CHAPTER 6

CO-OPERATION

6.1 Co-operative societies

Co-operation, whether for the sake of farming, hunting, looking after livestock and even for self defence, has characterized the history of human development everywhere in the world. However, the transitional, legal and institutional aspects of co-operative schemes came into being relatively recently, in various parts of the world (Kaya & Rapoo 1992). Kaya & Rapoo (1992) indicated that, in the area previously known as Bophuthatswana, traditional co-operation took a number of different forms. There was co-operation both in the field of crop and animal production. As in other parts of Africa members of a village community participated in some agricultural activities, such as land clearing, weeding and harvesting for a member of the community, who requested them to do so. There were also co-operation with respect to livestock care. For this kind of co-operation, there were invitations for drinks and feasting together, as a token of goodwill for the participants.

Traditional forms of co-operation were basically for subsistence, with limited independent exchange outside the family and clan membership. In these old forms of co-operation, the integration of diverse production, distribution and consumption systems rested on family and clan structures. Like in most pre-industrial and pre-capitalist societies, the division of labour among the co-operators was mostly based on sex and age (Kaya & Rapoo 1992), citing Campbell (1983). With the introduction of modern forms of co-operation,

traditional ways of co-operation are currently playing a less significant role. The introduction of a cash economy has brought about a differentation between the socio-economic contexts of production, distribution and consumption. Money has gained the command in the circulation of goods and services. It has also undervalued familial and clan sanctions and the solidarity that governed the traditional forms of co-operation. However, traditional, or even modern, forms of co-operation have often been confused with co-operative societies. For instance political and charitable organisations have been confused with co-operative societies. This implies that in order for co-operative societies to be successfully launched, there is a need to define the boundaries of their activities and principles. The co-operators, the public and those entrusted to manage co-operatives should note that a co-operative society is a specific type of socio-economic organisation. In a co-operative society, the promotion of pooling financial resources, for profit making per-se is not a specific characteristic of the co-operative as is often emphasized. The economic interests of members should be qualified in accordance with co-operative principles (Kaya & Rapoo 1992), citing Duma (1989).

In considering the domains of co-operative activities, one fundamental issue always needs to be recognized i.e. the traditional socio-economic links which existed prior to the formation of the co-operative society. Studies in various developing countries have shown that one of the fundamental failures of co-operative societies in these countries has been that they are often organized and managed by people whose traditional links with that specific socio-economic activity is minimal. For example, cattle rearing co-operatives would do well in an area, and amongst people, where cattle keeping has been a vital

economic and cultural factor. The above implies that it is proper to encourage co-operatives in the socio-economic activities known to the people and where their interests are strong.

6.2 Procedure prior to obtaining registration as a co-operative

Kaya & Rapoo (1992) indicated that according to the Bophuthatswana Co-operative Act of 1977, (No. 20 of 1997) no Co-operative shall be registered by the Registrar unless there has been present at least the minimum number of persons competent to form such a co-operative. The following documents should also have been presented at this meeting i.e. a written statement showing: the objectives of the co-operative; its business prospects, and facts and statistics calculated to show that, when registered, it will be able to carry out its objectives successfully; a copy of the regulations it is proposed to tender for registration.

After considering the statement and regulations, each of the qualified persons competent to form a co-operative, signs an application for membership in the proposed cooperative. They will then proceed to elect the first management committee of the co-operative, in accordance with the provision of the Bophuthatswana Co-operative Act. Within two months after the meeting of the Co-operative founders, the application for registration of the Co-operative society is sent to the Registrar of Co-operatives. The application should be accompanied by the following documents:

(a) a solemn declaration, or affidavit, by persons who acted as chairperson and secretary respectively at the founding meeting, to the effect that all the requirements of the Act in respect to registration of a co-operative have been complied with;

(b) a copy of a written statement showing the objectives of the co-operative, its business prospects and statistics calculated to show that, when registered it will be able to carry out its objectives successfully.

(c) two copies of the proposed regulations signed by not less than ten applicants for membership of a primary agricultural co-operative. Each of those signatures should be confirmed by at least one witness;

(d) a list containing:

(i) in the case of a primary co-operative society the full names, address, identity number, sex and occupation of the members of such co-operatives;

(ii) in the case of a secondary agricultural co-operative, the names and registered addresses of the primary agricultural co-operatives concerned;

(iii) in the case of a federal agricultural co-operative, the names and registered address of the secondary agricultural co-operative concerned;

(e) The permanent address of the registered office of the co-operative and the permanent address where the co-operative is to conduct its business.

6.3 **Model Regulations**

Any co-operative society which proposes to apply for registration in terms of the provision of the Bophuthatswana Co-operative Act may adopt as its regulations any or all of the model regulations, some of which are as follows:

(a) the proposed name of the co-operative, with the words "agricultural co-operative" as part of its name and the word "limited" as last word of its name;

(b) where the office and place of business are to be situated;

(c) the objectives of the co-operative;

(d) the manner in which the capital of the co-operative is to be raised or procured;

(e) the manner in which the profits which may result from the transactions of the co-operative shall be applied etc. (Kaya & Rapoo 1992).

6.4 **Problems of co-operative development in the area previously known as Bophuthatswana**

Co-operative businesses, like any other business, succeed to the extent that they are well managed. The limiting factor in nearly every case has been the lack of quality and vigour on the part of the manager, including management committees (Kaya & Rapoo 1992). Kaya & Rapoo (1992) indicated the following as some of the constraints limiting growth and development of co-operative societies, not only in the area previously known as Bophuthatswana, but in most African countries.

6.4.1 Lack of co-operative education

Due to illiteracy, or lack of co-operative education, members of the co-operatives are manipulated and misled by selfish leaders. This happens when leaders pass resolutions, which are contrary to members' interests and aspirations.

6.4.2 Ineffective supervision and control

The management of co-operative societies is the responsibility of management committees. But there are also staff employed by the co-operatives to carry out their businesses on a day to day basis. The employees are usually led by a manager or secretary. There is, however, an indirect management of co-operatives by the Government, usually by way of supervision, control and guidance. The Government role should be considered only as one of active helpfulness aimed at assisting them to develop to a more self sustaining level, especially in a situation where the co-operative movement is still in the infancy.

It has also been noted in the study by Kaya & Rapoo (1992) that the growth and development of co-operatives in the area have been hindered by lack of effective supervision. The laxity of both co-operative officials and Government, has been a limiting factor.

6.4.3 Lack of guidance in co-operative investments

There are two issues to be observed with regard to investments of co-operative societies. Firstly, it is normal practice, in co-operative business, to invest the surplus funds. When this is done, members should be issued with share certificates, equal to the amount which a member is supposed to receive in the form of dividends or bonuses. This means that the member

would also benefit from the profits earned from the investments. In the event of a member ceasing to be a member of a co-operative, the share certificate would be passed to his nominee or a member can be paid the amount shown in the share certificate.

If, however, a society wishes to invest with the aim to generate income for the society, members generally resolve to increase shares for such a project. Nevertheless, they may also decide to apply for a loan. But there must be a careful study of the project, so that a detailed feasibility report is presented to the members for consideration. There are cases noted, where management committees have used undue influence on members, such that resolutions by members are mere rubber stamps. In such cases, one is likely to find that the cost of projects have been inflated, so that the committee members get a share.

When a co-operative society plans to invest, the most important aspect to consider are the members. Is the project in line with the society's objectives? Will members' interests not be compromised by undertaking this investment? What benefits will members derive from it, in the short -term and/or in the long - term? What are the short-term or long term financial implications?

Are members' funds going to be tied up for long periods? These are some of the issues which committed co-operative leaders, must be satisfied with, before they decide to ask the members to approve the investments.

CHAPTER 7

DESCRIPTION OF THE ATAMELANG BARUI POLAR CO-OPERATIVE BEEF RANCH

7.1 Historical background and geographical situation

The members of Atamelang Barui Polar Co-operative Beef Ranch (ABPCBR) come from Ganyesa village. Besides the Co-operative Ranch, the members of the Ranch also have livestock in the Ganyesa communal grazing area and on leased farms in the vicinity of the Co-operative Ranch. The (ABPCBR) is surrounded by leased farms with a State Beef Production Project (Radobil) also adjacent. The Beef Ranch is +-60 kilometers from the Ganyesa village and +-130 kilometers from Vryburg, which is the nearest town from which supplies could be obtained. The Ranch is, therefore, far from town and it is expensive to bring inputs to the Ranch. This statement is further corroborated by Sebotja (1991), that the geographical situation of a farming unit is an important factor, in as far as it determines the cost of variable inputs and the price of the products, and thereby further affects the gross margin of an enterprise.

7.2 Climate

ABPCBR is in the Ganyesa district. Ganyesa is situated at 24° 10'E, 26°35'S. The area is very hot in summer, the hottest month being January (32.2° c) and very cold in winter, the coldest month being July (0.2° c). The area experiences strong dusty winds during August.

The average rainfall is low i.e. 469.3mm per annum and is concentrated in a short summer growing season.

There is no weather station in the Ganyesa district. The rainfall data obtained from the Weather Bureau Station on Armoedsvlakte Research Station, near Vryburg, has been used to depict the rainfall situation at ABPCBR.

Table 8.1: Average monthly rainfall on Armoedsvlakte Research Station.

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
mm	86.5	81.4	74.8	43.9	14.7	8.2	2.6	6.0	11.3	31.7	45.5	62.2	469.3

The average monthly maximum (M) and minimum (m) temperatures for the Armoedsvlakte Research Station are presented in Table 8.2.

Table 8.2: Average monthly maximum (M) and minimum (m) temperatures for Armoedsvlakte Research Station.

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
M°C	32.2	30.5	29.0	25.9	22.7	19.5	20.0	22.8	27.1	29.1	30.5	31.9
m°C	16.9	16.2	14.3	9.7	4.4	0.7	0.2	2.7	7.6	11.5	14.0	15.7

8.3 Soils

A survey of the soils on the ABPCBR was conducted (Van Heerden 1995). Apart from an old cultivated land, 23 representative sites were identified. These sites were all classified as belonging to the Clovelly form, Setlagole family. These sandy soils would be suitable for the establishment of A pubescens. This grass requires a sandy soil with a minimum annual rainfall of 250mm.

