ACCEPTABILITY OF STOCK REDUCTION IN BOTSWANA

N.V. Sebina[1] and G.H. Düvel[2]

ABSTRACT

The problem of overstocking, generally accepted to be the major cause of the degradation of natural resources on the communal rangelands of Botswana, has remained unresolved. Findings from a survey conducted in 1996 amongst a random sample of 132 stock farmers on different types of ranches in the Southern Region of Botswana indicate that various socio-cultural factors place significant constraints on stock reduction. The incompatibility of stock reduction with respondents' culturally conditioned needs, is probably the major hindrance. Resistance to stock reduction also lies in the fact that the problem of resource degradation is not really appreciated, probably because of the clear evidence that stock farmers tend to overrate the condition of their grazing. The general perception that "drought" and not "overstocking" is the major problem and cause of veld retrogression, is a further hindrance and also a symptom of the underlying fatalism that makes change towards more sustainable production very difficult.

1. INTRODUCTION

The livestock industry is the dominant agricultural production activity in Botswana and is generally referred to as the mainstay of the country's economy (Kwelagobe, 1996). This important industry is experiencing a continuous decline, which is manifested in low growth in production indicators such as calving percentage, off-take rates, mortality, sales and others, particularly in open communal areas, and this in spite of concerted efforts from the Government to improve the livestock sector through the encouragement of better husbandry methods (Government Paper No.1, 1991 and Kwelagobe, 1996).

The major reason for the decline in production is the rapid deterioration of natural resources, which is attributed to the over exploitation of the rangelands due to overstocking and overgrazing (Balopi, 1996 and Kwelagobe, 1996).

[1] *Post-graduate student, Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, Pretoria 0002.*

[2] *Professor of Extension and Director, South African Institute for Agricultural Extension, Department of Extension and Rural Development, University of Pretoria, Pretoria 0002.*

Numerous writers, including Baker (1980), Sandford (1983), Tsimako (1991) and Düvel & Afful (1994), have taken up the problem of overstocking. According to Düvel & Afful, (1994) quoting (Bembridge & Tapson, 1993), a vicious cycle of land and cattle deterioration has been initiated in Southern and Central Africa over the past four to five decades by the expansion of arable areas and a rapid increase in human and livestock population resulting in overgrazing, erosion and deterioration of natural rangelands (veld). These and other writers, such as Roe (1988), Shepherd (1989), McKean (1992) and Keijsper (1992:47) agree that while overstocking may not be the entire cause of range degradation and soil erosion, it is a contributing factor, and perhaps the major one.

Tsimako (1991:23) traced back the general dislike for the idea of stock reduction to the early years of the Tribal Grazing Land Policy (TGLP) consultation campaign. In those years concerns were raised that if conservation laws were put into practice, they may harm the TGLP because farmers would fear to obtain ranches thinking that they could be used as a means of stock reduction.

Whether farmers will decide to reduce their stock will depend largely on how they perceive and interpret the practice of stock reduction and whether it is perceived to be reconcilable with their needs. This reasoning is based on the field theoretical understanding of behaviour (Lewin, 1951) and the behaviour analysis model developed from it (Düvel, 1991).

The assumed hypothesis for this study is that:

a) Livestock farmers do not perceive stock reduction to be compatible with their needs.

b) Livestock farmers overrate the condition of the grazing or underrate the seriousness of the degradation.

c) Livestock farmers believe there are better or more appropriate solutions to the problem of resource degradation than stock reduction.

2. METHODOLOGY

The scope of the problem and the scarce research resources indicated at a pilot or case study as being the most appropriate approach. It was conducted in the Ngwaketse District located in the South East of Botswana, which has an area of 26,876 square kilometres. The hardveld covers approximately one-third of

the district and the sandveld covers the remaining two-thirds of the district. The population is estimated to be 160,000 people while the estimated number of livestock is approximately 99,000 cattle.

