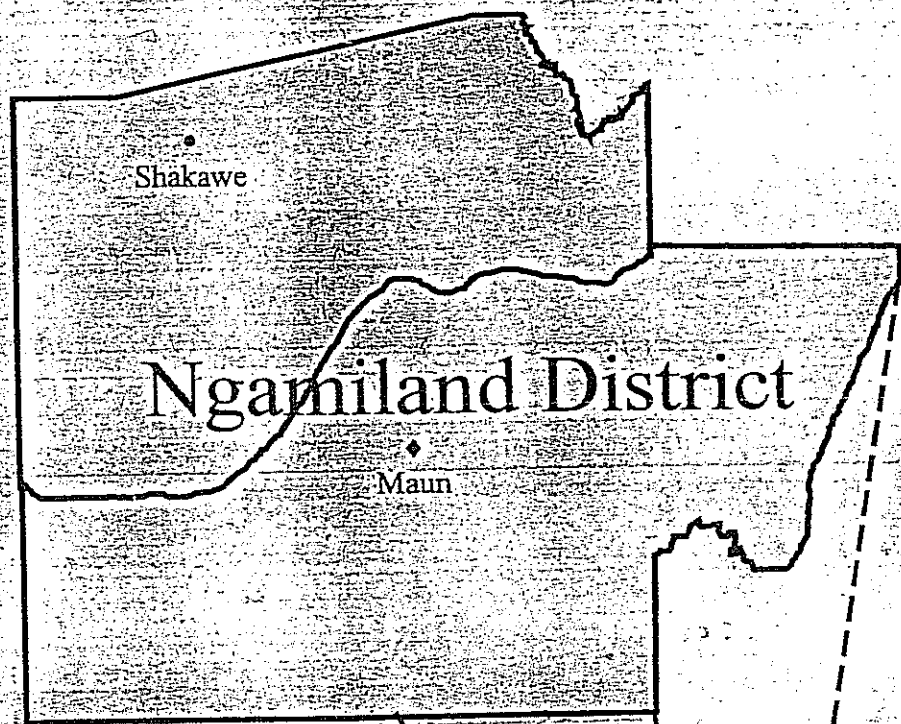


Socio-Economic Effects of CBPP in Ngamiland



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DAPS MISSION STATEMENT

The Division of Agricultural Planning and Statistics (DAPS) Mission Statement is to contribute to efficiency, competitiveness and sustainability of agriculture in Botswana. It will do so by:

- making policy recommendations based on sound analysis of feasible options.
- assessing the impact of Government Policy and Projects on the welfare of producers, consumers and natural resource base.
- providing timely, high quality economic, sociological, demographic and statistical information to Ministry of Agriculture clients.
- and providing business advice to existing and emergent agricultural enterprises.

DAPS is a service-driven Organisation. It exists to serve the needs of the public, policy makers, farmers and agricultural processing and marketing enterprises in Botswana. At the highest level, it assists the government to make and implement sound policy and allocation of resources in line with government's overall strategy for the sector.

In order to meet its mission, DAPS' management culture supports the development of individual and organisational capabilities.

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Acknowledgements

This survey was a success owing to contributions made by numerous government departments, officials as well as individuals in their private capacities.

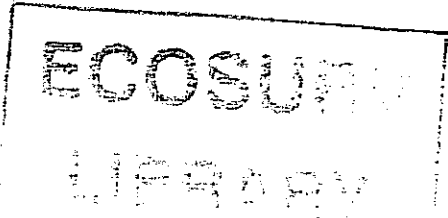
Firstly, we would like to express our gratitude to the residents of Ngamiland for the patience they displayed in answering our rather long questionnaire. All this, amid social and economic hardships brought about by loss of their prime source of livelihood, cattle. This clearly demonstrates that as long as social research concentrates on people's daily problems, chances of them developing a "research-fatigue" will remain minimal.

Secondly, the University of Botswana students who did all the enumeration work including listing in all the selected blocks need special mention for a job well-done. Even though there was very little time to conduct this study, under very difficult conditions such as long and uncomfortable distances, the amount of effort put and commitment shown by the students, remain one of the most significant reasons for its success. Special mention also needs to be made of the drivers who were assigned to the study. Most of the interviews were done either early in the morning or long after normal working hours, but never on any occasion did we receive complaints from them.

Both the District and the National CBPP Reference Groups were very supportive during the various stages of this study. Not only did they provide funds but also made arrangements for the provision of transport, office accommodation and other logistics that were critical to the success of this study. Valuable comments were also received from the District Reference Group at the preliminary stages of report writing.

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ABBREVIATIONS

ALDEP	Arable Land Development programme
ASU	Agricultural Statistics Office
CBPP	Contagious Bovine Pleuro-Pneumonia
DAPS	Division of Agricultural Planning and Statistics
FAP	Financial Assistance Policy
LWDP	Livestock Water Development Programme
M&E	Monitoring and Evaluation
MFDP	Ministry of Finance and Development Planning
MoH	Ministry of Health
NCHS	National Centre for Health Statistics
NCSA	National Conservation Strategy Agency
SLOCA	Services to livestock Owners in Communal Areas
UB	University of Botswana
VEEU	Veterinary Epidemiology Economics Unit
WHO	World Health Organisation

CHAPTER 1

1. Background

The need for accurate socio-economic data to guide management decisions was recognised during the early stages of the CBPP Eradication Project. The Division of Agricultural Planning and Statistics (DAPS), through its Monitoring and Evaluation (M&E) section and the Agricultural Statistics Unit (ASU), was charged with the responsibility to provide this information.