On the old cultivated land, two soil forms have been identified. The Molopo soil form, the soil family being Pomfret, and the Clovelly soil form, the soil family being Setlagole.

7.4 Vegetation

The main vegetation in this area is the Savanna formation. The veld type is the Kalahari thorn veld (Acocks 1988).

Due to the fact that the soil form on the whole farm is very uniform, the vegetation is also homogenous. It is only in the depressions where there is an increase in certain tree species but the botanical composition of the grass layer remains essentially the same.

The tree species of general occurrence are; T. camphoratus, G. flava, T. sericea, D. cinerea, A. mellifera, A. haematoxylon, and Z. mucronata. In some areas (deep sandy soils), T. sericea is the predominant tree species but in the depressions, A. mellifera tends to be predominant.

The data in Table 3.1 regarding the survey on tree species on the farm of the sites (4,5,6,7,8,9,10 and 11), there was a high percentage of trees of less than one metre high. In this situation, by the year 2000, should all these small trees survive and grow, these densities will pose a serious problem. This increase is, therefore, a problem which should receive priority attention.

The grass species of general occurence are: A. pubescens, B. nigropedata, D. eriantha, S. pappophoroides, S. Uniplumis, E. lehmanniana, E. rigidior, A. meridionalis, A. stipitata, S. kalaharensis, P. squarrosa, E. pallens, M. repens, A. congesta and T. berteronianus.

The grazing capacities as determined (chapter 3.2.2) are as follows: 28 ha/M.L.U; 27 ha/M.L.U; 22 ha/M.L.U; 20 ha/M.L.U; 11 ha/M.L.U and 10 ha/M.L.U.

Due to lack of drinking water in certain grazing camps, the grazing capacity, as determined, differs from one area to another. The areas which have no water, have not been heavily utilized in the past and the grazing capacities are relatively high (11 ha/M.L.U and 10 ha/M.L.U) whereas in areas which have access to water, utilization has been heavier, and the current grazing capacities are poor (27 ha/M.L.U and 28 ha/M.L.U).

7.5 Infrastructure

7.5.1 Fences

The ABPCBR has been planned and divided into nine blocks of four grazing camps each (36 grazing camps). The condition of the fences on some of the internal grazing camps is, however, poor. Some of the gates are broken and need to be replaced.

7.5.2 Watering points

Water is the major problem on the farm. Most of the grazing camps have no water because the windmills are broken, some boreholes are not in good working condition, others are not equipped with windmills and the reservoirs in some of the grazing camps are in poor condition. This situation has led to uneven utilization of the rangeland (some grazing camps are underutilized and others are overutilized).

7.5.3 Roads and firebelts

There is a road running through the middle of the farm from North to South (appendix E). The firebelts along the fences are poorly maintained. Apparently these were made some years ago but have not been maintained. Trees have developed along the fence which make it difficult to travel along the fence in a vehicle during the inspection trips.

7.5.4 Livestock handling facilities

There is a crushpen for the immunization of livestock and the dosing of cattle against internal parasites. The crushpen is still in good condition. The treatment of cattle against external parasites is irregular or ineffective, as has been observed by the presence of ticks on the cattle. Although there is a dipping tank on the farm, the cattle are not trench dipped because the herdsmen claim that the cattle are aggressive and do not want to get into the trench and, therefore, whenever cattle are treated for external parasites, a tick grease or a spray is used which is evidently not effective as it should be.

CHAPTER 8

THE SYSTEM AS CURRENTLY PRACTISED IN THE STUDY AREA

8.1 Introduction

ABPCBR was started in 1977. It is a farm of 9776 ha in extent. The members of the Co-operative were given Polar farm by the State on condition that they keep it in such a manner, that it remains a model farm for good livestock and veld management for the individual farmers on leased farms and particularly to farmers in the communal grazing area. The farmers, therefore, did not pay any fee towards using the farm. From information from the Assistant Secretary (Rakgwale 1995), the members were informed that, once allowed to use the farm, they would have to maintain it.

From information from the members, the Co-operative apparently started well, the farmers visiting the Ranch regularly, but later on, the activities of the farmers at the Co-operative deteriorated. The main problem appears to be poor management. It, therefore, became necessary to review the management system.

The farmers who started the ABPCBR are from Ganyesa communal grazing area (GCGA). It was also necessary to investigate the management of livestock in G C G A and to ascertain whether the attitude of these farmers from GCGA had not contributed to the retrogression in the management.

8.2 Social aspects of the farmers

8.2.1 Introduction

In this section the social aspects of the farmers of the ABPCBR are discussed. The aim is to ascertain whether certain characteristics of the members have contributed to the constraints on their farming activities.

8.2.2 Personal factors

Personal factors include sex, marital status, occupational status, age and level of education.

8.2.2.1 Sex and marital status

Gender plays a very important role in agriculture. In general, men are physically capable of coping with all the farming practices that may be recommended by the extension agents. On the other hand, women, even if they are better educated, often need mens' help to carry out certain activities in farming (Tshenkeng 1985).

Marital status also plays a major role in agriculture, especially in rural areas, where certain duties, such as the management of livestock and cultivation practices, except weeding, are assigned to men. On the other hand women are assigned duties such as cooking, fetching water, collecting firewood and weeding while the crops are growing. This means that an unmarried farmer is confronted with all the duties mentioned above and is, therefore, unlikely to be successful in all of them (Tshenkeng 1985). This statement is supported by Mtsotso (1982) who stated that married men are likely to progress faster in agriculture than unmarried men because they are being helped by their family members. Table .1, illustrates the distribution of the members of ABPCBR according to sex and occupational status.

Table 8.1: Distribution of the members of ABPCBR according to sex and marital status, 1995, (n=14).

Category	No.	%
Married men	13	93
Single men	Nil	Nil
Widowers	Nil	Nil
Widows	1	7
	14	100

As can be seen the majority of the farmers (93%) are married men and should, therefore, have a better chance of success in farming.

8.2.2.2 Occupational status of the farmers

Occupational status plays a very important role in agriculture. If a higher percentage of the physically able men supplement their income by working in urban areas permanently, or as monthly commuters, the progress in farming is often detrimentally affected as women, old men and inexperienced young men tend to be less successful in farming (Tshenkeng 1985). Theisen (1976) indicated that the absence of the male head of the family, over long periods of time, had a serious effect on the ability of the family to adjust. Theisen (1976) further stated that the stress and the loss of cohesion of the family unit caused by the absence of the head gave rise to a degree of functional disorganization within the family. For example, the wife may suddenly find herself unable to cope with the added responsibilities such as making kraal compost and dealing with livestock, which are traditionally men's work. This may result in a reduction in crop yields and livestock production which, in turn, would have a significant influence on the nutrition and health of the family. Table 8.2 shows the members of the Atamelang Barui Polar Co-operative Beef Ranch according to their occupational status.

Table 8.2: Distribution of the members of ABPCBR according to their occupational status, 1995, (n=14)

Category	No.	%
Permanently at home	12	86
Daily commuter	2	14
	14	100

Eighty six percent of the members of ABPCBR are permanent residents. The opportunity for the farmers (members) to visit the Co-operative frequently and improve the management practices and livestock production should, therefore, be good (especially as most of them have vehicles).

8.2.2.3 Age

Age plays an important part in agriculture. Smith and Zopt (1970), as cited by Bembridge (1975), in their study of the sociological effects of age, stated that an individual's age is one of the most important personal characteristrics, since the way a person thinks and behaves and their needs are closely related to age. Figure 8.1 shows the distribution of the members of ABPCBR according to age.

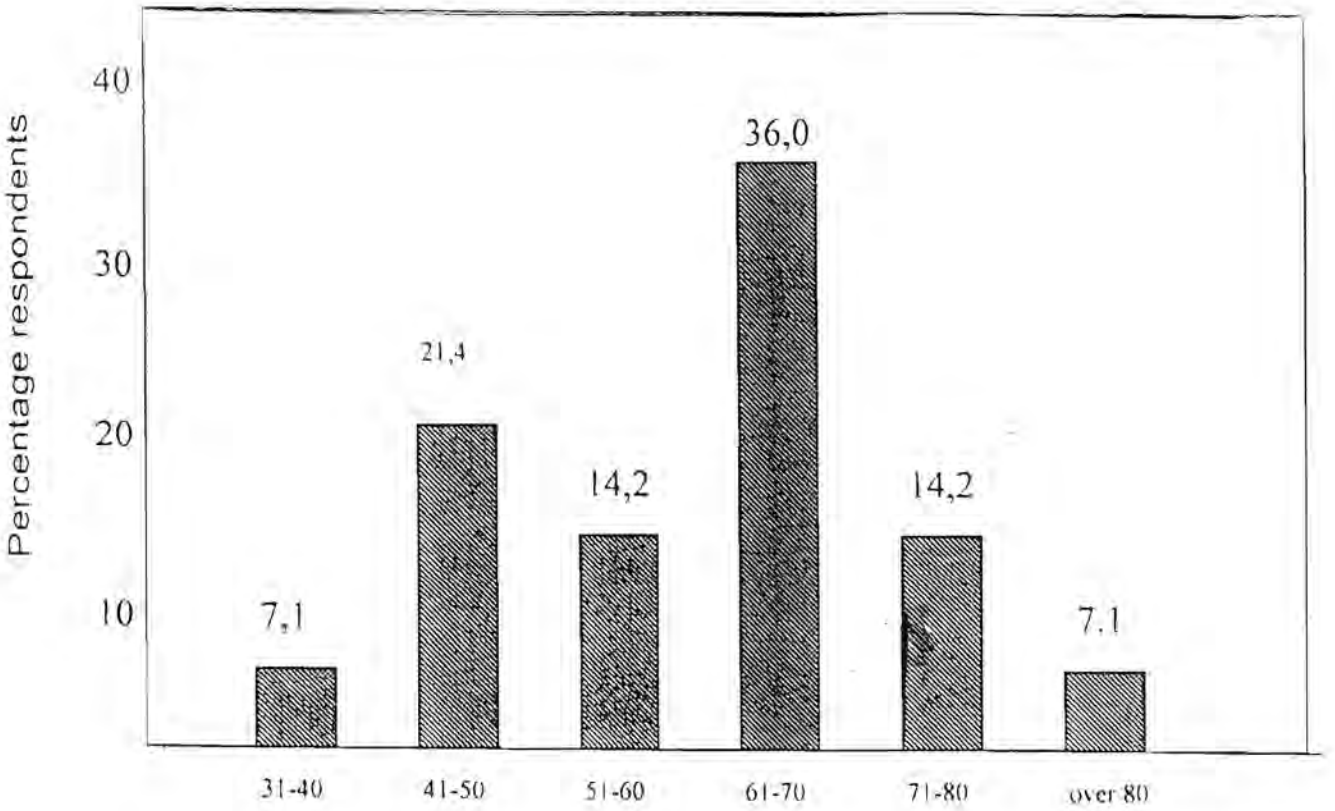

Figure 8.1: Distribution of the members of ABPCBR, according to age 1995 (n = 14)

Figure 8.1 shows that the majority of the farmers (57,3%) were older than 60 years of age. This group of the Co-operative members would be less likely to visit the Co-operative regularly to check on whether the veld and livestock were being managed correctly. Hence the management of both veld and livestock would tend to be poor on the Ranch.