A sample of 132 livestock farmers was chosen and consisted of (a) all 27 syndicate or group ranch members, (b) all 21 community ranch members, (c) 16 (50 percent random sample) individual ranchers and (d) 68 (60 percent random sample) of the communal farmers adjoining the group and individual ranches. The reasoning behind the latter was that communal ranchers' opinions regarding other types of ranchers are only meaningful if they have some knowledge about them.

The Southern Region/Ngwaketse District was selected because it is a relatively confined area having all types of grazing systems and their management variations which are bound to influence the perceptions regarding stock reduction. The grazing systems referred to are; individual (i.e. ranches owned by individual farmers), group/syndicate (i.e. a ranch owned by not more than twenty people), community (i.e. a ranch owned by the community members) and communal which refers to an open grazing for all.

Figure 1 and 2 give a brief overview of the characteristics of the respondents regarding their age and education respectively. 39% of farmers (respondents) are above the age of 60 and especially among the communal and group ranches the higher ages seem to dominate. As far as education is concerned, 45% are illiterate and the majority of these are found on communal and community ranches.

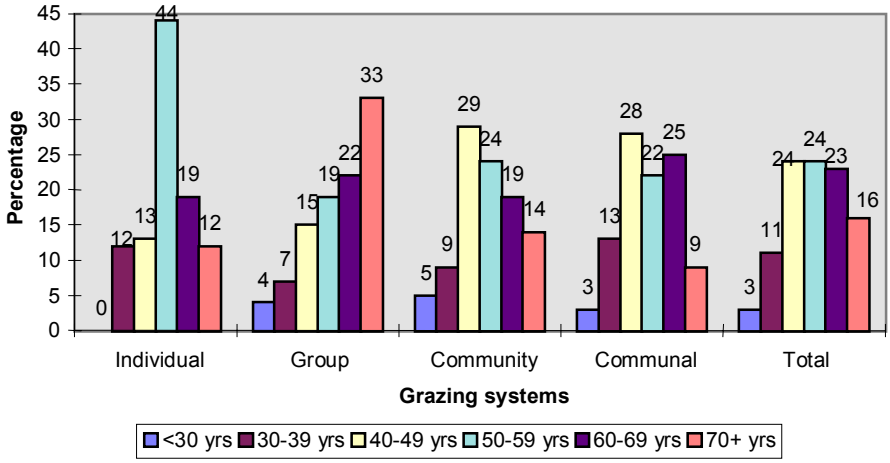

Figure 1: Distributions of respondents according to age

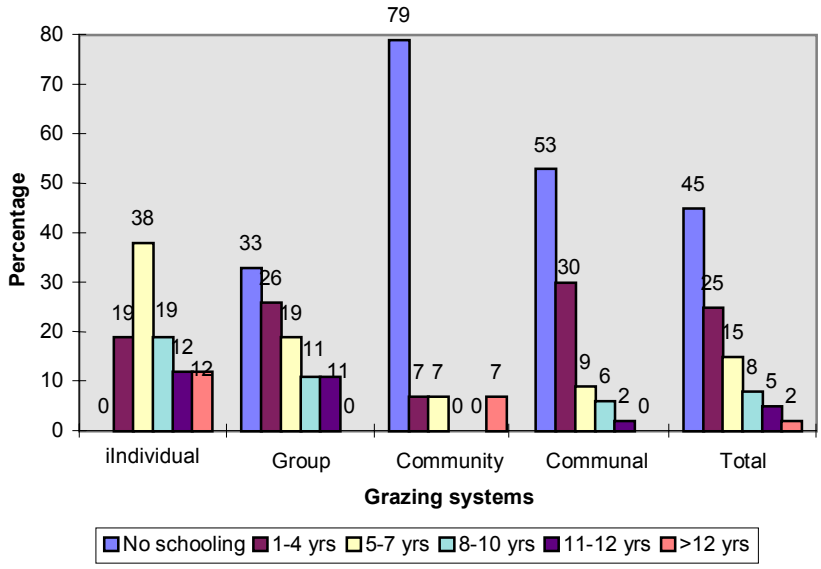

Figure 2: Distribution of respondents according to number of years' formal schooling

The four enumerators assisting in the survey were well briefed on the nature and purpose of the study, and accompanied by the supervisor (first author) during the first interviews to ensure correct interpretation of questions and responses. The questionnaire, a structural interview schedule, was translated into Tswana and the interviews conducted during November and December in 1996.

