-	-	-	-	-	-
61	- 70	1	-	-	1	-	-	-	-	1
71	- 80	1	-	-	-	-	-	-	-	-
> 80		-	1	1	-	-	-	1	-	-
None		23	197	156	158	184	177	190	192	61
Total		200	200	200	200	200	200	200	200	200
Average		15.3	135	13.3	14.2	12.9	13.2	35.1	9.4	7.4
Std. Dev		15.3	208	14.3	13.1	10.2	9.4	59.8	7.2	7.8

Table 6.4 Regular Sources of Minerals and Feed Supplements
Number of Households Reporting

Supplier	Molasses	Calf Starter	Regular Salt	Bone Meal	Rumevite	Dairy Meal
Roller Mills	-	-	3	-	2	13
Store	5	2	35	-	14	22
Co-op Lesotho	19	13	23	-	64	99
Feedlot	3	-	-	-	3	1
RSA	2	-	1	1	-	7
Dev. Project	-	-	1	1	12	1
Farmers	2	-	-	-	-	-
Other	4	-	1	-	-	8
Association	-	-	-	-	1	-
N/A	165	185	136	198	103	49
Missing Cases	0	0	0	0	1	0
Total	200	200	200	200	200	200

Table 6.5 Unit Price of Minerals and Supplements
Number of Households Reporting

Price Range	Molasses	Calf Starter	Regular Salt	Bone Meal	Rumevite	Dairy Meal
5	9	-	25	1	4	1
6 - 10	11	-	26	-	57	3
11 - 15	6	1	2	-	13	6
16 - 20	1	-	-	-	4	22
21 - 25	1	10	-	-	3	96
26 - 30	-	3	-	-	-	14
31 - 35	-	-	-	-	-	3
36 - 40	-	-	-	-	-	-
41 - 45	-	-	1	-	-	-
46 - 50	-	-	-	-	-	-
> 50	-	-	-	-	1	-
None	165	185	136	198	103	49
Missing cases	7	1	10	1	15	6
Total	200	200	200	200	200	200
Average	9.1	23.7	6	4	10.9	22
Std. Dev	5.4	2.8	5.3	-	6.4	3.9

Note: Units of measurement are:- molasses per litre,
calf starter per bag salt per bag, bone meal per bag,
rumevite per block, dairy meal per bag.

Table 6.6 Total Expenditure on Minerals and Supplements Used Per Week
Number of Households Reporting

<u>Total Cost</u>	Calf		Regular Bone		Dairy	
	<u>Molasses</u>	<u>Starter</u>	<u>Salt</u>	<u>Meal</u>	<u>Rumevite</u>	<u>Meal</u>
10	15	10	48	-	17	65
11 - 20	2	3	1	-	21	31
21 - 30	1	-	-	-	17	34
31 - 40	1	1	1	-	3	3
41 - 50	-	-	-	-	5	3
51 - 60	-	-	-	-	9	1
61 - 70	-	-	-	-	1	3
71 - 80	2	-	-	-	1	2
> 80	-	-	-	-	4	-
<u>None</u>	<u>179</u>	<u>186</u>	<u>150</u>	<u>200</u>	<u>122</u>	<u>58</u>
<u>Total</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>
<u>Average</u>	<u>14.5</u>	<u>8.3</u>	<u>2.3</u>	<u>2.3</u>	<u>-</u>	<u>33</u>
<u>Std. Dev</u>	<u>22.5</u>	<u>8.7</u>	<u>6.0</u>	<u>-</u>	<u>34</u>	<u>31</u>

Table 6.7 Types of Infrastructure
Number of Households Reporting

<u>Type</u>	<u>Cowshed</u>	<u>Kraal</u>	<u>Storeroom</u>
Stone	-	23	-
All Corrugated	81	5	44
Corrugated and Mud	1	-	1
Thatch and Stone	-	-	1
Corrugated & Stone	12	-	22
Thatch and Mud	1	-	5
Wood	3	6	-
Fence	-	23	-
Other	9	-	24
N/A	93	142	100
<u>Missing Cases</u>	<u>0</u>	<u>1</u>	<u>3</u>
<u>Total</u>	<u>200</u>	<u>200</u>	<u>200</u>