8.2.2.4 Level of education

Education plays a very important part in agriculture. Generally, farmers with some education are able to obtain farming information from written material such as magazines and newsletters. Such farmers tend to be receptive to new ideas, especially if the new ideas are related to information which they obtained from magazines (Tshenkeng 1985).

Leseme (1983) states that the potential of humans must be realized by education and training, before they can become key factors in the development process. The distribution of the members of ABPCBR in terms of education is reflected in figure .2.

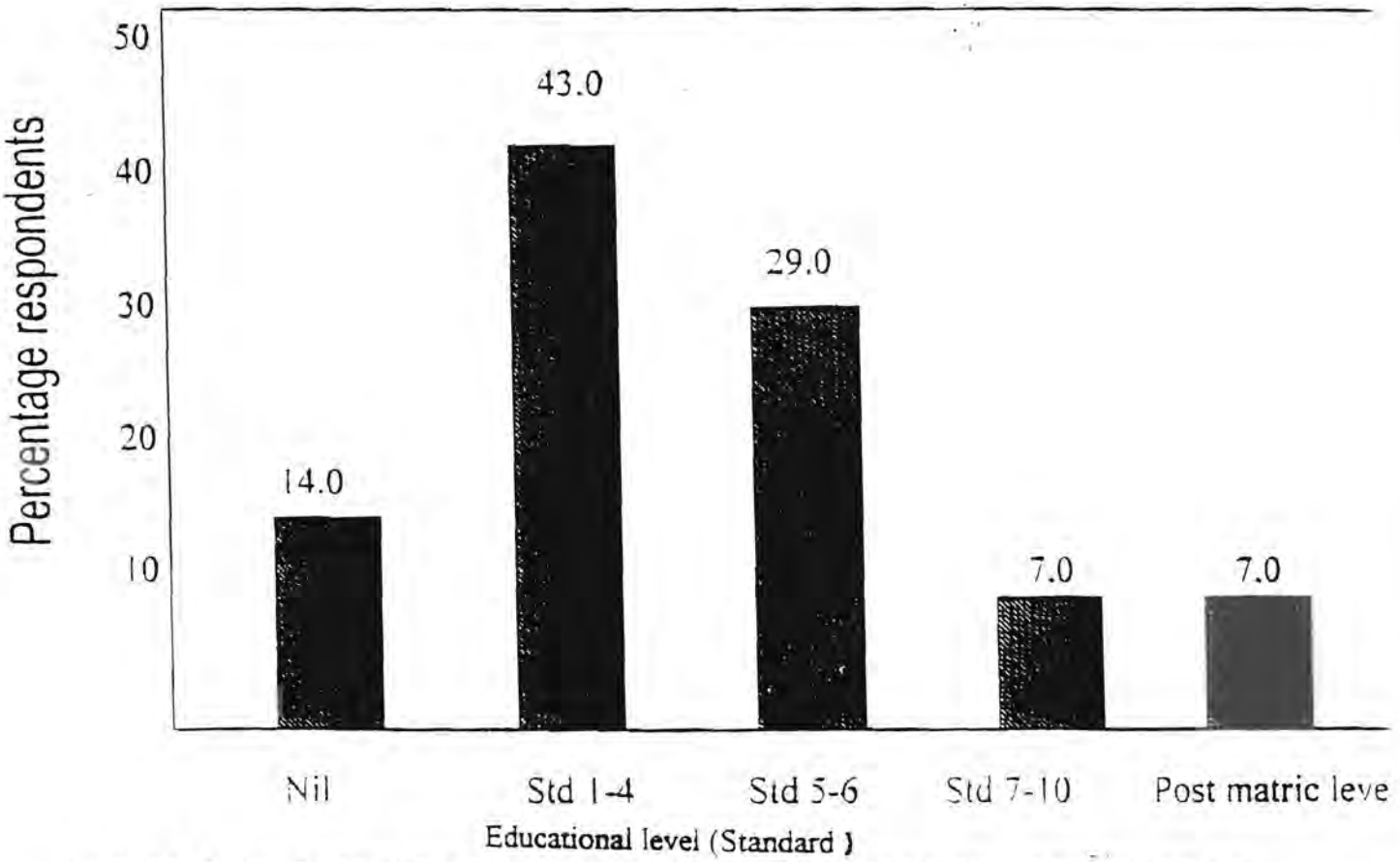

Figure 8.2: Distribution of the members of ABPCBR, according to the level of education, 1995, (n=14).

These data indicate that 14% of the members of the Co-operative Beef Ranch have never had an opportunity of schooling, while 43% had a level of education of between Std I and Std 4, 29% a level of between Std 5 and 6, 7% a level between Std 7 and 10 and 7% a post matric level. Although the majority of the members had a low standard of education (between Std I and Std 4), considerable progress in agriculture may be achieved, if the correct approach is applied. Steyn (1982), states that care should be taken not to forget that illiterate people can take initiative if approached and involved properly.

8.2.3 Discussion of the personal factors

The majority of the members of ABPCBR are permanent residents. The members should, therefore, have the opportunity to visit the ranch frequently to help in the management of veld and livestock and to inspect the infrastructure (for example, the broken windmills and broken fence lines). Unfortunately ABPCBR is characterized mainly by older members and the Ranch is about 60 kilometers from the Ganyesa village, where the majority of the members live. It is evident that these older members would be less likely to visit the Ranch regularly. This means that such members should be motivated to arrange that their family members should visit the co-operative on their behalf and help in the management of the veld and livestock.

A high percentage of the members of the Co-operative (43%) have an education of between Std I and Std 4. Since all the members of the Co-operative own livestock on the Ranch and in the GCGA, they should, therefore, have considerable experience of farming and there should be no problem in motivating them to accept new ideas on farming.

Considering the number of years spent as members of the Co-operative (most of them 18 years), the farmers should be committed to the management of the Co-operative. Observations on the poor management of the Co-operative would, however, seem to indicate that the members of the Co-operative have stronger commitments elsewhere.

All members of the Co-operative (although others mentioned other sources also) indicated that they obtain information on the management of the veld and livestock from the extension officers. The situation

regarding the management of the veld and livestock at the Co-operative does, however, indicate that the farmers were not applying this information.

8.2.4 Farming experience of the members of the Co-operative

Experience plays a very important role in farming especially where the level of education of the farmer is low. His/her experience in farming facilitates his/her receptiveness power for new ideas. Table 8.3, shows the distribution of members of ABPCBR, according to their farming experience on the Ranch.

Table 8.3: Distribution of the members of ABPCBR according to their farming experience on the Ranch, 1995, (n=14)

Category	No.	%
18 years experience	11	79
11 years experience	1	7
5 years experience	1	7
1 year experience	1	7
	14	100

The majority of the members of the Co-operative (79%) had been farming at the Co-operative since its inception. By 1995, they had already completed 18 years as members of the Co-operative. This means that they should have gained enough experience to realize good profits from the Co-operative.

8.2.5 Sources of information on the management of the veld and livestock

A source of information is an individual or institution that originates a message (Bembridge 1975, citing Rogers and Shoemaker 1970). The communicator gives expression to a message intended to reach the audience in a manner that results in correct interpretation and desirable responses. The credibility of the communicator, as perceived by the

audience, is a key factor determining the effectiveness of the communication (Smith 1971, cited by Bembridge 1975). Table 8.4 illustrates the distribution of the members of ABPCBR, according to the sources of information on the management of the veld and livestock.

Table 8.4: Distribution of the members of ABPCBR, according to the sources of information on the management of the veld and livestock, 1995, (n=14).

Category	No.	%
Extension officers only	11	79
Extension officers and own experience	1	7
Ext. off., adjacent white farmers, farmer colleagues and own experience	2	14
	14	100

Table 8.4, indicates that the majority of the members of ABPCBR get information on the management of veld and livestock from the extension officers. Considering the poor level of management of the veld and livestock observed at the Co-operative, it would appear that the farmers were not applying this advice. The E.O's might not have been utilizing the various recommended channels. The most common channels include, meetings of all kinds, radio, books, bulletins, letters, newspapers, organized tours and personal contacts (Leagan 1961, cited by Seobi 1980). Seobi (1980), citing Bembridge (1978), further stated that research has shown that for effective communication, at least five channels need to be used, each supplementing the other in a planned and orderly manner.