3. RESULTS

3.1 Reasons for keeping cattle

Needs represent the basic motives governing human behaviour, and can also be expected to be critical in understanding decisions regarding livestock production and stocking rates. The reasons for keeping livestock are expected to reflect the individual's needs either directly or indirectly (Düvel, 1991). Of particular importance is whether these judgements are compatible with stock reduction; something that cannot be expected to be the case if the respective objectives can be achieved with more rather than less livestock (Düvel & Afful, 1994:88).

The answers given by respondents in response to an open-ended question regarding their reasons for keeping cattle should be particularly valid in revealing respondents' needs, since they are expected to reflect what is uppermost in their minds and were provided without any prior influence.

According to the findings of the survey (Table 1) based on an open-ended question regarding the reasons for keeping cattle, 86.7 percent of the respondents mentioned *source of cash* as the main reason for keeping cattle. This percentage applies more or less equally to every grazing system. The percentage is somewhat lower for respondents on community ranches (70%) but they again were more inclined to mention the reasons of business or commercial uses.

Table 1: Main reasons (goals) for keeping cattle based on grazing systems (N = 128*)

Reasons	Respondents per ranch type								Total	
	Individual		Group		Community		Communal			
	n	%	n	%	n	%	n	%	N	%
Source of cash	14	87.5	25	92.6	14	70	58	89.3	111	86.7
Business commercial	2	12.5	2	7.4	3	15	2	3.1	9	7
Have more cattle	-	-	-	-	2	10	1	1.5	3	2.3
Draught power	-	-	-	-	1	5	1	1.5	2	1.6
Source of milk	-	-	-	-	-	-	2	3.1	2	1.6
Source of meat	-	-	-	-	-	-	1	1.5	1	0.8
Tradition	-	-	-	-	-	-	-	-	-	-
TOTAL	16	100	27	100	20	100	65	100	128	100

*Missing cases = 4

In addition to an open-ended question regarding the reasons for keeping cattle, respondents were also asked to rate the importance of a list of different possible reasons. These findings are summarised in Table 2.

Table 2: The relative importance of respondents' reasons for keeping cattle based on grazing systems (N = 127*)

Reasons	Respondents according to grazing systems									
	Individual		Group		Community		Communal		Total	
	n	%	n	%	n	%	n	%	N	%
Source of cash	5	35.7	13	48.2	6	30	20	30.3	44	34.7
Ceremonial feast	4	28.7	6	22.2	6	30	21	31.8	37	29.1
Source of wealth	1	7.1	3	11.1	-	-	6	9.0	10	7.9
Pay *lobola*	1	7.1	-	-	2	10	7	10.6	10	7.9
Source of milk	2	14.3	2	7.4	3	15	1	1.5	8	6.3
Draught power	-	-	-	-	2	10	4	6.1	6	4.7
Source of manure	-	-	1	3.7	-	-	4	6.1	5	3.9
Prestige/status	1	7.1	-	-	1	5	3	4.6	5	3.9
Commercialise farming			2	7.4					2	1.6
TOTAL	14	100	27	100	20	100	66	100	127	100

*Missing cases = 5

As was the case with the open-ended question, the provision of *source of cash* (34.7%) features as the most important reason for keeping cattle, closely followed by *ceremonial feast* (29.1 %) and then *source of wealth* (7.9%), *payment of lobola* (7.9%) and *milk* (6.3%).