The two sections consequently undertook two successive studies, in 1996 and 1997, with the broad objective of establishing the socio-economic effects of cattle eradication on the livelihood of the Ngamiland population. The studies recommended to CBPP management intervention measures and strategies that could be used in order to cushion communities from the effects of the sudden collapse of their most vital source of livelihood, i.e. cattle.

This report presents a summary analysis of data from the 1997 survey, which was conducted between June and August. ^{Winter! Post-harvest} While the 1996 study was carried out during the cattle eradication exercise, the 1997 study was done during cattle restocking. In both cases, the study field team thus had an opportunity to observe these vital project processes. This report therefore presents not only information collected through the questionnaire but also benefits from the observation process.

The study was carried out after close consultation with various stakeholders, primarily the CBPP Coordination Office in Maun, the CBPP District Reference Group, also based in Maun, and other Government Ministries. Non-Governmental Organisations, though invited, were not able to participate.

A special Reference Group was also put in place, with M&E as the Secretariat, to coordinate overall execution of the study. Represented in this body were the Ministry of Agriculture (DAPS, ALDEP, Veterinary Epidemiology Economics Unit (VEEU)); Family Health Division of the Ministry of Health; Food Resources Department and National Conservation Strategy Agency (NCSA), both from the Ministry of Local Government,

Lands and Housing; the Rural Development Co-ordination Division, Ministry of Finance and Development Planning; and the Faculty of Social Sciences, University of Botswana.

The overall design of the study, ie sampling techniques and estimation procedure, was done by the Agricultural Statistics Unit. A team of 40 University students was engaged to administer the questionnaire, under close supervision in the field by both M&E and ASU.

1.1 Objectives of the Study

The objectives of the study were:

- a) to monitor and evaluate the impact of the eradication of CBPP (Cattle Lung Disease) on the population of the area,
- (b) to identify problems and constraints arising from the restocking exercise, and
- (c) to evaluate the relevance of current relief measures and their effects on the livelihood of the Ngamiland population.

Specifically, the survey investigated the following broad areas, with the view to answering pertinent questions posed by the CBPP eradication programme and government interventions aimed at mitigating the resultant hardships:

- Household demographic structure and socio-economic characteristics;
- Health and nutrition
- Farm characteristics, (both crop and livestock, labour);
- Use of cash compensation and Restocking;
- Future coping strategies

The aim of this paper therefore is to give an overview of the major findings of the survey in order to facilitate management decision making in the interim, while providing an opportunity to all interested parties to identify areas for further analysis of the survey data. The paper introduces and discusses the main results of the study areas before finally reaching conclusions and recommendations.

1.2 Sampling Methodology

Ngamiland is divided into several localities demarcated into blocks, which are definable land areas shown in a map. These blocks were constructed during the 1993 Agricultural Census. Ngamiland is subdivided into Ngamiland East and Ngamiland West and is stratified into three strata, the village stratum, and land stratum and cattlepost stratum. The list of blocks in the area constitutes a **FRAME** from which a sample is drawn.

During the design of the study Ngamiland East was restocked and the restocking was still on going in Ngamiland West. The determination of the sample size in each stratum for each district should take into consideration the information provided for the two districts. Some people in Ngamiland East who did not opt for 100% cash compensation were likely to have moved back to the cattleposts while those in Ngamiland West were likely to be around the places where relief measures programmes were in place. In view of the assumptions made and in view of the information made available about the two districts, the sampling methodology recommended was a two stage stratified random sampling. The first stage sampling units (PSU) were the number of blocks selected with probability proportional to the measure of size (**MOS**). The **MOS** was the number of dwellings enumerated during the 1991 Population and Housing Census. The second stage sampling units (SSU) were the number of households listed in each selected block. A sample of the listed households was drawn using the systematic random sampling. A predetermined average sample size of approximately 10 households per block was drawn.

1.2.1 Assumptions

- People were likely to have moved to other areas to get the temporary relief measures established after the cattle eradication in Ngamiland.
- The relief measures were assumed to be in place where there are facilities such as offices, schools, clinics and other Local and Government structures.
- After the restocking exercise, there was a likelihood of migration from villages and lands back to the cattlepost areas.
- A compromise in sample selection would be made in determining the allocation of sample size in each stratum.

1.2.2 The Sample Selection

Independent samples were selected in Ngamiland East and Ngamiland West districts respectively. The sample size was approximately 33% of the total blocks in each Agricultural District. This ratio produced approximately 50 blocks in Ngamiland West and 46 blocks in Ngamiland East, with a total of approximately 96 blocks selected in Ngamiland for the study.

Given a fixed average sample size of approximately 10 households selected block, there were approximately 500 households selected in Ngamiland West and 460 households selected in Ngamiland East. This resulted in approximately 960 households selected in Ngamiland. With a total number of 40 enumerators to administer the questionnaire, each enumerator was expected to list approximately 2.5 blocks and to administer the questionnaire to approximately 25 selected households.

In light of the assumptions made on the two districts above, the sample size in Ngamiland West was determined in the ratio 2:2:1 for the village stratum, land stratum and the cattlepost stratum respectively. The sample size in Ngamiland East was determined in the ratio 4:3:3 for the village stratum, land stratum and the cattlepost stratum respectively. For a sample of households to be drawn, a list of households in each selected block was required. As a result enumerators started listing total dwellings in each selected block to identify the total number of households in each dwelling unit and in each block. This list formed the frame from which a sample size of approximately 10 households was drawn. The selection of a sample size of approximately 33% of blocks in each district allocated according to the aforementioned ratios results in the following allocation of the number of blocks into the sample per stratum.