There was no E.O. assigned specifically to the Co-operative. The E.O. who was servicing leased farms, adjacent to the Co-operative Beef Ranch, helped the

members of the Co-operative in the management of the Ranch. The same E.O. had committed himself to helping the farmers by delivering mineral licks with his official vehicle. The basic philosophy of agricultural extension is to help people to help themselves. This can be achieved through an effort to achieve the objectives of extension viz. (i) to motivate people and to help them to develop and improve their agriculture and rural life; (2) to create incentives which will lead to optimum economic agricultural production; (3) to improve the image of farming and status of extension workers (Seobi 1980). After a meeting with the E.O. and Co-op members, there was a discussion that the farmers should appoint a manager for the Co-operative. This step was taken because it was realized that the members of the Co-operative did not have a sense of ownership and depended on the E.O. for all the management activities on the Ranch.

8.3 Livestock production

Livestock production is the major component of agricultural production in the so-called Black States of South Africa because 80 to 86 percent of these areas can potentially only be utilized for grazing (Steyn 1982) Steyn (1982) further stated that approximately 58 percent of the gross value of agricultural production can be attributed to livestock and that the gross returns on total livestock units in such areas was R1,66 per livestock unit compared to R46,90 in the commercial farming sector of the Republic of South Africa (Benso 1978).

8.3.1 Livestock management

Management plays a very important part in the livestock production, because it determines the success of the farming business when all other factors are normal

8.3.1.1 Farmers visits to the Co-operative

The management of livestock at ABPCBR is generally poor. Members visit the Ranch only occassionally. When asked on their visits to the Co-operative, eight (57%) out of the 14 members of the Co-operative Beef Ranch reported that they visit the Co-operative only once a month, and six (43%) reported that they visit the Co-operative only once in two months. The frequency of visits to the Ranch is very poor and hence the management of the veld and livestock is also poor. The problems experienced with livestock, as identified by the members during their visits, are presented in Table 8.5.

Table 8.5: Identification of problems by Co-operative members during their visits, 1995, (n=14)

Problems experienced	No. of respondents	%
Lack of water	6	43
Poor condition of livestock	3	21,4
Deaths due to diseases	2	14,3
No mineral licks	2	14,3
Rotation of camps not regular	1	7
	14	100

The largest proportion of the Co-operative members (64%) indicated that lack of water in the grazing camps, and poor condition of livestock were the major problems. The cause of lack of water was ascribed to insufficient boreholes and broken windmills. Members felt that the State should do the work. If they were committed to the Co-operative, they would have repaired the broken windmills themselves, drilled sufficient boreholes to supply all grazing camps with water, and tested the strength of the existing boreholes with the aim of gravitating water to the different watering points. Although some members felt that the problem could be solved by drilling more

boreholes, they did not feel that it was their duty to see to the broken windmills, despite the pre-condition that they undertook to maintain the farm (8.1). Some windmills had been broken for three years and nothing had been done to repair them.

8.3.1.2 Feeding of mineral supplements

Mineral nutrition plays a very important part in livestock production in this area. Minerals support a wide range of functions in the body:

- the composition of skeleton and teeth,
- maintenance of osmotic gradients and exchange of ions
- surface electrical activity and irritability of muscles and nerves.

The adequate supply of, and balance between, minerals are essential. Mineral imbalances in animals on veld are related to soil quality. Large regions in Southern Africa are phosphorus deficient (Casey & Maree 1993). It is, therefore, necessary to correct this deficiency by supplying phosphorus licks. The response with respect to supplying mineral licks is tabulated in Table 8.6

Table 8.6: The frequency per month, of feeding mineral licks on the Co-operative, 1995, (n=14)

Frequency month	No. of respondents	%
Once	6	43
Twice	4	29
Thrice	1	7
Four times or more	3	21
	14	100

The confused response on this aspect indicated that the members did not know about the desired frequency of feeding mineral licks. The feeding of such licks at the Co-operative was poor. It was observed that the troughs for mineral licks were often empty. Phosphorus deficiency was also observed in cattle, especially with the old cows. The affected animals moved with symptomatic stiff short gait, hump-backed and the abdomen tucked under the body.

8.3.1.3 Treatment of cattle against ticks

The members of the Co-operative were asked the frequency of dipping cattle against ticks and the majority (36%) reported that the treatment was applied only once a year, using the tick grease. Although tick infestations on cattle are generally not a serious problem in the area, the general opinion is that annual treatment against ticks is inadequate.

8.3.1.4 Stock theft at the Co-operative

Stock theft is a serious problem in the Ganyesa district. The members of the Co-operative stated that they were also experiencing problems with cattle theft. When asked what steps they took to solve the problem, the members of the Co-operative stated that they reported the matter to the police. The fact that most members only visited the Co-operative once per month, is an indication that their livestock control was poor and that cattle theft could develop into major problem.

8.3.1.5 Herd composition

The members of the Co-operative were requested to describe the herd composition at the Co-operative. All respondents knew that the herd was divided into groups such as cows, heifers, steers and bulls, but none of them had any idea of the number of livestock

in each group. This situation illustrated the lack of attention to their cattle on the Ranch. The herd composition at ABPCBR as determined by the E.O. was as follows:

Cows	150	
Calves	90	(0,5 x 90 = 45 M.L.U)
Heifers	45	
Steers	48	
Bulls	6	
Total	339 cattle (294 M.L.U).	

8.3.1.6 Cattle owned at the Co-operative as well as on leased farms and in the communal grazing area

All Co-operative members reported that apart from cattle on the Co-operative Ranch, they also owned cattle in the GCGA and on leased farms. This situation was purported not to affect the management of the Co-operative. Although members stated that owning livestock at the Co-operative and on communal grazing area did not affect the management of the Co-operative, there is a strong feeling that each farmer (member) is more committed to their livestock closest to home, or on leased farms, and thus has little time to pay attention to the Co-operative. The members have been advised to appoint a manager for the Co-operative in an attempt to improve the level of management at the Co-operative.

8.3.1.7 The type of breed kept

The members brought cattle on to the farm at the start of the Co-operative. The breeding herd for the Co-operative was selected from their herds. Each member selected and brought in a certain number of cows and heifers from his own herd. Livestock were then improved by upgrading i.e. putting in improved sires to improve livestock. With respect to the breed of

bulls used, there appear to be a considerable confusion. Initially two bulls (Hereford and Drakensberger) were donated by the then President of Bophuthatswana with the aim of helping the members to improve their livestock. The other bulls (Brahman, Simmentaler, Pinzgauer and Bonsmara) were brought in by the members themselves. Most of the cattle on the Co-operative are thus crosses of the abovementioned breeds.

The Co-operative is situated in a semi-arid area and cattle breeds such as the Hereford, Simmentaler, Pinzgauer and even the Brahman have been observed to lose a lot of condition during winter, which indicates that such breeds are less suited for such a system, because of their high maintenance and management requirements.

8.3.1.8 Reproduction

All the members of Co-operative indicated that they rear cattle in order to sell them for profit. This statement, therefore, shows that at least the members of the Co-operative regard farming as a business undertaking, although their management might be unsatisfactory. The reproductive and mortality rates of cattle on the Co-operative Ranch are presented in Table 8.7.

Table 8.7. Reproductive and mortality rates of cattle at ABPCBR, 1995.

Reproduction and mortality	No	%
Cows	150	-
Calves born	90	60
Calf mortality	14	16
Calves weaned	76	84

The average calving percentage was sixty percent. This might have been caused by low level of nutrition since cattle were mostly concentrated in the grazing camps which had water, which, therefore, were over-utilized and degraded. The calves are entirely dependent upon milk in their initial growth stage, prior to their being able to utilize natural grazing. High calf mortality (16%), might have been caused by insufficient milk from the cows due to low level of nutrition and poor nutrition when they started to utilize the natural grazing. This situation has led to a low weaning percentage (84%).

8.3.1.9 Marketing of livestock

Marketing plays a very important part in any business. It is, therefore, necessary that before a farmer starts any enterprise, he should first determine whether there will be a market for that commodity. Forty-three percent of the members of ABPCBR reported that culling and selection exercise is done once in two years and thirty-six percent stated that it is done once a year, whereas twenty-one percent stated that it is not done. This situation indicates that members do not visit the Co-operative regularly and do not know how these activities are applied at the Co-operative.

The current stocking rate on the Co-operative Ranch is 294 M.L.U (on 9776 ha, this is equal to 33ha/M.L.U) compared to 960 M.L.U (10,2 ha/M.L.U) in 1980. The number of cattle on the farm has thus declined considerably. Although a high percentage of the cattle have been sold, and also a certain percentage given to members as a share, a percentage died in the veld due to poor management of livestock. On two occasions, the remains of animals in the veld were identified, which the members of the Co-operative did not know

The farmers sell their livestock at the Tswana Livestock Auctioneers (local livestock auctioner). They were not, however, satisfied with the price offered for their cattle, mainly because there were too few buyers and there was not enough competition in bidding for livestock.

8.4 Range management on the Co-operative

Basically, range management deals with the use of land of low potential productivity maintained under extensive systems to produce water, red meat, fibres, hides, wildlife, timber and recreational opportunities in such a way that the basic resources (soil and vegetation) remain unimpaired (Stoddart, Smith & Box 1975). Stoddart, Smith & Box (1975) further indicate that range management is the science and art of optimizing the returns from rangelands in those combinations most desired by and suitable to society through manipulation of range ecosystems.

8.4.1 Problems experienced by members of the Co-operative regarding the veld

The problems are presented in Table 8.8

Table 8.8: Distribution of members of ABPCBR with respect to veld problems, 1995, (n=14).

Problems experienced	No. of respondents	%
Poor grazing condition	9	64
Bush encroachment and poor grazing condition	4	29
Under-utilization of some of the grazing camps	1	7
	14	100

Sixty-four percent of the members indicated that the major problem is poor grazing condition. In fact 93% of the members have mentioned poor grazing condition as the major problem. It was also found that 29% of the members reported bush encroachment as one of the problems they experience, with 7% indicating that some of the grazing camps were under-utilized. The statement that some camps are under-utilized indicates that they realize that there is a problem but lack the commitment to attend to such a problem, or seek advice to solve such a problem.

8.4.2 Causes of problems in the veld

The causes of the veld problems, as identified by the Co-operative members, are tabulated in Table 8.9

Table 8.9: The distribution of the members of ABPCBR, according to the causes of veld problems, 1995, (n=14).