These findings largely resemble those of Düvel & Afful (1994) in that the purpose of cash takes the first position, something that varies significantly from the findings of earlier research (Hundleby, 1991), where "cash" seldom achieved a higher ranking than third position. It therefore seems as if the use of cattle as a source of cash is becoming more important. The wide variety of reasons for which cattle are kept, especially also cultural reasons, emphasises that the importance of cattle has not declined. In fact, the more cattle are kept, the better these needs can be fulfilled; something that is not reconcilable with cattle reduction.

3.2 Goal achievement

Goals and aspirations can be regarded to be the means through which the individual satisfies his needs and, as such, are expected to have an important bearing on behaviour regarding livestock production (Düvel, 1991).

Respondents' views regarding the most important factor contributing to increased stock production are summarised in Table 3.

Table 3: Distribution of respondents, on different grazing systems, according to their views of the factor contributing most to increased production or income (N = 126*)

Contributions	Respondents per ranch type									
	Individual		Group		Community		Communal		Total	
	n	%	n	%	n	%	n	%	N	%
Stock reductions	7	46.7	12	44.4	12	57.1	34	54	65	51.6
Keep more cattle	3	20	5	18.5	4	19.1	11	17.5	23	18.2
Have better cattle	5	33.3	6	22.2	-	-	9	14.2	20	15.9
Improve grazing	-	-	4	14.9	3	14.3	6	9.5	30	10.3
More suppl. feeding	-	-	-	-	2	9.5	3	4.8	5	4
TOTAL	15	100	27	100	21	100	63	100	126	100

*Missing cases = 6

According to these findings (Table 3) it appears as if stock reduction is need compatible since it is rated by 51.6 percent of the respondents as the most important factor contributing to improved stock production.

Respondents on individual and group ranches rate stock reduction somewhat lower and place, relatively to the community and communal ranches, a higher value on the quality of cattle. These findings, if reliable, suggest that stock reduction should, in general, be highly acceptable.
A similar but open-ended question regarding respondents' opinions as to how they would improve their livestock production over the next few years (Fig. 3) gave a completely different, and probably more reliable and valid picture.

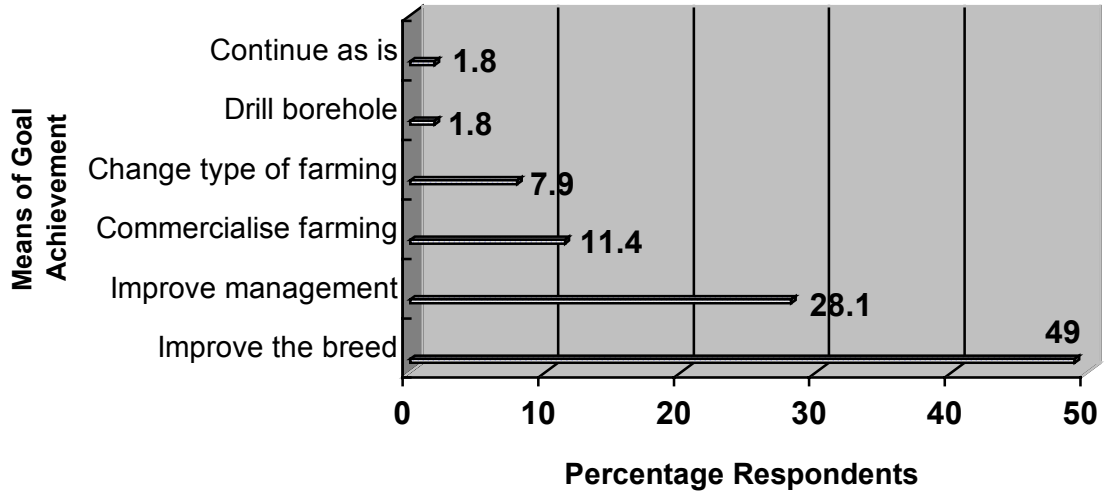

Figure 3: Respondents' perceived means of realising their goals concerning the improvement of livestock production (N=114)

The responses show that improving the breed and management are the two methods mentioned by 77,1 percent of the respondents, while stock reduction does not feature at all.