Ngamiland West.

Village stratum = 20 blocks,
Land stratum = 20 blocks
Cattlepost stratum = 10 blocks.

Ngamiland East.

Village stratum = 18 blocks
Land stratum = 14 blocks
Cattlepost stratum = 14 blocks.

1.2.3 Estimation Procedures

ESTIMATION IN ANY GIVEN k^{th} STRATUM

$$\begin{aligned}\hat{Y}_k &= \frac{1}{n_k} \sum_{i=1}^{n_k} \frac{M_i}{p_i m_i} \sum_{j=1}^{m_i} y_{ij} \quad \forall j = 1, 2, 3, \dots, m_i, \\ &= \frac{1}{n_k} \sum_{i=1}^{n_k} \frac{M_i}{p_i m_i} y_i \quad \forall i = 1, 2, 3, \dots, n_k, \\ &= \frac{1}{n_k} \sum_{i=1}^{n_k} \frac{M_i}{p_i} \bar{y} \quad \forall k = 1, 2, 3.\end{aligned}$$

Where,

y_{ij} = The value of the variable of the j^{th} selected household in the i^{th} selected block.

$y_i = \sum_{j=1}^{m_i} y_{ij}$ = Total of values of the variable of in the i^{th} selected block.

$\bar{y} = \sum_{j=1}^{m_i} \frac{y_{ij}}{m_i}$ = Mean of values of the variable in the i^{th} selected block.

\hat{Y}_k = Aggregate of values of variable in any given stratum.

M_k = Total Number of dwellings in a stratum .

m_k = Total number of dwellings in a selected block in the k^{th} stratum

n_k = The total number of selected blocks in any given stratum.

$p_i = \frac{m_k}{M_k}$ = The probability of selecting the i^{th} block in any given stratum.

M_i = The total number of listed households in a selected block.

m_i = The total number of selected households in a selected block.

ESTIMATION IN ANY DISTRICT

$$\hat{Y}_d = \sum_{k=1}^3 \hat{Y}_k.$$

Where,

\hat{Y}_d = Aggregate of values of the variable in any given district.

ESTIMATION IN NGAMILAND

$$\hat{Y}_N = \sum_{d=1}^3 \hat{Y}_d.$$

Where,

\hat{Y}_N = Aggregate of values of the variable in Ngamiland.

ALLOCATION OF DUTIES

Activity	Section
1. Selection of a sample of blocks.	Agricultural Statistics.
2. Provision of maps for Ngamiland	Agricultural Statistics.
3. Demarcation of selected blocks on the maps.	Both Sections.
4. Identification of selected blocks in each stratum.	Both Sections.
5. Listing of dwellings/households in each selected block.	Monitoring & Evaluation
6. Selection of the sample of households in a selected block	Both Sections.
7. Field operations/interviews/questionnaire administration	Monitoring & Evaluation
8. Coding and Editing.	Monitoring & Evaluation
9. Data Entry & Verification.	Monitoring & Evaluation
10. Data Validation (Screen Editing).	Monitoring & Evaluation
11. Data Processing.	Monitoring & Evaluation
12. Data Analysis	Monitoring & Evaluation

CHAPTER 2

2. Summary of Results**2.1 Household Characteristics**

This section highlights the results of household variables that were investigated. They included main household demographic characteristics, such as household size, sex and age of household head, occupation of household members, schooling and education attainment of household members, members requiring special assistance and sources of livelihood. A selection of the results is presented here.

2.1.1 Demographic Characteristics

Table 1 shows the total number of estimated households, by sex of household heads, that were enumerated for the survey. In total 15635 households were enumerated. This figure falls short of the actual total number of households in Ngamiland due to non-response as a result of migration, among other reasons. An important observation to note from the table is that there were more female headed households in Ngamiland West than there were male ones. This is in contrast to the situation in Ngamiland East.

Table 1 Household Head by Sex and District

District	Male headed	Female headed	Total
Ngamiland West	3561	4154	7715
Ngamiland East	4674	3246	7920
Total	8235	7400	15635

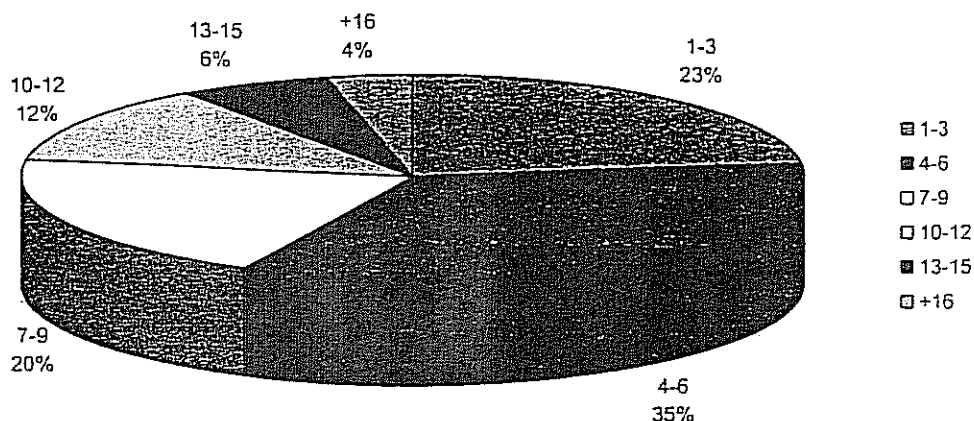
CBPP Survey '97

52.6

47.3

The dependency ratio, which is defined as the total number of economically inactive household members divided by total number of economically active ones, was higher for male headed households than female headed households. However this indicator is limited under local conditions because people start working at younger ages, than, say, in Western countries, and continue until well into old age.