Causes of the problems	No. of respondents	%
Lack of rain	7	50
Veld fires and lack of rain	2	14,3
Continuous grazing	3	21,4
Lack of help from water supply authority	2	14,3
	14	100

Table 8.9 shows that 50% of the members of the Co-operative indicated that the basic cause of the veld problems was drought. A further 14,3% indicated the cause to be veld fires and lack of rain. Altogether 64,3% of the members indicated that the basic cause of poor grazing condition was the lack of rain. Some members 21,4% stated that the cause of the problem experienced regarding the veld was continuous grazing and 14,3% reported that the cause of the problem is that they do not get help from the Water Supply Authority. Although 64,3% of the Co-operative members

reported the cause of the problems they experienced to be lack of rain, there are areas on the Ranch where the condition of grazing is good (with the grazing capacity of 10ha/M.L.U and 11 ha/M.L.U), as compared to other areas which are in poor condition (20 ha/M.L.U, 22 ha/M.L.U and 28 ha/M.L.U). This is a clear indication that poor management and not lack of rain is the primary cause of poor veld condition. The fact that the members of the Co-operative do not get help from the Water Supply Authority should not be a problem because the Co-operative is an independent body and the members could arrange for private contractors to help solve the water problem mentioned in Table 8.5, more especially as they knew that they were responsible for maintenance (chapter 8.1).

The members of the Co-operative were given Polar farm to use, by the State on condition that it is maintained, and kept it in such a manner, that it remained a model farm for the demonstration of good livestock and veld management to the individual farmers on leased farms and particularly to farmers in the communal grazing area.

The Ranch has already been divided into grazing paddocks but most of these paddocks do not have water at present. In some of the paddocks, the windmills are broken and in others the boreholes have not been equipped. This situation has resulted in livestock concentrating in paddocks which have water and as a result these are over-utilized. The decline in grazing condition could thus be ascribed to both over and under-utilization.

8.4.3 Farmers solutions to the veld problems

Members offered several solutions, which have been tabulated in Table 8.10

Table 8.10: Distribution of the members of ABPCBR according to solutions of veld problems, 1995, (n=14)

Solutions of problems	No. of respondents	%
Water Supply Authority to help solve water problem	5	36
Drill more boreholes	2	14,3
Rotational grazing	3	21,4
Provide water in the grazing paddocks	1	7
Cutting of trees and rotational grazing	2	14,3
Reduce livestock	1	7
	14	100

Table 8.10 shows that 36% of the members of ABPCBR felt that the Water Supply Authority should solve the water problem on the farm. This statement indicates that the farmers were not clear on the pre-condition by which they were allowed to use the farm (chapter 8.1), because it is clear that they are not committed to the Co-operative and, therefore, act as though the Ranch belongs to the Department of Agriculture, and all associated organisations falling under it, and that these organisations are responsible for the maintenance of infrastructure.

The members of the Co-operative were fortunate because the basic infrastructure was provided i.e. fences were erected, boreholes drilled and equipped, chrushpen for handling livestock provided and a house for herdsmen. The then President of Bophuthatswana also donated two bulls. These bulls were given to the Co-operative to improve their livestock. In return, the Co-operative was to act as a source of information and demonstration for the adjacent farmers on the correct management of livestock and veld. Apparently the members have tended to think that the Department of Agriculture will always give them everything free of

charge and, therefore, expect help from the Department on aspects, which they themselves should do. This situation should once more be clarified.

The farmers were asked to indicate whether the "Rest" paddocks had been grazed. All of them (100%) replied in the affirmative, adding that they rest those grazing paddocks which do not have water. This statement indicates that the farmers do not have a clear idea of the reason for resting. The farmers, therefore, need more education on the reason for resting the veld.

8.4.4 The value of veld burning

Fire and its use in veld management is aptly summed up by the phrase "Fire - a bad master but a good servant". This is because, now, as in the past, a great deal of damage has been and is being done to the veld through the incorrect use of fire, resulting in a serious deterioration in the condition and productivity of the vegetation and widespread soil erosion. Conversely, research and the appreciation of the ecological role fire plays in the dynamics of natural ecosystem and plant communities, in particular, indicate that it can be a very important and useful tool in the management of vegetation (especially savanna) for livestock (Trollope 1989).

The members of the Co-operative were asked whether veld burning is of any value on the farm and all of them (100%) stated that veld burning is of no value and their reasoning was that veld burning leads to veld deterioration. At the Co-operative, because of lack of water in some grazing paddocks, the veld is under-utilized and this situation has led to moribund conditions and the deterioration of the veld. Most of the highly desirable grass species such as Anthephora

pubescens and Digitaria eriantha, which had developed in those areas have died because they have not been stimulated by grazing. This area, therefore, needs to be burnt to remove the dead grass and stimulate the highly desirable species to develop. The farmers, therefore, need education on fire as a management tool.

8.4.5 Situation with respect to bush density (Bush encroachment)

Encroachment can be defined either as the invasion of undesirable plants into an area where previously it did not occur or aggregation of existing undesirable plants in the area (Trollope et al. 1989). It was indicated by Donaldson (1966) that large areas in many parts of the world of once good grazing were virtually ruined, or in the process of being ruined, by dense encroachment of worthless bush. The value of grazing land may be completely destroyed by encroaching woody plants, and their eradication may cost more than the land is worth.

Donaldson (1966), citing van der Schijff (1964), further stated that in South Africa, where approximately thirty-three percent of the area is covered by bush, scrub or Savanna, it has been estimated that at least 12,847,500 ha of bushveld is largely damaged by the abnormal coppicing of bush or is endangered by bush encroachment. Donaldson (1966) further indicated that in the Orange Free State Region, it is mainly the Molopo area (now part of North-West Province), of the Vryburg, Kuruman and Mafikeng districts, which had been invaded by undesirable scrub plants. Donaldson (1966), citing Eberson et al. (1960) states that it has been estimated that over 856500 hectare of valuable veld of this area had been dominated by

black-thorn *A. mellifera* spp. detinens), a multi-stemmed undesirable thorny woody plant. The members of the Co-operative were asked to indicate whether the bush density on the farm had increased, had not changed, or had actually declined since the inception of the Co-operative Ranch. Their responses are tabulated in Table 8.11.

Table 8.11: Distribution of the members of ABPCBR with respect to their bush density on the farm, 1995. (n=14).

Bush density situation	No. of respondents	%
Increased	12	86
Unchanged	2	14
Declined	-	-
	14	100

The majority of the members of the Co-operative felt that the bush density on the farm has increased since the inception of the Co-operative. When asked what steps should be taken in the present situation, all members who stated that the density has increased, responded that the density should be controlled by chemical methods. Although the farmers indicated that bush encroachment should be controlled chemically, the control of bush by a chemical, although much faster, may be expensive, especially considering the large area that has been affected. The method of burning the stem would appear to be more affordable for the farmers. Although it might be a slow process, it is cheap to apply because the fuel used is dry dung, sawdust or wood. Donaldson (1967) indicated that burning the lower basal areas of the stems of blackthorn plants with dung, sawdust, wood, or with any other types of available fuel, offers an effective and relatively economical method of controlling this plant, provided that, the effective period of the burn

exceeds three minutes. It was further stated by Donaldson (1967) that, although this method of eradicating blackthorn is subject to various problems such as limited supply of readily available fuel, the shortage of labour and the slowness of the method, there is a reason to believe that these obstacles can largely be overcome.

8.4.6 Encroaching tree species

When asked to identify the most invasive tree or shrub species on the Co-operative Ranch, the members' responses were as follows (Table 8.12):

Table 8.12: Distribution of the farmers of ABPCBR according to the identification of invasive tree species, (1995, n=14).

Encroaching tree or shrub species on the farm	No. of respondents	%
Acacia mellifera	8	57,2
Dichrostachys cinerea	2	14,3
Acacia tortilis	1	7,1
Grewia flava	2	14,3
Acacia erioloba	1	7,1
	14	100

Most of the members of the Co-operative (57,2%) regarded A. mellifera (blackthorn) as the most invasive tree species on the Co-operative. It is clear that the basal stem burning method, recommended by Donaldson (1967), should be evaluated by the members of the Co-operative to control bush encroachment.

8.4.7 Grass species occurring on the farm according to the members of the Co-operative

The knowledge of grass species by farmers has a very important role in the management of the veld. If the farmers do not have the knowledge of grass species

occurring on his/her farm, he/she could easily overestimate the condition and grazing capacity of the veld. This could result in veld deterioration. The members of the Co-operative were asked to name the grass species which they identified on the farm of the Co-operative and also to evaluate their feeding value. Their answers have been tabulated in Table 8.13.

Table 8.13: Distribution of the members of ABPCBR according to grass species identified and their perception of feeding value, 1995, (n=14)

Grass species	No. of members and their perception of the feeding value of grasses						Total no respondents	
	Poor		Fair		Good			
Aristida congesta	8	57	4	29	2	14	14	100
Eragrostis lehmannia	10	71	3	21	1	7	14	100
Cenchrus ciliaris	11	79	2	14	1	7	14	100
Cynodon dactylon	5	36	3	21	6	43	14	100
Eragrostis pallens	7	50	6	43	1	7	14	100

Fifty seven percent of the members of the Co-operative Ranch recognized Aristida congesta as one of the poor grass species occurring on the farm. Aristida congesta is the predominant grass species in overgrazed areas on the farm, hence the members tend to note it well. The majority of the members (79%) indicated that Cenchrus ciliaris was one of the poor grasses occurring. Cenchrus ciliaris is very scarce on the Co-operative, hence the farmers do not know it. The farmers must have seen a sample of Cenchrus ciliaris or have been taken elsewhere because in the Ganyesa district, this grass is found only in the depression of earthen dams and along the tarred roads where it is not disturbed by grazing.

It is essential that the members of the Co-operative Ranch should be educated on the importance of different grass species occurring on the Ranch, as well as their feeding value, to enable them to monitor veld condition using the key grass species approach.