3.3 Status

As indicated by Düvel & Afful (1994:132), incompatibility of stock reduction with status can be a serious hindrance to the implementation of stock reduction if status is dependent on stock numbers.

The social importance of attachment originating from the turnover of cattle is of much greater significance to farmers due to the fact that, it is usually associated with status. To establish the relationship of socio-economic status and cattle numbers or herd size, the respondents were requested to indicate whether figures of stock number are associated with low, medium and high socio-economic status (Fig. 4).

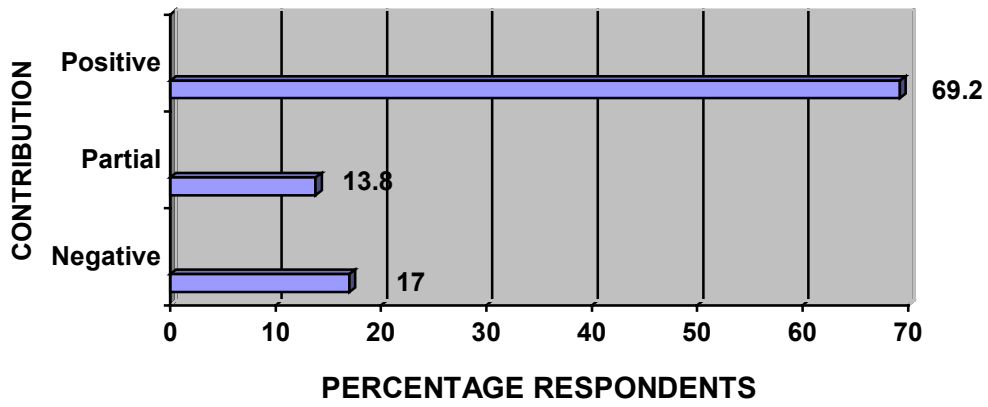

Figure 4: Respondents' perceptions of the contributions of herd size or stock numbers to status within the community (N = 130)

According to Fig. 4 most of the respondents (69.2%) indicated that status depends on the number of cattle that people own, while a further 13.8% agree that the number of stock partially contributes to the status of an individual. These findings confirm that the herd size is important from a status point of view and that stock reduction does not appear to be compatible with it.

3.4 Stock production problems

Problems are need-related in the sense that they usually represent constraints en route to the goal. These constraints can temporarily over-shadow the goal(s) in the sense that the attention is temporarily diverted to the problem with the immediate objective being to overcome the problem. It is for this reason that problems as a form of a need are an appropriate point of departure for any extension or persuasion strategy, and that the specific innovation should, if possible, be compatible with or lead to a solution of the perceived major problem (Düvel, 1991).

The responses in reaction to a question as to whether the major stock farming problem was lack of land or too many cattle or any other problem, which then had to be named, are summarised in Fig. 5. It is hardly surprising that farmers do not perceive overstocking as a major problem of stock farming. As Fig. 5 shows, most farmers (65%) regard drought as the most serious problem of stock farming. Overstocking, if perceived as a problem, is attributed more to the lack of land than to the keeping of too many cattle.

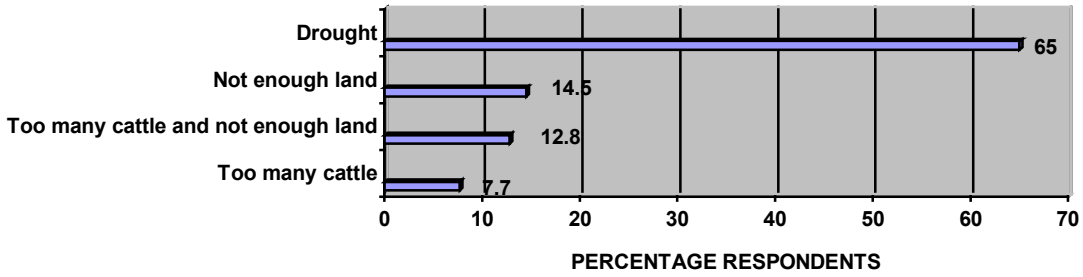

Figure 5: The most import stock farming problems as perceived by respondents (N=117)

Respondents were also requested to place in rank order the importance of a list of problems. The responses relating to the most important problem are shown in Table 4.