Table 6.8 Cost of Infrastructure (Maloti)

Cost Range	Number of Households Reporting		
	Cowshed	Kraal	Storeroom
199	36	18	22
200 - 399	14	6	18
400 - 599	8	-	4
600 - 799	2	-	-
800 - 999	1	-	1
1000 - 1199	2	-	1
1200 - 1399	-	-	1
1400 - 1599	2	-	-
1600 - 1799	-	-	-
1800 - 1999	-	-	-
2000	-	-	2
N/A	93	143	100
Missing Cases	0	30	56
Total	200	200	200
Avg Cost	262	188	304
Std	315	292	426

Table 6.9 Milk Utensils and Equipment

Number	Number of Households Reporting				
	Milking Cans	Delivery Can	Strip Cup	Sieve	Scale
1	134	48	62	81	3
2	48	22	-	-	-
3	8	8	-	1	-
4	3	1	-	-	-
5	-	1	-	-	-
6 - 10	1	-	-	-	-
None	3	119	135	113	197
Missing Cases	3	1	3	5	-
Total	200	200	200	200	200

Table 6.10 Cost of Milking Utensils / Equipment
Number of Households Reporting

<u>Cost</u>	<u>Milking Cans</u>	<u>Delivery Cans</u>	<u>Strip Cup</u>	<u>Sieve</u>	<u>Scale</u>
20	73	7	27	16	3
21 - 40	17	3	1	2	-
41 - 60	16	13	1	11	-
61 - 80	-	3	-	5	-
81 - 100	-	2	-	-	-
101 - 120	-	4	-	-	-
121 - 140	-	1	-	-	-
141 - 160	-	1	-	-	-
161 - 180	-	-	-	-	-
181 - 200	-	1	-	-	-
> 200	-	3	-	-	-
None	3	119	135	113	189
<u>Missing Cases</u>	<u>91</u>	<u>43</u>	<u>36</u>	<u>53</u>	<u>8</u>
Total	200	200	200	200	200
Avg Cost	17	76	9	30	11
Std Dev	16	66	5	27	3

Table 6.11 Types of Water Troughs and Feeding Bunks
Number of Households Reporting

<u>Type</u>	<u>Water Trough</u>	<u>Feeding Bunk</u>
Drum Cut	107	131
Special Trough	6	16
Wheel Barrow	14	28
Bath / Basin	41	21
Other	8	-
None	24	4
<u>Missing</u>	<u>-</u>	<u>-</u>
Total	200	200

Table 6.12 Cost of Water Troughs and Farm Implements
Number of Households Reporting

<u>Cost</u>	<u>Water Trough</u>	<u>Wheel Barrow</u>	<u>Spades</u>
20	61	17	70
21 - 40	24	55	23
41 - 60	11	30	2
61 - 80	2	11	1
81 - 100	1	11	1
> 100	3	-	-
None	34	20	7
<u>Missing</u>	<u>64</u>	<u>56</u>	<u>96</u>
Total	200	200	200
Avg Cost	30	43	15
Std Dev	56	22	15

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

Since independence, Lesotho has introduced many agricultural development projects which have sought to improve the wellbeing of Basotho. Some of these projects which are normally funded under bilateral arrangements between Lesotho government and donor communities have, amongst other activities, sought to promote dairy farming and support marketing systems. The most noteworthy of these projects is the Canada/Lesotho Dairy Development Project. Rapid and sustainable development of the marketing networks can assist to speed up the process of dairy development and commercialization on a national scale.