CHAPTER 9

RECOMMENDATIONS

9.1 The conditions of using the farm as a Co-operative

There was no written contract, between the co-operative members and the Department of Agriculture, that the co-operative should be used as a model farm and that farmers should be responsible for the maintenance of the farm, hence the farmers are not committed to the Co-operative. It is recommended that the conditions set for farmers on leased farms in the Ganyesa district should also apply to the farm of the Co-operative i.e. the farmers should pay the Department of Agriculture, a rental fee per hectare per annum for the grazing land, subject to an escalation clause. The farmers should be responsible for the maintenance of the farm (including infrastructure). There should be a written contract entered into, between the farmers of the co-operative and the Department of Agriculture. In the contract it should be clearly stated that if the farmers do not use the farm correctly, the Department has the right to take it from them. This contract should be signed by both, the members of the co-operative and the representative of the Department of Agriculture. In this way it is hoped that the farmers would be more committed to the Ranch.

9.2 Extension service

Due to a shortage of staff, there can be no extension officer who is solely responsible for the Co-operative, but the E.O. who is working on leased farms adjacent to the Co-operative should be responsible for extension service to the Co-operative members. The

E.O. should compile a training programme in this respect on the management of livestock and veld on the co-operative, as there should be opportunities to use this unit for demonstration purposes, as was originally intended.

The Extension Officer should visit the Ranch regularly i.e. at least once a week to check on the management of livestock and veld as well as infrastructure and discuss the problems identified with the manager and steps to be taken for their solution based on his (manager) level of decision making. He should arrange for meetings,(at least once per month) with the members of the co-operative to discuss problems, which the manager is unable to solve without the consent of the Co-operative members, particularly if large amounts of money are required. The E.O. should arrange for information days or farmers days on the activities on the farm such as dipping for external parasites and determining weaning weights. He should discuss inoculation and dosing programmes with the members of the co-operative. He should also conduct workshops and demonstrations on the activities of the farm such as castration of male calves, dehorning of cattle, inoculation for various diseases and dosing against internal parasites. The E.O. should train the farmers on the above mentioned skills so that at the information or farmers' days the members could demonstrate these activities to the invited farmers.

9.3 **The role of the Department of Agriculture on the Co-operative**

Senior officials of the Department of Agriculture, particularly those in the management position, should visit the Co-operative regularly to check on the

management of veld and livestock on the farm. They should check as to whether the skill training programmes compiled by the Extension Officer are being carried out, information days or farmers days (to which farmers from leased farms and communal grazing area are invited) are being held and that the co-operative is actually used as a model farm. In this way it is hoped that the members of the co-operative would become more interested in, and committed to the activities carried out on the Ranch, because they would know that they would have to demonstrate the activities on the farm to the farmers outside the Ranch.

9.4 Infrastructure

9.4.1 Fences

The fences on the farm need to be repaired, loose wires tightened and broken gates repaired or replaced in order to control livestock. The E.O. should motivate the members in their monthly meetings that they are responsible for the maintenance and repair of the broken fence lines. The E.O. should particularly emphasize to the manager that whenever the fence lines are broken, he should organize the herdsmen to repair them.

9.4.2 Water points

The water situation requires drastic attention. All grazing camps which do not have water need to be provided with water so that a rotational grazing and resting system can be applied.

9.4.3 Dipping tanks

There is a crushpen which is provided with a dipping trench. The farmers do not use a dipping trench but treat cattle with a tick grease because the cattle are not used to a trench. The fact that cattle are not

handled frequently makes them wild and it is, therefore, difficult to be forced into a dipping trench. Farmers should handle cattle regularly by inoculation and dosing practices. In this way farmers would be able to use the dipping trench more effectively, and even increase the frequency of dipping. In between the dipping trench frequencies, the tick grease practice could be applied.

9.5 **Breed of bulls to be kept**

Under the current level of management, the bulls that need to be kept should be hardy breeds such as the Sanga, Drakensberger, Bonsmara and Afrikaner. Heavier breeds such as the Hereford, Simmentaler, Pinzgauer and even the Brahman (with higher maintenance requirements) could be introduced as the level of management and nutrition is improved.

9.6 **Marketing of livestock**

Cattle that have been culled during the selection exercise should be sold to reduce the pressure on the overgrazed areas, or cattle to be marketted could be withdrawn from the veld and "finished" on Cenchrus or Anthephora. It is recommended that the culling and selection exercise be done before the winter season commences and thereafter, the farmers should arrange for buyers at the livestock auction as this usually results in higher prices at the livestock sales.

9.7 **Management of livestock**

9.7.1 Treatment of calves from birth to weaning age

The weight of calves should be determined at birth. The quality of grazing at this time should be good so that calves will get sufficient milk from their mothers and sufficient grazing when they start to utilize the veld grass. At the age of 4 to 6 weeks calves should be inoculated against paratyphoid

disease. Thereafter besides veld grass they should be provided with supplementary feed and mineral licks as required, and treated according to the scheduled inoculation and dosing programmes. At weaning the weight of calves should be determined again. This exercise enables the farmer to have a knowledge of the growth rates of the different calves as well as the mothering ability of the dams. This statement is corroborated by van Zyl, Maree & Seifert (1993) that weaning weight is an important trait in beef production, since weaners are usually the first marketable product in the beef herd and the weaning weight of the calf crop is a true indication of the cow's efficiency.

9.7.2 Condition of cows at calving

The condition of cows at calving is very important since it affects subsequent reconception rates. Properly planned supplementation is the key to the condition of cows at calving (van Zyl et al. 1993). Due to the poor condition of some of the grazing camps, supplementary feed in the form of crop residues and mineral licks should be provided to cows to keep them in a good condition and to enable them to produce sufficient milk for calves. The calving season should be planned in such a way that when the cows start calving there should be enough grass for the cows to perform well. It has been recommended, by van Zyl et al. (1993), that as a rule of thumb, the calving season should commence approximately 30 days before the first summer rains and that a high percentage (60%) of the calves should be born in the first 30 days of the season.

9.7.3 Management of bulls

It is a general statement that a bull is half the herd. This actually implies that the bull should be carefully selected and well managed to give the farmer

a good calf crop. The bulls should be kept in a separate paddock and only brought to the cows during the mating season. The bulls should be kept in a good condition, by supplementary feeding before being taken to the cows for mating, but should not be overfed. The bulls which are in poor condition are lazy and tend to lose the desire for mating. The members of the Co-operative should check on the bulls regularly to see that they do not lose condition and to check on their fertility before being taken to the cows for mating. The bulls should be kept far from the cows' paddocks so that they do not break the fence and force their way to the cows. The number of bulls to cows should be in the ratio of 1:20 or 1:25. Fortunately, on the farm at present there is the correct number of bulls to cows (ratio 1:25).

9.7.4 Culling and selection

To ensure that the farmers of ABPCBR keep the desired type of cattle it is necessary that culling should be done every year. The aim of culling would be to remove all unwanted cattle from the farm and to keep only those that meet the production standards set. This exercise is also important because the members of the Co-operative will feed only animals whose production potential is within the farmers expectations. Culling is usually based on the following criteria:

(i) Females

- A cow that persistently weans lighter calves should be removed because weaning weight plays a crucial role in beef production.

- A cow that lacks mothering ability should be culled because the calves of such a cow take long to reach the target weaning weight.

- Elderly cows tend to lose reproduction potential and it is advisable to replace them with young capable animals.

- All cows that have aborted should be culled.

- Animals suffering from diseases that require expensive treatments should be removed.

(ii) Bulls

- The bulls that have undesirable defects such as an abnormality in the sheath that may prevent the penis from extruding should be removed.

- The bulls that fail to serve the cows successfully should be removed.

N.B. Due to the frequent drought periods in the area and lack of competition from the buyers at the livestock auction, it has been found profitable to sell steers at 18 months to 2 years of age or even older.

9.7.5 Dipping of livestock

Ticks, the most important external parasites of domestic animals in South Africa, are usually a problem in the summer rainfall regions. Ticks do harm both directly and indirectly. Directly, they cause loss of condition of their hosts e.g. loss of condition in cattle resulting from loss of blood, tick worry and tick toxicosis. Their bites, damaging in themselves, can result in the degrading of hides. Frequently, too, they provide a route for invasion of the animal tissue by secondary, harmful organisms. Indirectly ticks carry diseases which may cause death (Bayer 1998).

In the Western Region of the North West Province (Ganyesa area) the problem of ticks on livestock is not as severe as compared to the Eastern Region (Brits areas) of the Province. It is recommended that dipping of cattle should be done four times per year, using the trench method. The tick grease method could be used when necessary between these occassions.

9.7.6 Feeding of mineral lick

Boyazoglu (undated) reported that the most limiting individual nutrient is phosphorus which deficiency is down to 0.05% in Winter and rises to 0.17% still inadequate level in summer. These fluctuations can be mellowed substantially by the judicious supplementation of nutrients in the form of licks which are formulated according to seasons.

9.7.6.1 Lick formulation

Boyazoglu (undated) indicated three basic types of licks which are available and which require only a shovel and hard floor to mix and store under roof. Animals are fed in troughs and these are replenished when necessary.

9.7.6.1.1 Mineral lick - summer

In its simplest form, a lick is made up to supplement the phosphorus deficit of good summer grazing as follows:

Dicalcium phosphate	50 kg
Salt	50 kg
Molasses meal	20 kg
	120 kg

It is indicated that such phosphate supplementation, aided by molasses to improve acceptability, could benefit growing, pregnant and lactating cattle substantially.

9.7.6.1.2 Mineral and energy lick - Autumn

This formulation is recommended where grazing is waning in quantity and quality as in Autumn or where summer rains have been below optimum and the summer grazing is unseasonably sparse.

Maize meal	50 kg
Dicalcium phosphate	25 kg
Molasses meal	20 kg
Salt	50 kg
	145 kg

It is indicated that where animals have never had access to a salt-phosphate lick, the initial intakes for 2-3 weeks could be substantially higher until their needs are saturated for salt and phosphate.

9.7.6.1.3 Mineral-energy-protein lick - winter

The winter months necessitates supplementation of a broader spectrum of essential nutrients to maintain the previous summer gains at best, or minimize the cyclical winter losses of body mass, with their related negative effect on the following season's fertility.