Table 4: The frequency distribution of respondents (on different types of ranches) according to their perception of the stock farmer's most serious problem (N=128*)

Problems	Respondents per type of ranch									
	Individual		Group		Community		Communal		Total	
	n	%	n	%	n	%	n	%	N	%
Drought	4	30.7	6	22.2	4	19.1	11	16.3	25	19.5
Stock theft	1	7.7	4	14.8	5	23.8	10	14.9	20	15.6
Overstocking	2	15.4	4	14.8	2	9.5	10	14.9	18	14.1
Dual grazing	1	7.7	1	3.8	3	14.3	10	14.9	15	11.7
Poor management	1	7.7	6	22.2	3	14.3	4	6	14	10.9
Bush encroachment	2	15.4	3	11.1	1	4.7	6	9	12	9.4
Poor prices (selling)	-	-	1	3.7	3	14.3	7	10.5	11	8.6
Poor grazing	1	7.7	2	7.4	-	-	4	6	7	5.5
Poor or no fencing	1	7.7	-	-	-	-	5	7.5	6	4.7
TOTAL	**13**	**100**	**27**	**100**	**21**	**100**	**67**	**100**	**128**	**100**

*Missing values = 4

Again drought features as the most important problem and placed in the first position by 19.5 percent of the respondents. Only 14.1 percent of the respondents regard overstocking as the priority problem within the given list, and this percentage hardly varies within the different grazing system categories.

The fact that stock reduction is not perceived as a possible solution to livestock production problems is a matter of great concern since it further emphasises the difficulty of successful interventions in this regard.

3.5 Rangeland problems

The need for or acceptability of stock reduction is necessarily dependent on whether, according to respondents' perception, the grazing is currently overstocked and/or whether its current condition is in a poor state.

One indication of whether respondents are of the opinion that too many cattle are being kept, is whether they are aware of the current stock numbers (Table 5).

Table 5: The frequency distribution of respondents according to their knowledge of the number of stock kept on the grazing system

Knowledge of cattle numbers	Respondents on different types of ranches									
	Individual		Group		Community		Communal		Total*	
	n	%	n	%	n	%	n	%	N	%
No knowledge	-	-	1	4.6	7	33.4	42	66.7	50	41
Some knowledge	8	50	20	90.8	12	57.1	21	33.3	61	50
Good knowledge	8	50	1	4.6	2	9.5	-	-	11	9
TOTAL	**16**	**100**	**22**	**100**	**21**	**100**	**63**	**100**	**122**	**100**

*Missing cases = 10

According to Table 5 the large majority of respondents have no knowledge (41 percent) or only a limited knowledge (50 percent) of the correct number of cattle. It is only the individual ranchers that have a fairly good knowledge of the present number of cattle kept on their ranches. These findings seem to indicate that the potential need for stock reduction is somewhat undermined by respondents' ignorance of the current stock numbers.

To test whether respondents tended to overrate the current grazing condition, they were asked to rate their grazing. These ratings were compared with those of enumerators, accepting that the enumerators' rating represented a more objective rating of the current grazing condition.

The findings summarised in Fig. 6, clearly show that respondents tend to perceive their grazing in a much better condition than the enumerators did. Whereas 76% of the respondents rate their rangelands to be in a very good

condition not a single ranch is assessed by enumerators to be in a very good condition.