Indeed, a widespread attraction of farmers into dairy farming can serve as a constructive, and a socially acceptable alternative to facilitate the destocking process and reduce transhumance. Prospects for this happening are not clear as yet, but the relatively high momentum in the practice of a zero-grazing system underscores bright prospects. The study established that 74.5 percent of dairy farmers rely exclusively on zero-grazing, 10 percent exclusively on open pasture grazing, and the remaining 15.5 rely on a combination of open pasture grazing as well as stall feeding. By drawing more livestock owners who practise extensive livestock husbandry into dairying, the prospects for rehabilitation of rangelands will be increased. This strategy can be gradually implemented without necessarily affecting the draught power requirements. Above all, this avoids legislative measures such as grazing fees which are socially and politically sensitive. Generally, there is a consistent attraction of farmers who venture in dairy farming to fulfil their business aspirations. More than 50 percent of farmers only started dairying in the 1980s.

Cattle contribute substantially to the non-cash gains of Basotho farmers, but little to cash-income flows. By contrast, sheep and goats are the principal cash income earners, more importantly through wool and mohair sales. A fully developed dairy industry has a potential for increasing the relative share of cattle to the overall cash income earnings of the livestock sector.

It is not an easy task to make precise estimates of the number of dairy farmers in Lesotho. What is clear is that major strides are taking place in the lowlands where sources of dairy inputs and support facilities are easily accessible. More so, it is important to take note of the fact that close to 50 percent of these farmers are found in one district, Maseru. This unequal takeoff of dairy development is mainly explained by the level of urbanization and relative availability of services in this district. The dairy plant which services the entire dairy development area is also located in this district. It is conceivable, that as a number of regional milk collection centres increases in other districts, the imbalance will be narrowed and create a relatively more uniform development.

Participation in dairy farming depends mostly on the enthusiasm and financial background of individuals and market related opportunities. In addition, age was found to be an important decision criterion for engagement in dairying. The majority of farmers are mostly in the middle age groups, all above thirty years of age. These were largely male farmers. It became apparent that most females who tend to take complete charge of farm operations are widows. In other words, where both partners are alive, males dominate in the management roles regarding farm operations. Single farmers are not common. It is argued here that most marriages, and financial security of families tend to occur when couples are over 30 years of age. At this time, couples actively seek opportunities for investment and tend to readily take risks.

Overall, the herds of Basotho dairy farmers are characterized by a mix of nondescript cattle and genetically superior dairy cattle. The reason for this is to balance risk between the potential gains/losses associated with improved cattle. However, indications are that farmers who are engaged in dairy farming tend to gradually reduce numbers of their nondescript cattle to a minimum level. Comparison between the off-take rates of improved cows and nondescript cows reflects an apparently high substitution rate between the two. The annual off-take rate for exotic cows is 13 percent, with 6.5 of it caused by sales off-take. By comparison, the annual off-take rate for nondescript cows is higher at 21 percent, where 11.7 percent of it is attributed to sales off-take.

Education is a fundamental element for success in industrial and agricultural development. Basotho dairy farmers generally have the elementary education with most of them having gone through the primary school level. By default, these farmers, are expected to easily assimilate and comprehend the basic parameters which go with a successful modern dairy farming. Only about 3 percent of these dairy farmers do not have any formal education.

Apart from the involvement of farmers who come from various backgrounds, some of whom live in urban, semi-urban and rural areas, there is a striking participation by civil servants and former government employees. One third of the dairy farmers are civil servants, most of whom had acquired at least a Junior Certificate education. There is a widely accepted fact in Lesotho that migrant mine earnings have a significant impact on the agriculture of Lesotho. On the one hand, there is a perspective that mine earnings impede agricultural progress. The alternative is that migrant mine earnings are perhaps supportive to investment on agriculture. The first view point would suggest that households with migrant mine incomes invest less in

agriculture, while the latter presupposes that available funds would lead to increase in agricultural participation and investment. The survey tends to support the former in that only 10 percent of the farmers had male labourers employed in the RSA mining industries.