Fig 2 Household Size Distribution in Ngamiland



The household size ranges from 1 to more than 16. For both districts, the modal family size was the 4-6 bracket.

2.1.2 Special Needs

Table 3 shows the distribution of people who had special needs and whether they were receiving any assistance at all from government.

As can be observed from Table 3, nearly all people having special needs were getting some assistance from Government. Although the table does not indicate a detailed analysis the type of assistance that was given, food rations, followed by the Labour Intensive Public Works programme, were the most common forms of assistance.

Table 3 Distribution of Households Having People with Special Needs and Receiving Government Assistance

Type of need observed	Ngamiland West		Ngamiland East		Total Ngamiland	
	% having	% receiving assistance	% having	% receiving assistance	% having	% receiving assistance
Lactating mothers	14.4	98.6	11.5	100.0	12.7	99.5
Pregnancy	4.1	100.0	3.5	100.0	3.8	100.0
TB sufferer	1.1	100.0	0.8	100.0	1.0	100.0
Phys. Disability	1.6	100.0	1.2	100.0	1.4	100.0
Sight impairment	1.9	100.0	1.7	100.0	1.8	100.0
Hearing impairment	1.9	100.0	3.7	97.2	2.9	98.0
Mental disability	0.5	100.0	0.4	100.0	0.4	100.0
Leprosy	0.1	100.0	0.2	100.0	0.2	100.0
Under five	100.0	100.0	100.0	99.7	100.0	99.9
Destitute	1.1	100.0	0.5	100.0	0.8	100.0
Other	1.2	100.0	2.1	95.9	1.7	97.3

CBPP Survey '97

2.1.3 Sources of Livelihood

In as much as cattle were the major source of livelihood for the majority of the population, their destruction in Ngamiland caused major economic dislocation in the community. Although there is a major methodological variation between the previous survey and the current one, the latter highlights three important observations that confirm the structural changes that have taken place in the local economy since the destruction of cattle.

First, whereas in 1996 cattle were ranked as the first most important source of livelihood by 52% of a sample of 753 households (Table 4b), it is now ranked first by only 7.2% of the households. It is highly unlikely that this variation can be attributable to sampling and other statistical differences alone.

Table 4a Ten Most Important Sources of Income as Ranked by the Population in Ngamiland - 1997

Rank	First sources			Second sources			Third sources		
	Sources	Households		Sources	Households		Sources	Households	
		No.	%		No.	%		No.	%
1	Arable farming	5832	37.3	Arable farming	3204	21.6	Smallstock	2215	20.5
2	Salary	2576	16.5	Govt Assist	2421	16.3	Govt. assist.	1689	15.7
3	Govt Assist	2320	14.8	Salary	1989	13.4	Arable farming	1275	11.8
4	Cattle	1124	7.2	Wages	1370	9.2	Poultry	1268	11.8
5	Wages	1022	6.5	Smallstock	1191	8.0	Wages	703	6.5
6	Remittances	602	3.9	Cattle	1129	7.6	Trad. beer	669	6.2
7	Smallstock	545	3.5	Remittances	737	5.0	Cattle	509	4.7
8	Trad. Beer	299	1.9	Trad. Beer	712	4.8	Reeds	370	3.4
9	Rentals	287	1.8	Vending	324	2.2	F/wood	357	3.3
10	Vending	215	1.4	F/wood	264	1.8	Salary	309	2.9

CBPP Survey '97

Table 4b Ten Most Important Sources of Income as Ranked by the Population in Ngamiland - 1996

Rank	First source			Second source			Third source		
	Sources	H/holds		Sources	H/holds		Sources	H/holds	
		No.	%		No.	%		No.	%
1	Cattle	395	52%	Arable farming	281	41%	Small stock	143	28%
2	Arable farming	190	25%	Small stock	131	19%	Arable farming	97	19%
3	Paid employment	85	11%	Cattle	89	13%	Paid employment	70	14%
4	Small stock	37	5%	Paid employment	45	7%	Poultry	62	12%
5	Poultry	13	2%	Poultry	43	6%	Trad.beer/chibuku	39	8%
6	Remittances	12	2%	Trad.beer/chibuku	25	4%	Crafts	30	6%
7	Trad.beer/chibuku	9	1%	F/wood/poles/t/gra	24	3%	Cattle	23	4%
8	Crafts	7	1%	Crafts	23	3%	F/wood/poles/t/gra	22	4%
9	F/wood/poles/t/gra ¹	5	1%	Remittances	22	3%	Remittances	15	3%
10	Fishing	0	0%	Fishing	7	1%	Fishing	12	2%
Total		753	100%		690	100%		513	100

Source: Socio-economic Profile of Ngamiland; Mlenga et al

*certainly
more
in dependence*

*livelihood
defn*

Second, an important observation to emerge from Table 4a is the role Government assistance is now playing as a source of livelihood for the majority of the population in Ngamiland. In the previous survey, only few households actually mentioned relying on this type of assistance (Table 4b).