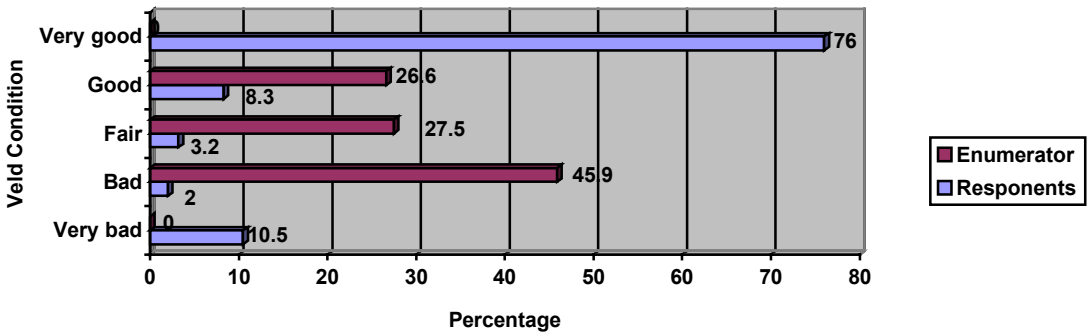

Figure 6: The comparative rating of veld condition by respondents and enumerators (N = 132)

The differential perception or misperception is particularly conspicuous in the case of the more common communal and community ranches. These comparisons are shown in Fig. 7, which summarises the average percentage ratings of enumerators and respondents regarding the veld condition on the different types of ranches.

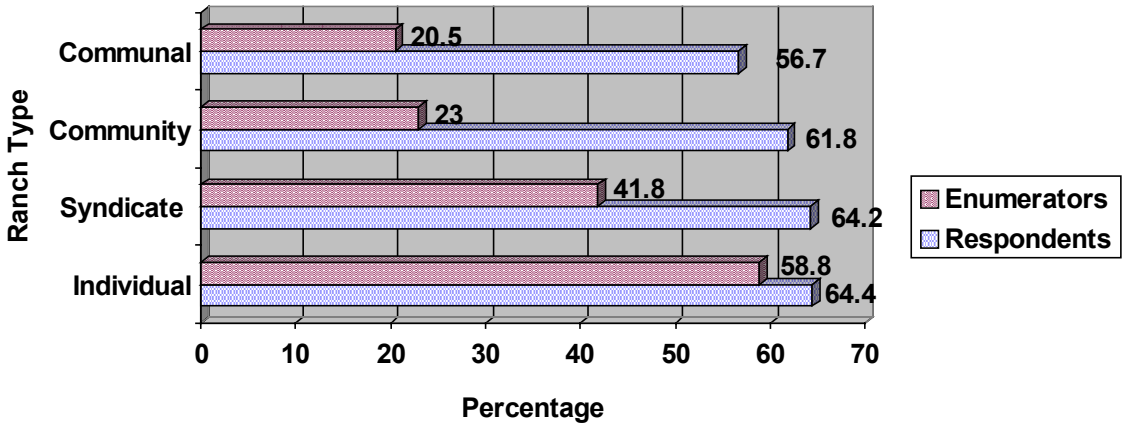

Figure 7: A comparison of respondents' and enumerators' average assessment (expressed as a percentage) of the grazing condition of the various types of ranches

These findings suggest that respondents largely overrate the veld condition and that their misperception results in an undermining of their potential need tension regarding veld improvement. In other words, the potential need for rangeland improvement is reduced by respondents overrating or misperception of the current condition.

3.6 Alternative solutions to poor grazing condition

The above findings suggest that respondents' need for veld improvement is limited or even absent. This being the case, the obvious challenge from extension is to bring about disillusionment among the farmers regarding the real condition of the natural rangeland. However, even when this is achieved, the reduction of stock is not likely to just happen. The reason for this is, as Table 6 indicates, that the prominence of stock reduction as a means of improving the rangeland condition is low compared to other alternatives.