The distribution of dairy cows by breeds clearly reflects the government policy thrust. Since a government demonstration farm was established in 1973, Friesian cows have been promoted as a national breed of choice in the Lowlands. The study established that 74.3 percent of the dairy cows are Friesian, Jerseys 9.3 percent, and others 12.2 percent. In government circles, there is an apparent disregard of cross breeds. However, it was found during the survey that the rate of cross breeding is a real threat to the attainment of pure breeds. The uniform price of milk in the dairy plant also acts as a catalyst which discourages low milk producing cows such as Jerseys even though they give a high fat content in milk. The pricing system does not allow for a premium on fat content which would otherwise make Jerseys popular. In this way, it is envisaged that Friesian cows will continue to enjoy prominence in numbers while other breeds are reduced. This, it is envisaged, will achieve the government goal of reducing dependence on imports and increase farm incomes.

The average herd size of dairy cows is about two per household. Feed costs were identified as the principal factor which hampers increase in herd sizes. After an assessment of the off-take rates, and on further enquiry it was established that farmers who intended to expand farm operations aim at establishing five to six dairy cows as their optimal herd size. This may further be read to imply that Lesotho will not have very large commercial farms in the long run. More importantly, it is apparent that dispensation of equity and market share are less likely to be unfavourable in the industry. Should this be the case, the industry is expected to achieve stability which is often of prime

importance if very few participants dominate in the supply of a product.

Lesotho depends heavily on imports from the RSA in many ways. Imports involve a wide range of finished and semi-processed products. On examining the principal sources of dairy cows, it was established that 48 percent originated from the RSA. Approximately 39 percent of cows are raised by individual farmers from replacement heifers. A more rapid increase in accumulation of dairy cows occurred mostly from 1985 and the trend seems to continue. Mafisa as a common feature of livestock management in Lesotho, is not a common practice amongst dairy farmers. In view of the fact that a significant percentage of cows is raised locally despite a high level of imports, aggressive educational programmes on calf raising need to be launched in order to ensure a uniform quality of exotic cows for years to come.

Credit facilities must be seen as the essential element for continued growth of the industry. Farmers are unlikely to fully utilize the available credit facilities extended by the Lesotho Agricultural Development Bank if they are not made part of the national dairy development programme through the Ministry of Agriculture. Only a small proportion of farmers (34 percent) had at any one time enjoyed the credit facilities extended by either the Lesotho Agricultural Development Bank, the Lesotho Distant Teaching Centre and other revolving fund schemes to start and support their farm operations.

Three important management related factors which affect the economic viability of dairy farming were examined. Firstly, the herd ratio was found to be unfavourably low at 60 percent. This implies that on the average, adult dairy cows constitute 60 percent of total number of dairy animals and this ratio is low since 40 percent of the herd is basically not income earning but adds to operating costs. Milking ratio was also unfavourable.

Secondly, much as artificial insemination improves herd quality through a wide choice of semen, it is alarmingly unsuccessful with a conception rate of 44 percent. That is, for every 100 cows served with AI, 66 fail to conceive and have to be repeated. The main cause for failure was found to be human error, and incompetence on the part of farmers as well as transport for AI technicians. It may, however, also be the incompetence of the AI technicians who lack training. A need therefore, arises for improvement in AI services and to extend these services with a wider coverage of the farming community. Should the high failures of artificial insemination recur, it is conceivable that farmers will lose faith in it and resort to scrub bulls as an alternative. This would have a damaging effect on the industry immediately and in the long-run.

Thirdly, the rate of reproduction is an important element in the economics of dairy farming, this primarily depends on fertility and feeding. The herds of Basotho dairy farmers were found to have irregular and long calving intervals varying from 12 months to 36 months with an average of 16 months. This compares unfavourably with an idealized inter-calf interval of 11 to 12 months under intensive dairy management.

It is argued here that record keeping is the centre piece of success and forms the basis for proper planning and coordination of economic activities. This is one of the qualities which distinguishes ardent business enterprising managers from passive investors. Lack of proper record keeping amongst farmers is a serious drawback. Most farmers take record keeping for granted and this leaves a lot to be desired about the impact and relevance of the extension services. Farmers generally regard record keeping as a worthless exercise. Evidence contained in this study suggests that this arises mainly as a result of inadequate exposure and lack of relevant training.