The survey also shows that arable farming has now become the first most important source of livelihood in Ngamiland. However just like in the previous survey, smallstock still remains the third most important source of income in the region.

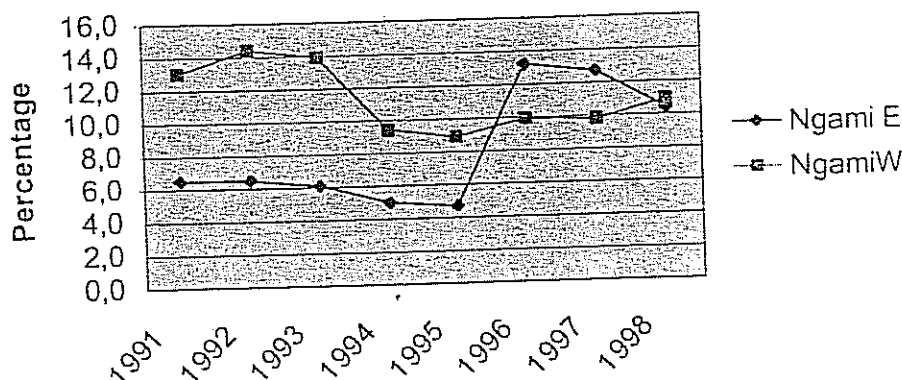
¹ Fuel wood/poles/tiratching grass

² Some households did not reveal, or had no principal source of income: some had only one or two.

2.1.4 Nutritional Status of Under 5 Population

One of the major objectives of the study was to assess the nutritional status of under-fives.

Figure 3: Nutritional Status In Ngamiland
1991 to 1998



Source: Drought Assessment Reports: 1991-1998

As can be seen from the above figure, the rate of malnutrition was declining in both Ngamiland East and West before CBPP (ie prior to 1996), even though it was much higher in the West. Around 1996, things took a different turn, malnutrition rose, and in Ngamiland East it more than doubled, from 5% to over 12%. It seems though that this trend is gradually being reversed in Ngamiland east, as by the first quarter of 1998, the rate of malnutrition had fallen to just above 10%.

The same cannot, however, be said about Ngamiland West. To start with, the rise in malnutrition was not very sharp in this sub-district. The most worrisome observation to be made here is that slight as this increase may appear, it is still continuing. This has left the two sub-districts at almost the same level of malnutrition, but with Ngamiland East showing stronger signs of recovering than Ngamiland West.

In an attempt to investigate factors that influence malnutrition, this study randomly selected two under-fives from each sampled household in cases where there were more than two eligible children. If a sampled household was found to have two under-fives, both were automatically included. The same was done for households which had one child under the age of five years.

Three major characteristics, namely age, weight, and height of child, were obtained and used to derive anthropometric indices. These indices are then cross-tabulated with a selected set of factors that are known to affect the nutritional status of children, for example age and sex of the child, number of meals per day and sex of household head.

The indices, *weight-for-age*, *weight-for-height*, and *height-for-age*, measuring the prevalence of under-weight, wasting/thinness, and stunting/shortness, respectively, are recommended by the World Health Organisation as reliable indicators of nutritional status.

The nutritional status figures are based on Standardised Z-score values of children's Weight-for-Age (or Height-for-Age or Weight-for-Height) from the WHO/America National Centre for Health Statistics (NCHS) reference population mean and lower standard deviation for the given age, height or weight. The categorisation of the Z-scores into "Severe", "Moderate" or "Normal" is also based on the WHO/NCHS recommendations.

2.1.4.1 Nutritional Status versus Age of Child

For each of the variables cross-tabulated with nutritional status of under-fives, three biological aspects related to human development are assessed, namely; under-weight prevalence, stunting/shortness, and wasting/thinness.

a) Under-weight Prevalence

Table 5a District Nutritional Status of Underfives by Age (Weight for Age)

Ngamiland West							
Age group (months)	Level of Malnutrition						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
0-11	21	8.8	19	3.7	1092	25.1	1132
12-23	77	32.2	202	38.9	819	18.9	1099
24-35	31	13.0	138	26.6	897	20.7	1067
36- 47	46	19.2	118	22.7	892	20.5	1056
48- 59	63	26.4	42	8.1	643	14.8	758
Total	239	100.0	519	100.0	4343	100.0	5102
Ngamiland East							
Age group (months)	Level of Mainutrition						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
0-11	21	10.6	51	10.9	837	18.9	909
12-23	68	34.3	137	29.1	948	21.5	1153
24-35	51	25.8	84	17.9	918	20.8	1053
36- 47	20	10.1	154	32.8	1097	24.8	1270
48- 59	38	19.2	44	9.4	618	14.0	700
Total	198	100.0	470	100.0	4418	100.0	5085
Ngamiland Totals							
Age group (months)	Level of Malnutrition						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
0-11	42	9.6	70	7.1	1929	22.0	2041
12-23	145	33.3	339	34.3	1767	20.2	2251
24-35	82	18.8	222	22.4	1816	20.7	2119
36- 47	66	15.1	272	27.5	1988	22.7	2326
48- 59	101	23.2	86	8.7	1262	14.4	1449
Total	436	100.0	989	100.0	8762	100.0	10186

CBPP Survey '97

From these data it emerges that approximately 4.3% of Ngamiland's under-fives are severely underweight. In Ngamiland East, this figure is slightly lower at about 3.9% while in Ngamiland West it is 4.7%. Children between the ages of 12 and 23 months are the most affected, with 32.4% and 34.4% of all severely underweight children falling in this age category in Ngami East and West respectively. The same trend can be seen under the

moderate category of nutritional status, where this age group still outnumbered the rest at 38.9% in the West and 29.2% in the East.³

It is not clear why this is the case but it is possible that once children exit the infancy stage (generally taken to be the first 11 months of life), parental attention tends to decrease. For example, most mothers are likely to terminate breastfeeding once the child has survived the first year of its life, and this is likely to affect the child's nutritional status, especially if alternative sources of nutrients are of poor nutritional value.