Table 6: Respondents' average assessment* of different solutions according to their effectiveness and acceptability in improving rangeland conditions

Solutions for improving grazing condition	Effectiveness	Acceptability
Stock removal (n=122)	3.09	3.12
Stock reduction (n=123)	3.25	3.20
Rainfall (n=123)	4.02	4.68
More grazing cells (n=122)	3.59	3.95
More camps (n=122)	3.48	3.83
Rotational grazing (n=122)	2.36	2.52

* *Rating based on a 5-point scale with 5 = highest effectiveness and acceptability and 1 = lowest effectiveness or acceptability.*

Both from an effectiveness and acceptability point of view, stock reduction is ranked only in fourth position out of a total of six alternatives. More rainfall, more grazing cells and more camps are far more attractive alternatives. The fact that the perception of farmers on individual or group ranches is not much more favourable, indicates just how big and difficult this task is of improving and maintaining the natural grazing resources through the promotion of stock reduction.

4. CONCLUSION

Sustainable stock production in Botswana is dependent on the maintenance and improvement of the natural grazing, for which purpose the reduction of stock numbers is essential. For extension this will be an extremely difficult and challenging, if not impossible, task, because of the unacceptability of stock reduction, of which overwhelming evidence has been provided in this paper. Stock reduction is clearly not reconcilable with respondents' needs,

goals and perceived means of achieving them. A contributory factor is the farmers' misperception of the condition of their natural grazing and consequently the fact that the seriousness of the problem is not appreciated. Even if the problem was appreciated, stock reduction is not perceived as the appropriate and acceptable solution.

It is, as a first step, important that the difficulty and the almost impossible nature of this extension challenge is appreciated. Ultimate success will depend on whether it will be possible to create new incentives and needs with which stock reduction is compatible.

REFERENCES

BAKER, R., 1980. *Desertification : cause and control. A study of the U.N. plan of action and its possible application*. Development studies. Occasional Paper No.6.

BALOPI, P. K., 1996. *Official opening speech for the national conference on the Fencing Component of the National Policy on Agricultural Development.* Grand Palm Hotel. Gaborone. Botswana.

DÜVEL, G. H. & AFFUL, D. B., 1994. *Human constraints in stock reduction and communal land management in a subsistence farming situation in South Africa*. Research Report : South African Institute for Agricultural Extension. University of Pretoria.

DÜVEL, G. H., 1991. Towards a model for the promotion of complex innovations through programmed extension. *South African Journal of Agricultural Extension*, 20:70.

GOVERNMENT PAPER NO. 1., 1991. *National policy on agricultural development.* Government Printer, Gaborone. Botswana. 1, 13 pp.

HUNDLEBY, J.A.B., 1991. *A strategy for the reclamation of communal rangelands with special reference to cattle herd composition.* Proceedings of an international conference meeting. Rangeland Challenges in Southern Africa in the 1990's. CSIR, Pretoria.

KEIJSPER, V.P., 1992. *The tribal grazing lands policy at the crossroads : fencing by individuals in the communal areas of Botswana*. A position Paper.

KWELAGOBE, D.K., 1996. *Official closing speech on the occasion of the fencing component of the national policy on agricultural developm*ent. Grand Palm Hotel. Gaborone. Botswana.

LEWIN, K., 1951. *Field Theory in Social Sciences. Selected Theoretical Papers.* England: Tavistock Publications Ltd.

McKEAN, M.A., 1992. Success on the commons : A comparative examination of institutions for common property resource management. *Journal of Theoretical Politics,* 4(3):247-281.

ROE, E.M., 1988. *Uncommon grounds for commons management : making sense of livestock rangeland projects South of Sahara.* PhD dissertation. University of California. Berkeley.

SANDFORD, S., 1983. *Management of pastoral development in the third world*. Overseas Development Institute, London. XIV. 316 pp.

SHEPHERD. G., 1989. The reality of the commons : answering Hardin from Somalia. *Development Policy Review. ODI Journal*, 7:51-63.

TSIMAKO, B., 1991. *The tribal grazing land policy (TGLP) ranches performance to date*. Socio-economic Monitoring and Evaluation Unit. Division of Agricultural Planning and Statistics. Ministry of Agriculture. Gaborone. Botswana.