Milk produced by Basotho farmers is marketed through two major channels, namely the informal and formal marketing channels. The informal marketing channels take up a larger share of the locally produced milk through direct sales to neighbours and local institutions. The formal marketing system absorbs less than a third of the total milk produced in Lesotho. This share could substantially increase with the establishment of milk collection centres country wide in the future. The increase in milk coming from Leribe, Butha-Buthe and Mohale's Hoek districts since the milk collection centres were established underscores this.

Improvement in transport is further expected to facilitate commercialization of dairy farming. However, transport of milk was identified as a limiting factor by most farmers and conditions their desire to restrict expansion of dairy operations. Where transport sharing could be adopted as an alternative, farms are too small and few to take advantage of the economies of scale.

There is a general difference in the producer price discovery process and price levels between the formal and informal channels. In the informal marketing arrangements the producer price is higher and free of legislative controls. Farmers in various areas tend to wield monopoly power by engaging in a collusive behaviour in setting prices. Associations act as a catalyst to ensure this collusive behaviour and uniformity in price received by farmers within a given area. By contrast, producer price in the formal market tends to be lower and determined mostly in a monopsonistic manner. In this case, the dairy plant enjoys monopsony, and it asserts a limited form of market power in the establishment of producer prices.

Alternative routes in the utilization of milk which compete with sales are retention for home consumption and calf requirements. These two alternative uses account for approximately 19 percent

of total milk production. These are not income earning, rather, they are cost-saving uses of farm produce.

The cost of feeds is taken by most farmers to be the most limiting factor. Farmers rely heavily on purchased concentrates as well as roughage. Very few of them have land to grow fodder which meets their requirements. Above all, fodder has to compete with food crops which are a top priority for the farming community.

In this early development of the sector, more government input will continue to be an important factor. This has to be made directly through the enactment of dairy legislation and the support of a National Dairy Board as well as indirectly through support projects.

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APPENDIX A

QUESTIONNAIRE
MILK PRODUCTION AND MARKETING SURVEY

PART I
DEMOGRAPHIC DATA

1. Enumerator: _____
2. Date of interview: _____
3. How old is the dairy farm? (State the year of acquiring the first improved dairy cow) _____
4. Name of respondent: _____
5. Designation of respondent:
Owner of dairy farm _____
Dairy farm manager _____
Other _____
6. District: _____
7. Area: _____
8. Village: _____
9. (a) Marital status, sex, age, residence, highest education attained and occupation of the respondent and spouse.

Household members Name	*Marital Status	Sex	Age	Residence	Highest Education Attained	Occupation
1						
2						

* Marital status= married, single, divorced, or widowed.

- (b) (i) How many children are living with you _____
Male _____ Female _____
- (ii) How many of the children are between 14 and 21 years of age
Male _____ Female _____
- (c) How many adults (over 21 years excluding you and your spouse) are living with you _____
Male _____ Female _____

10. Did you inherit the dairy farm or you started on your own?

11 (a) Have any members of the household attended dairy courses conducted by the government (Livestock Department)? YES ___ (go to 11b) NO ___ (go to 11c)

(b)

* Participant	Year Attended	Number of Courses	Length of Course(days)	Subject(s) covered

* Participant may be the farm owner (respondent) or the spouse or any member of the household.

(c) Why has no one attended dairy courses conducted by the Government?

- No time to attend _____
- Not aware that the courses are available _____
- Can't afford the fee _____
- Information of no value _____
- Other _____

PART II
HERD INVENTORY

12 How many cattle do you have? Number

Total Cows	_____
Heifers	_____
Calves	_____
Oxen	_____
Bulls	_____
Steers	_____

13 How many cattle do you have of the following categories?

(a) Improved Dairy Breeds (NOTE: Improved=Friesian, Jersey, Brown Swiss).