In fact, the Botswana Family Health Survey (BFHS) both I (MoH, 1985) and II (CSO, 1989), conducted in 1984 and 1988 respectively, show that the mean duration of breastfeeding in Botswana was approximately 19 months, after which the proportion of women still breastfeeding begins to fall rapidly. It is possible that the mean duration of breastfeeding quoted above has probably fallen to well below 19 months over the ten years since BFHS II. On the other hand, the proportion of women breastfeeding beyond the mean continues to decline rapidly. These two factors combined lend weight to the suspicion that termination of breastfeeding may explain the high incidence of under-weight status among 12-23 month olds.

It turns out however that the high incidence of malnutrition, both severe and moderate, among 12-23 month olds is the only similarity between the two sub-districts. In Ngamiland West for example, the second most severely under-weight age group is 48-59 months (26.4%) while in the East it is 24-35 months (25.8%). Moderately under-weight children also show a different trend among the two districts with regard to the second most affected age group.

³ Under moderate nutritional status, the most affected age group in the East is 35-47 months at 32.7%.

b) Stunting

Table 5b District Nutritional Status of Underfives by Age (Height for Age)

Ngamiland West							
Age group (months)	Level of Malnutrition						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
0-11	65	11.4	54	6.4	1004	27.0	1123
12-23	216	37.8	219	26.0	675	18.1	1110
24-35	59	10.3	188	22.4	872	23.4	1120
36- 47	165	28.9	195	23.2	675	18.1	1034
48- 59	66	11.6	185	22.0	497	13.3	748
Total	571	100.0	841	100.0	3723	100.0	5135
Ngamiland East							
Age group (months)	Level of Malnutrition						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
0-11	44	13.5	74	13.4	755	18.1	873
12-23	184	56.6	162	29.3	808	19.4	1153
24-35	17	5.2	134	24.3	902	21.6	1053
36- 47	41	12.6	93	16.8	1136	27.2	1270
48- 59	39	12.0	89	16.1	572	13.7	700
Total	325	100.0	552	100.0	4173	100.0	5049
Ngamiland Totals							
Age group (months)	Level of Malnutrition						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
0-11	109	12.2	128	9.2	1759	22.3	1996
12-23	400	44.6	381	27.4	1483	18.8	2263
24-35	76	8.5	322	23.1	1775	22.5	2172
36- 47	206	23.0	287	20.6	1811	22.9	2304
48- 59	106	11.8	274	19.7	1069	13.5	1449
Total	897	100.0	1392	100.0	7897	100.0	10184

CBPP Survey '97

8.6% of Ngamiland's under-fives are severely stunted, the incidence being much higher in the West at 10.9% compared to the East's relatively lower 6.2%. Consistent with under-weight trends shown above, stunting is more pronounced among the 12-23 month olds than any other age group. For example, as much as 37.8% of the severely stunted children in Ngamiland West fall in this age group while in Ngamiland East the figure is even higher at 56.5%. Overall, 44.6% of all severely stunted children in Ngamiland are aged 12-23 months. It is also important to note that this age group also forms the majority of the moderately stunted group as well, 26% in Ngami West and 29.3% in Ngami east. The

same explanation as that made above is advanced for the high incidence of stunting among 12-23 month olds.

b) Wasting

Table 5c District Nutritional Status of Underfives by Age (Weight for Height)

Ngamiland West							
Age group (months)	Level of Malnutrition						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
0-11	0	0.0	53	29.1	1044	21.7	1097
12-23	17	30.4	38	20.9	1055	22.0	1110
24-35	16	28.6	58	31.9	996	20.7	1069
36-47	23	41.1	17	9.3	975	20.3	1015
48-59	0	0.0	16	8.8	732	15.2	748
Total	56	100.0	182	100.0	4802	100.0	5039
Ngamiland East							
Age group (months)	Level of Malnutrition						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
0-11	0	0.0	71	33.2	765	16.4	836
12-23	0	0.0	78	35.5	1051	22.5	1127
24-35	64	62.1	19	8.9	970	20.8	1053
36-47	0	0.0	37	17.3	1233	26.4	1270
48-59	39	37.9	11	5.1	650	13.9	700
Total	103	100.0	214	100.0	4669	100.0	4986
Ngamiland Totals							
Age group (months)	Level of Malnutrition						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
0-11	0	0.0	124	31.3	1809	19.1	1933
12-23	17	10.7	114	28.8	2106	22.2	2237
24-35	80	50.3	77	19.4	1965	20.7	2122
36-47	23	14.5	54	13.6	2208	23.3	2285
48-59	39	24.5	27	6.8	1382	14.6	1449
Total	159	1.6	396	3.9	9470	94.5	10026

CBPP Survey '97

Figures on wasting depict a remarkably different picture from that painted under stunted growth and under-weight prevalence. First and foremost, unlike the other two conditions, wasting is almost non-existent among the 12-23 month olds, and virtually zero at infancy (0-11 months). Instead it peaks between 24 and 35 months at a startling 50.4% for the whole of Ngamiland. Its incidence however varies markedly between the two sub-districts, being more pronounced among 36-47 month olds (40.7%) in the West while in the East most of its victims are aged between 24 and 35 months (62.5%).