Maize meal	150 kg
Dicalcium phosphate	50 kg
High protein concentrate (60%)	
(10% urea content)	100 kg
Molasses meal	80 kg
Salt	200 kg
	580 kg

This lick supplies energy and protein which assures the maintenance of the ruminant microflora for the best utilization of the poor quality winter grazing. The advantage is substantial in relation to the limited cost.

9.7.7 Feeding of crop residues

ABPCBR is in the semi-arid area of the North West Province and the rainfall is low and unreliable (10.8.4.2). Livestock tend to lose condition considerably during winter. It is necessary that the members of the co-operative should provide supplementary feed in the form of crop residues (maize stover and groundnuts hay) during winter. Crop residues could be obtained from some black farmers in the area and from neighbouring white farmers.

9.8 Management of the veld

9.8.1 Stocking rate

The grazing capacity of the veld in the Ganyesa district, as determined by the state in 1965, was 10ha/M.L.U. for Bench Mark condition. This grazing capacity has never been reviewed. Based on Bench mark condition, the farm could theoretically carry 976 M.L.U. The current grazing capacity, based on the variable range condition, varies over three identified portions: The first portion of the farm (indicated as A on the map - appendix C) is that which has been lightly utilized (grazing capacities 10ha/M.L.U and 11ha/M.L.U). The reason for this is that the windmill in this area had not been functioning and livestock had to walk a long distance to water and consequently concentrate near the water point. When they do come to the area without water, they only stay for a short period and go back to the area which has water, hence the good grasses are not overutilized and, therefore predominate. The second portion (B on the map-appendix C) is that which is totally underutilized. While the windmill in this area was not functioning and the area was also far from the water point, it had a higher percentage of Anthephora pubescens, which is very sensitive to underutilization and the grass has become moribund and has died out. This situation has

resulted in low current grazing capacities (20ha/M.L.U and 22 ha/M.L.U). The third portion (C on the map - appendix C) is the portion that has water and is the area where livestock concentrate and is, therefore, heavily overutilized (current grazing capacities 27 ha/M.L.U and 28ha/M.L.U). For practical purposes, as indicated on the map (appendix C), the farm can, therefore, be divided into three portions:

Portion A = 10ha/M.L.U (4234 ha)	423 M.L.U.
Portion B = 20ha/M.L.U (3184 ha)	159 M.L.U.
Portion C = 30ha/M.L.U (2342 ha)	78 M.L.U.
	660 M.L.U.

Based on the variable range condition indicated above, the average stocking rate on the farm should be in the region of 660 M.L.U (266 breeding cows, 53 breeding heifers, 11 bulls, 212 calves, 99 steers 1.5 years, 100 heifers 1,5 years and 179 steers 2.5 to 3 years = 920 head of cattle [659 M.L.U.]). The range condition should be monitored regularly and the stocking rate adjusted as the range condition improves. The potential grazing capacity (when the veld condition has improved) will be 978 M.L.U. There is thus a strong motivation to improve the veld condition and, therefore, the grazing capacity.

9.8.2 Rotational grazing

This is defined as the type of management which requires that the grazing allotted to a group or groups of animals for the entire grazing period, be subdivided into at least one more camp than the groups of animals (Barnes 1989, citing Booysen 1967). Barnes (1989) further stated that the primary objectives of the rotational grazing are:

1. To control the frequency of utilization of plants through the control of the frequency of utilization of each camp. Animal production is maintained from a fluctuating forage source, and forage production is maintained through the defoliation of plants according to their requirements for maximum production.

2. To control the intensity of utilization of plants through the control of animal numbers and periods of occupation. This objective aims at reducing the extent of species selection by manipulating stocking pressure, and attempts to prevent large differences in competitive ability between preferred plants.

Recommendations have been made with respect to the type of breed to be kept on the co-operative. As stated that there are six breeds of bulls on the farm (chapter 8.3.1.7), most of the cattle are crosses of these bulls. The co-operative is situated in a semi-arid area and the level of management at the co-operative is still poor, therefore, the types of breed that are recommended currently are the Bonsmara, the Drakenberger, the Sanga and the Afrikaner. Except the Afrikaner and the Sanga, the other two breeds of bulls (Bonsmara and Drakensberger) are already present on the farm and the crosses of these bulls can easily be identified.

It is recommended that the other breeds of bulls (Hereford, Simmentaler, Pinzgauer and Brahman) be replaced, as they grow old, by the four breeds of bulls mentioned above, taking into consideration that the ratio of bulls to cows should be 1:20 or 1:25.

The progenies of the Bonsmara and Drakensberger bulls, which can be easily identified, should be kept separate and served by the Bonsmara and Drakensberger bulls respectively.

The cattle should be grouped as follows:
- cows
- calves
- heifers
- steers and bulls

There are 36 paddocks on the farm, and because some of the paddocks are overutilized, 33% of the grazing area should be rested for the whole growing season, to recover and for the grass to form seed without being disturbed by defoliation. These rest camps (paddocks) will only be grazed during winter. Tainton and Danckwerts (1989) indicated that resting one third of the veld in the sweet grassveld area will result in the accumulation of the fodder reserve and regaining of the vigour of the desirable grasses. The rest of the area (67%) would be rotationally grazed. Out of the 36 paddocks, 12 paddocks would be rested for the whole growing season and the rest (24 paddocks) would be divided as follows:

3 herds - cows and calves (318 M.L.U) = 12 paddocks (4 paddocks per herd).
1 herd - heifers (97 M.L.U) = 4 paddocks.
2 herds - Bulls and steers (244 M.L.U) = 8 paddocks (4 paddocks per herd).

After weaning the male calves would graze with the steers and bulls and the female calves would graze with the heifers depending on the number.

Depending on the number of cattle in each paddock and the size of the paddock, livestock would be allowed a

period of occupation of a maximum of two weeks to prevent regrazing (second bite) particularly of the desirable species. This recommendation was suggested by Barnes (1989) who found that the repeated defoliation of the same plants within the grazing period exerted a high demand on the reserve carbohydrates, for regrowth.

9.8.3 Rotational resting

Rest periods are designed to allow for a period of uninterrupted plant development so that the plants are provided with an opportunity to complete those processes necessary for the survival and continued health, free from interference, or to allow forage to accumulate for animal production purposes. Irrespective of the form of grazing management which is adopted, resting is often essential if the condition of the veld is to be maintained or improved (Tainton & Danckwerts 1989).

As mentioned in 9.8.2 above, 12 paddocks will rest for the whole growing season, when 24 paddocks will be rotationally grazed. Although the maximum period of occupation allowed in the growing season will be two weeks, the farmers and the extension officer should visit the paddocks regularly for inspection and to check whether in some of the paddocks, based on the grazing pressure, it is not necessary to move livestock from one paddock to another even earlier than decided.

9.8.4 Burning to remove moribund grass material

9.8.4.1 Burning the grass material

The area that needs to be burnt had previously a higher percentage of A. pubescens. Due to the fact that there was no water in this area, the paddocks were underutilized. A. pubescens is sensitive to underutilization and, therefore, died out because of the moribund condition. This material, therefore,

needs to be burnt, in order to stimulate A. pubescens and other desirable grass species to develop.

9.8.4.2 Season of burning

The rainfall in the Western Region of the North West Province is very low and unreliable particularly during the Spring season (September, October and November), and the first Spring rains are usually of a thunderstorm nature.

This means that if burning is done during Spring, the area may remain bare for a longer period and, therefore, exposed to soil erosion. The rainfall tends to be higher and reliable from December to March. Although Trollope (1989) states that the danger of soil erosion can be minimized by burning as close as possible to the commencement of the growth at the beginning of the growing season, because of the unreliable nature of rainfall in Spring, it is recommended that burning, particularly to remove moribund material, should be delayed until it has rained. Burning should be done after a good rain so as to retain as much material on the soil surface as possible. According to Trollope (1989), burning to remove unacceptable and/or moribund grass material, should be applied when the soil is moist so as to retain as much litter on the soil surface as possible after burning.

9.8.4.3 Type and intensity of fire

The effect of burning on vegetation depends to a large extent on the type and intesity of fire (Trollope 1978). Trollope (1989), citing Brown & Davis (1972) and Luke & McArthur (1978), indicated three broad types of fire namely:

- Ground fire: The fire that burns below the surface of the ground in deep layers of organic material.
- Surface fire: The fire that burns in the herbaceous surface vegetation.
- Crown fire: The fire that burns in the canopies of trees and shrubs.

Trollope (1989), stated that besides the afore-mentioned types of fire, a further subdivision into fires burning with and against the wind could be made. Trollope (1978) referred to these fires as head and back fires. Trollope (1989) further stated that, according to Phillips (1974), the two types of fires have a significantly different effects in the open plant communities. Trollope (1989), citing Trollope (1978), stated that research results showed that head fires had a significantly greater rate of spread, flame height and overall intensity than back fires, while at ground level, back fires were more intense and had a significantly depressive effect on the recovery of the grass sward, resulting in lower yields. Trollope (1989) further stated that research results and field experience indicated that, under ranching conditions, veld fires should be applied as head fires because they cause the least damage to the grass sward and can do maximum damage to woody vegetation, if necessary.

Based on the research results of Trollope (1989), it is recommended that, to remove the moribund material in the area mentioned above, a head fire of cool intensity (100 KJ/S/m) be applied. Trollope (1989) stated that such a fire will be obtained if it is applied when the air temperature is 20°c and the relative humidity 50%. He further indicated that

these conditions generally prevail during the morning until approximately 11h00 and during the afternoon after 15h30.

9.8.4.4 Grazing management after burning

It is recommended that after burning, the area should be given a full season rest and should only be grazed lightly in winter. This statement was made by Trollope (1989), citing (Trollope (1984a); Aucamp & Danckwerts (1986) and Anon. (1988), confirming that recently documented post-burn grazing management recommendations require that the veld in semi-arid areas should be given ample opportunity to recover after fire, and that in particular, it has been recommended that the veld should not be grazed until it has recovered to a height of 100mm to 150mm.