(i)

Item	Jan. 1 1987	Number Purchased in 1987	Purchase Price	Number sold in 1987	Sale Price	Home Slaugh- ter	Death Jan 1-Dec 3 1987
Cows							
Heifers							
Calves							
Steers							
Oxen							
Bulls							

(ii) What are the common causes of deaths to your dairy herd?

(iii) Give reasons for selling dairy cows:

1 _____

2 _____

3 _____

4 _____

5 _____

(Note: Reasons may be low milk production, failure to calve, diseases etc)

(b) Indigenous Breeds (indigenous breed=Drakensberg, mixed breed, etc)

Item	Jan. 1 1987	Number Purchased in 1987	Purchase Price	Number sold in 1987	Sale Price	Home Slaugh- ter	Death Jan 1 - Dec 3 1987
Cows							
Heifers							
Calves							
Steers							
Oxen							
Bulls							

14 What marketing problems do you encounter in selling culls (if any)?

1 _____
2 _____
3 _____
4 _____
5 _____

15 State other types of livestock kept: Number

Sheep	_____
Goats	_____
Horses	_____
Donkeys	_____
Commercial Layers	_____
Commercial Broilers	_____
Other (Specify)	_____

Inventory of Currently Milking Dairy Cows

Name	Age	* Breed	Year Bought	**Condition When Bought	Purchase Price	Where Bought	Bought on cash/ credit	Number of calves produced	Date of last Calving
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									

*Breed - Friesian, Jersey, Brown Swiss, Other improved, Other Unimproved.

**Condition - Pregnant, Lactating, or too young to calf when bought.

(b) Inventory of Cows Which are Currently NOT Milking

Name	Age	* Breed	Year Bought	**Condition When Bought	Purchase Price	Where Bought	Bought on cash/credit	Number of calves produced	Date of last Calving	End of last lactation Year/Month
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

*Breed - Friesian, Jersey, Brown Swiss, Other improved, Other Unimproved.

**Condition - Pregnant, Lactating, or too young to calf when bought

PART III

FACILITIES ON THE FARM

17

Item	*Type Description	Year built/ bought	** Cost of Structure /Purchase cost
Milk cow Shed			
Kraal			
Milking parlour			
Water trough			
Feeding bunks			
Feed/tools storeroom			
<u>Equipment/tools:***</u>			
1 Wheel barrow(s)			
2 Spade(s)			
3			
4			
5			
<u>Milking utensils</u>			
(specify)****			
1 Likhamelo			
2 Delivery can(s)			
3 Strip cup(s)			
4 Sieve			
5			

*Local material not bought, stones, mud etc, or use of masonite or other material purchased materials;; specify material used.

** Total cost of building the structure or cost of buying the equipment or utensils

*** eg Wheel barrows, spades etc. state the number.

**** e.g milk pails, cans etc. description includes size and material.

PART IV

OPERATING COSTS

18 Do you mostly stall feed your dairy cows or you depend on grazing?
(explain) _____

19. Feed type purchased, source of supply, cost per unit and rate of feeding:
(Current year 1988)

Type of Feed	Name of Supplier	Location of Supplier	Cost of Feed per unit	*Amount of feed Used (per period)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

eg 1/2 a bale, 2 bales, 1 block of mineral (rummevite), bags.

20 (If feed is bought from BOTH Lesotho and RSA)

Where do you mostly buy your feed from? Lesotho | _____ |
RSA | _____ |

21 Do you feed lactating cows differently from those not lactating?
YES _____ (explain how and why) NO _____

22 How is the feed transported to your farm?

Own transport	_____
Public transport	_____
Through dairy association	_____
Hired transport	_____
Delivered by supplier	_____
Other (Specify)	_____

23 Indicate the method and practice used on the farm to feed milk to the calves:

		Until what Age
Suckle the calves before milking	_____	_____
Suckle the calves after milking	_____	_____
Drink milk from the buckets	_____	_____
Feed on milk replacer	_____	_____
Feed on skim milk	_____	_____
Other (specify)	_____	_____

If you suckle the calf after milking, do you leave one teat un milked Yes _____ No _____

24

(a) Do you keep farm records for ?