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Looking at the absolute figures though, a precautionary note may be issued that wasting is not a serious problem in the district. For example, only 159 children were affected by wasting compared to as much as 896 stunted and 437 under-weight. These figures translate into 1.6% for wasting, 8.6% and 4.5% for stunting and under-weight respectively for the whole district.

2.1.4.2 Nutritional Status versus Sex of Child

As mentioned earlier, the three conditions of under-weight prevalence, stunting and wasting are analysed in relation to a set of characteristics of the under-fives. This subsection deals with nutritional status of under-fives in relation to gender.

b) Stunting

Table 6b District Nutritional Status of Underfives by Sex of Child

Ngamiland West							
Sex of Child	Level of Malnutrition						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
Male	187	32.7	545	64.9	2028	54.5	2760
Female	384	67.3	295	35.1	1696	45.5	2375
Total	571	100.0	840	100.0	3724	100.0	5135
Ngamiland East							
Sex of Child	Level of Malnutrition						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
Male	164	50.6	231	41.8	2174	52.1	2569
Female	160	49.4	321	58.2	1999	47.9	2481
Total	324	100.0	552	100.0	4173	100.0	5050
Ngamiland Totals							
Sex of Child	Level of Malnutrition						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
Male	351	59.2	776	55.7	4202	53.2	5329
Female	545	60.8	616	44.3	3695	46.8	4856
Total	896	100.0	1392	100.0	7897	100.0	10185

CBPP Survey '97

Contrary to the under-weight situation depicted above, the majority of the stunted children are girls, who constitute 60.8% of all severely stunted children in Ngamiland. This trend is easily discernible in Ngamiland West with 67.3%, and is slightly reversed in the East, at 49.4%. For moderately stunted children males dominate the district total at 55.7%. At sub-district level however, there are more moderately stunted girls than boys in Ngami East.

Overall, there are more "normal" height boys than girls in each sub-district even though the difference is more discernible in Ngamiland West than in the east.

c) Wasting

Table 6c District Nutritional Status of Under-fives by Sex of Child

Ngamiland West							
Sex of Child	Level of Malnutrition						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
Male	52	94.5	116	63.7	2591	52.1	2750
Female	3	5.5	66	36.3	2379	47.9	2448
Total	55	100.0	182	100.0	4970	100.0	5208
Ngamiland East							
Sex of Child	Level of Malnutrition						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
Male	130	87.2	121	56.5	2514	50.4	2765
Female	19	12.8	93	43.5	2477	49.6	2589
Total	149	100.0	214	100.0	4991	100.0	5354
Ngamiland Totals							
Sex of Child	Level of Malnutrition						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
Male	182	89.2	237	59.8	5109	51.3	5525
Female	22	10.8	159	40.2	4856	48.7	5037
Total	204	100.0	396	100.0	9965	100.0	10562

CBPP Survey '97

An overwhelming majority of the wasted children, both severely and moderately, in Ngamiland are boys (89%). In Ngamiland West the figure stands at a remarkable 93.8% while in Ngamiland East it is not any better at 87.3%. On the whole however, less children are victims of wasting than they are victims of stunting and under-weight.

2.1.4.3 Nutritional Status versus Sex of Household Head

Gender was not only restricted to the sex of the child in question, sex of the household head was also included in the analysis to find out if it had any influence over children's nutritional status. This is particularly important in Botswana's case where resource endowment has been found to vary greatly between male and female headed households (eg BIDPA, 1997). Needless to mention, this has a direct implication for household food security as the amount of food that a household can access depends directly on the amount of resources at its disposal.

a) Under-weight Prevalence

Table 7a District Nutritional Status of Underfives based on Sex of Head of Household

Ngamiland West							
Sex of H/Head	Level of Malnutrition by Weight for Age						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
Male	142	59.4	229	44.1	1821	41.9	2193
Female	97	40.6	290	55.9	2523	58.1	2909
Total	239	100.0	519	100.0	4344	100.0	5102
Ngamiland East							
Sex of H/Head	Level of Malnutrition by Weight for Age						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
Male	102	51.5	341	72.7	2369	53.6	2812
Female	96	48.5	128	27.3	2049	46.4	2273
Total	198	100.0	469	100.0	4418	100.0	5085
Ngamiland Totals							
Sex of H/Head	Level of Malnutrition by Weight for Age						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
Male	244	56.0	570	57.7	4190	47.8	5005
Female	192	44.0	418	42.3	4572	52.2	5182
Total	436	100.0	988	100.0	8762	100.0	10187

CBPP Survey '97

Against all expectation and popular belief most severely under-weight children in Ngamiland are found in male-headed households. In the district as a whole for example, 56% of the severely under-weight children came from male-headed households. In Ngamiland West the figure is even higher at 59.5% while it stands at 51.7% in the East. In fact, male-headed households in Ngamiland West consistently display higher levels of under-weight status, with more children coming from them being severely affected (59.5%), less being moderately under-weight (44.2%), and even less (41.9%) being of normal weight relative to those from female-headed households.