9.8.5 Bush control

Bush encroachment causes a significant reduction in the grazing capacity of veld (Trollope, Hobson, Danckwerts & van Niekerk 1989). Trollope et. al. (1989) indicated that both Du Toit (1968; 1972) and Trollope (1977) have found that the annual production of grass material was reduced by approximately 40-50% in veld encroached by bush. Trollope et al. (1989) further quotes Aucamp, Danckwerts, Teague & Venter (1983) who found that at A. karroo densities of 1000, 1500 and 2000 tree equivalents (T.E)/ha, the grazing capacity of the veld can be expected to be 90, 67 and 32% of its potential, respectively. Trollope et. al (1989), citing Trollope (1983a), reported results obtained in the false thorn veld of the Eastern Cape which showed that, in veld with different densities of a multi-species bush component, the estimated mean grazing capacity of unencroached veld was 3.0ha/M.L.U while that of encroached veld was only 6.0ha/M.L.U.

Trollope (1977), cited by Trollope et al. (1989), indicated that there are two alternative approaches to the control of bush encroachment. The first is to adapt the vegetation to the animal factor, or secondly, to adapt the animal factor to the vegetation. Trollope et al. (1990) stated that until recently, the general approach of pasture scientists and ranchers has been to adapt the vegetation to the animal factor. Trollope et al. (1989) further indicated that cattle ranching has been the main livestock enterprise of the encroached areas and the philosophy was to retain only that fraction of the vegetation that is acceptable to cattle, namely grass, and a limited number of acceptable trees and shrubs, and to eradicate the unacceptable vegetation, i.e. bush.

On the majority of the sites surveyed on the Co-operative (67%), tree densities of more than a thousand trees per hectare were recorded. These will have a serious effect on the grazing capacity. This situation is aggravated by the fact that some sites (10 and 11) have a low density but a high percentage of young trees, less than one metre high, which will pose a serious problem in the future (chapter 7.4). This means that the problem of bush encroachment requires urgent and immediate attention.
The fact that the members of the Co-operative Ranch are not fully committed to the management of the farm means that they will not agree to the use of expensive chemical methods. The stem-burning method, which has been applied with success by some farmers on leased State farms should be adopted by the members of the Co-operative. This method is slow but very cheap to apply because it can be applied by herdsmen while busy with their routine work. All that is needed is some sawdust, dry dung or wood or even groundnuts shells.

It would not be advisable to use veld fire to burn the whole area encroached by bush because most of the grazing camps have a very sparse cover, which will not be effective to use fire to kill the thorn bush.

Trollope et al. (1989) state that recently, the second approach i.e. adapting the animal factor to the vegetation, has been receiving attention of pasture specialists and ranchers alike. This involves introducing a browsing animal such as the goat into the farming system. As stated earlier, the level of management of the Co-operative is still, however, very low and because it will be expensive for the members of the Co-operative to provide infrastructure, such as a netting wire fence to control goats, it is recommended that the introduction of goats, into the farming system, should be delayed until the level of management of the farmers has improved.

9.8.6 Demarcation of sites for determining the grazing capacity and bush density.

The extension officer and the members of the Co-operative should demarcate representative areas, of 0.1ha (30mx30m), where the veld condition and grazing capacity will be determined at regular intervals. This should be done using iron standards at the corners of each site. Another site of 0.5ha (50mx100m) should be demarcated in each area to determine the bush density.

9.8.7 Establishment of planted pasture

Dannhauser (1991) stated that traditionally, South Africa is a land of livestock production and indicated further that previously livestock was kept mainly on the veld. This is supported by the fact that 80% of the land in South Africa comprises veld for livestock. Dannhauser (1991) further reported that much had been

done on the veld and the management thereof. This work has shown that the condition of the veld had declined. Based on this, it is clearly necessary that planted pasture be established to reduce the grazing pressure on the veld and to increase livestock production.

9.8.7.1 Establishment of "borseltjiegras in strips

Anthephora pubescens requires a sandy soil with the minimum annual rainfall of 250mm. Fair (1989) indicates that the most outstanding attributes of Anthephora are its drought tolerance, palatability and nastritive value. It, therefore, results in excellent animal production. It also has a good foggage value. It is recommended that Anthephora seed be planted in strips two metres apart in more degraded areas during the rainy season (January to March) to improve the botanical composition of the veld. This has been applied with success by one of the white farmers in the North Western side of Kuruman district.

9.8.7.2 Establishment of "borsetjiegras" - A. pubescens on the old cultivated area (5ha area)

There are two soil forms on the old cultivated land where planted pasture need to be established:

(i) Molopo soil form - Pomfret soil family
(ii) Clovelly soil form - Setlagole soil family (chapter 7.3).

A pubescens, because it requires very sandy soil, will be established on the Clovelly soil form.

9.8.7.2.1 Seedbed preparation

A very fine seedbed, which is moist, free from clods and plant material, is necessary for the planting of grass. The subsoil should contain sufficient moisture to facilitate the development of seedlings after germination.

9.8.7.2.2 Planting season, method of planting, seeding rate fertilization and weed control

Since rainfall in the Western Region of the North West Province is very unreliable in Spring, it is not advisable to plant grass during this period. It is recommended that the grass be planted at the end of January to February. During this period, the rainfall is more reliable and weed problems are minimal.

There is a special planter for grass. This planter is specially manufactured to plant borseltjiegras seed. Since borseltjiegras seed is woolly, this planter has been manufactured to minimize wastage of the seed. Because of a small area, the use of a contractor is recommended.

Although Dannhauser (1991), citing Donaldson & Kelk (1974), recommended, that for optimum stand density, seed should be planted at the rate of 5kg/ha in rows 75-90 cm apart, in the Western Region of the North West Province, seeding rate generally varies between 3 to 4kg/ha in rows 1000 - 1500 cm apart.

Regarding fertilization, a representative soil sample, from the old cultivated area, was sent to the North West Agricultural Development Institute (NWADI) in Potchefstroom for analysis and recommendations. The results, from the Institute (Bloem 1998) were made available. Based on these results, Bloem (1998) recommended the fertilizer mixture 2:3:0 (21) at the rate of 380 kg/ha at planting, and a topdressing of 82 kg/ha LAN 2 to 3 months thereafter.

Grass seedlings are very sensetive to weed competition and weed control is a necessity, especially in the establishment season.

9.8.7.2.3 Utilization

Fair (1989) reported that Anthephora should not be grazed in the first summer of establishment. In the following seasons it should be grazed once or twice in the summer and then rested for winter grazing.

The Anthephora pasture will be used for finishing steers being prepared for sale and also as a seed source (chapter 7.3). Such seed may be used to overseed veld paddocks, which are in poor condition, to establish larger areas of pasture or as a source of income.

9.8.7.3 Establishment of bluebuffalograss - C.ciliaris on the old cultivated land (3ha area)

Dannhauser (1991) has stated that the best known cultivar of this grass is Molopo. Recently the cultivar Gayndah was imported from Australia, but little is known about its adaptability, although it has a finer texture and might, therefore, be more palatable.

C.ciliaris will be planted on the Molopo soil form, of the old cultivated land because it requires a heavier soil.

9.8.7.3.1 Seedbed preparation, planting season, planting method, seeding rate and fertilization

The same as those mentioned in 9.8.7.2.2 above.

9.8.7.3.2 Utilization of pasture

This pasture will be utilized by the bulls when they are not with the cows. If they do not utilize the grass efficiently, steers will be used on the same pasture.

9.8.7.3.3 Management of pasture

(i) Ripping and clean mowing

Fair (1989) stated that C. ciliaris responds very well to cultivation and aeration of the soil between the rows. Ripping to the depth of 15-20cm should be done at least once a year.

Cenchrus should be cut back to ground level each year to remove the old and dead material and to stimulate new tillers. This implies that a mowing equipment should be made available or because of a small size of the cultivated area, a contractor could be hired to do the work.

9.9 Training of farmers

The members of the Co-operative need training and motivation to manage their farm effectively as well as to improve their commitment.

9.9.1 Training on the management of veld and livestock

The farmers of the Co-operative Ranch need training in record keeping of all farm activities. The following records should be kept:

(i) Records of all the grazing camps, which should clearly be numbered must be kept. This will include notes on problems in each paddock such as deterioration of the veld, the moribund situation, bush encroachment, the presence of poisonous plants etc.

(ii) Records of the infrastructure on the farm and their condition. For an example, most of the windmills on the farm are not functioning and these need to be recorded so that a method can be identified for their repair.

(iii) Records of the number of livestock on the farm i.e. birth dates, weaning dates, birth weights, weaning weights, date of sales, prices obtained on sales, mortality etc.

(iv) The inoculation for specific diseases, such as anthrax, which is done annually in this area, should be recorded so that farmers can know timeously when to order vaccine to inoculate for such diseases.

(v) While veld burning is not encouraged on the Ranch, because of the sparse grass cover, farmers should be taught that underutilization of the veld leads to moribund condition and that to control the situation, grazing camps may be burnt to remove the dead grass and to stimulate the living grass tufts to develop. A record should be kept of this situation.

(vi) Farmers should be taught to keep records of the rotational grazing and rotational resting of the veld. Farmers should be taught to inspect their grazing camps before cattle are allowed into the camps and after they have been moved to another. It will also be necessary to inspect the camps currently in use to determine whether there is still enough grass for livestock in the particular paddock.

(vii) Besides record keeping the members of the Co-operative Ranch need to be motivated on their commitment to the Co-operative and to make them aware of the contract signed with the Department of Agriculture (chapter 9.1) i.e. to remind them that they have been allowed to farm on condition that the Co-operative is maintained as a model farm of sound management of livestock and veld for demonstration to the adjacent leased farms and the communal grazing area.

(viii) The extension officer should teach the farmers to assess veld condition and have representative sites demarcated, where the veld condition on the farm could be re-evaluated to check if it is improving or deteriorating, as well as checking whether the bush is increasing or not.

(ix) It is important that the extension officer should teach the members of the Co-operative at least elementary book keeping, i.e. the total expenditure and income, so that at the end of the year they could balance their books and see whether their business is a success or not.

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