Milk production per cow	_____
Milk sales	_____
Feed cost	_____
Feed usage	_____
Breeding	_____
Other (specify)	_____

(b) Who designed the record system for you? _____

(c) Why do you not keep farm records (NOTE: to be asked only if no records were kept)? _____

25 Breeding information for Jan 1987 to Dec 1987

	Number	BULL USED WAS OWNED BY:			Cost per Head
		Govt	Self	Other farmers	
Cows bred artificially					
Number repeated					
Cows served by improved bull					
Number repeated					
Cows served by other Bull types					
Number repeated					

26 Other costs:

Item	Costs for Jan 1987 to Dec 1987
Medicines	
Hired labour	
Cleaning supplies	
Milking cream	
Other (specify)	

27 What diseases often attack your dairy cows? _____

PART V

RESOURCE INVENTORY

28 (a) Do you have fields? YES _____ (go to 28b) NO _____ (go to 29)

(b)

Fields	*Size	Crops now grown	Crops normally grown
1			
2			
3			
4			
5			

* State whether acreage is given in Sesotho or in English units.

29 (a) Do you grow fodder for your dairy cows? YES _____ NO _____ (go to 29b)

(b) Why do you not grow fodder? _____

30 (a) What is the source of water for dairy herd?

Well _____
 Tap _____
 River _____
 Dam _____
 Other _____

(b) Distance from the yard _____

(c) Is water of good quality for the cattle? YES _____ NO _____

(d) State how inadequacy of or lack of water on the farm poses problems to your dairy farm _____

31 (a) Do you own a truck or bakkie? Yes _____ (go to 31b)
 NO _____ (go to 32)

(b)

	Type (truck/bakkie)	Year bought	New/used	Price
1				
2				
3				
4				
5				

32 (a) Do you have a tractor? YES _____ (go to 32b)
 No _____ (go to 33)

(b)

	Type	Year Bought	New/Used	Purchase price
<u>Tractors</u> 1.				
2.				
3.				
<u>Tractor Equip- ment</u> 1.				
2.				
3.				
4.				

PART VI

RETURNS TO THE DAIRY ENTERPRISE

33 Milk production and disposal per day (daily averages)

Item	Amount		Price received per ltr	
	1987	1988	1987	1988
Milk sold to the dairy plant				
Milk sold to neighbours				
Milk sold to institutions				
Milk consumed at home				
Milk fed to calves				

(34) How is the price determined for milk sold to neighbours? _____

35 What are the delivery or distribution arrangements for milk?

- Alternate with other farmers
- Use own vehicle
- Use public transport
- Walk
- Neighbours buy all milk not consumed
- Association organized transport
- Other (specify) _____

36 If you use your own vehicle all the time to deliver milk, do you also deliver for other farmers and what are the delivery charges if any? (explain) _____

37 Other sources of income besides milk

(a) Farming Activities: _____

(b) Non-farming Activities: _____

(NOTE: Please ensure that all business enterprises owned by the household are listed, eg shops, restaurant, taxis, butchery, dry cleans etc.)

PART VII

MANAGEMENT AND EXTENSION

38 Are you planning to expand the number of dairy cows? YES _____ NO _____

If YES (a) Give the optimal herd size of dairy cows you are planning to have _____

(b) How do you plan to obtain the additional cows?
retain own calves _____

purchase cows from neighbours _____

Purchase cows through livestock _____

Other _____

If NO (c) What are the reasons for not expanding your dairy herd?

39 (a) Have you ever been visited by a dairy extension officer(s)?

YES _____ (go to 39b) NO _____ (go to 39c)

(b) _____ How many times did he/they visit the farm between jan 1987 and Dec 1987? _____

_____ When did he/they last visit you?

_____ Does/do he/they visit your farm voluntarily or only when you invite him/them? (explain) _____

(c) What services do you think the government Dairy Division should improve? (explain) _____



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