The picture is a bit different in Ngami East as more of the moderately under-weight children (72.6%) come from male-headed households. This proportion however falls sharply to 53.6% of the children whose weight is normal. Yet again, there are more severe cases in Ngami West (54.7%) than in Ngami East.

b) Stunting

Table 7b District Nutritional Status of Underfives based on Sex of Head of Household

Ngamiland West							
Sex of H/Head	Level of Malnutrition based on Height for Age						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
Male	270	47.3	271	32.3	1708	45.9	2249
Female	301	52.7	569	67.7	2016	54.1	2886
Total	571	100.0	840	100.0	3724	100.0	5135
Ngamiland East							
Sex of H/Head	Level of Malnutrition by based on Height for Age						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
Male	188	57.8	330	59.9	2320	55.6	2839
Female	137	42.2	221	40.1	1853	44.4	2211
Total	325	100.0	551	100.0	4173	100.0	5050
Ngamiland Totals							
Sex of H/Head	Level of Malnutrition based on Height for Age						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
Male	458	51.1	601	43.2	4029	51.0	5088
Female	438	48.9	791	56.8	3868	49.0	5097
Total	896	100.0	1392	100.0	7897	100.0	10185

CBPP Survey '97

Stunting, like under-weight, is more prevalent among male-headed households in Ngamiland. In Ngamiland West however, more severely and moderately stunted children (52.7% and 67.8% respectively) come from female-headed households than from male-headed ones. On the whole, severe stunting is more prevalent in Ngami West (11.1%) than in Ngami East (6.4%).

c) Wasting

Table 7c District Nutritional Status of Underfives based on Sex of Head of Household

Ngamiland West							
Sex of H/Head	Level of Malnutrition based on Weight for Height						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
Male	21	37.5	41	22.5	2156	43.4	2218
Female	35	62.5	141	77.5	2814	56.6	2990
Total	56	100.0	182	100.0	4970	100.0	5208
Ngamiland East							
Sex of H/Head	Level of Malnutrition by based on Weight for Height						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
Male	89	59.7	144	67.3	2760	55.3	2993
Female	60	40.3	70	32.7	2231	44.7	2361
Total	149	100.0	214	100.0	4991	100.0	5354
Ngamiland Totals							
Sex of H/Head	Level of Malnutrition based on Weight for Height						Total
	Severe		Moderate		Normal		No.
	No.	%	No.	%	No.	%	No.
Male	110	53.7	185	46.7	4916	49.4	5211
Female	95	46.3	211	53.3	5045	50.6	5351
Total	205	100.0	396	100.0	9961	100.0	10562

CBPP Survey '97

Wasting, though not as widespread as the other two conditions in Ngamiland district, seems to be common among children from female-headed households in Ngamiland West. For example, 63% of the severe and 77.4% of the moderate cases come from female-headed households. In Ngami East, the opposite is true as 59.8% of the severe cases and 67.4% of the moderate ones come from male-headed households.

Even though these results, particularly with regard to under-weight and stunting, are somewhat unexpected, they are not surprising. This is especially so if they are taken against the background that most large families are male-headed (Table 2), and that a higher dependency ratio has also been observed among male-headed households.

2.1.4.4 Nutritional Status versus Number of Meals per Day

In addition to gender issues, a closely related yet more direct factor was taken into consideration in analysing nutrition data, the number meals the child had the previous day. The number of meals that a child has in a day is, of all variables included in this analysis, perhaps the most directly related to the child's nutritional status as it determines the child's access to nutrients, which are in turn crucial for child development. Further, given the widespread distribution of food rations following cattle removal, this variable can be used to evaluate the extent to which the ration succeeded in cushioning residents, particularly under-fives, from malnutrition.

a) Under-weight Prevalence

Table 8a District Nutritional Status of Underfives based on Meals per day

Ngamiland West							
No. of Meals /day	Level of Malnutrition based on Weight for Age						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
One-Two	123	51.7	314	60.5	2090	48.4	2528
Three-Four	81	34.0	186	35.8	1591	36.9	1858
Five or More	34	14.3	19	3.7	636	14.7	689
Total	238	100.0	519	100.0	4317	100.0	5075
Ngamiland East							
No. of Meals /day	Level of Malnutrition based on Weight for Age						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
One-Two	82	41.4	194.0	41.3	1333	30.5	1609
Three-Four	95	48.0	201.0	42.8	2202	50.4	2498
Five or More	21	10.6	75.0	16.0	833	19.1	928
Total	198	100.0	470.0	100.0	4368	100.0	5035
Ngamiland Totals							
No. of Meals /day	Level of Malnutrition based on Weight for Age						Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
One-Two	206	47.1	508	51.4	3424	39.4	4137
Three-Four	176	40.3	387	39.2	3793	43.7	4356
Five or More	55	12.6	93	9.4	1469	16.9	1617
Total	437	100.0	988	100.0	8686	100.0	10110

CBPP Survey 97

Information from Ngamiland tends to support the above view, as generally children who had one or two meals a day form the greatest proportion of the severely under-weight; compared to those who had more. This pattern is more discernible in Ngamiland West

where 51.7% of all severely under-weight children were those who had less than three meals a day. In turn severely under-weight children who had up to four meals a day (34%) outnumbered those who had five or more meals a day (14.3%) of the severely under-weight group in this sub-district.

Data also shows the same trend for moderately under-weight and normal children, even though it is worth noting that for the normal weight group, the gap between children who had two or less meals per day and those who had up to four is considerably smaller. This is an important result as, in a perfect situation, one would expect the proportion of normal weight children to increase as the number of meals per day increases, at least up to a certain number of meals. It is also important to note that almost half of Ngamiland West's under-fives (49.9%) had not more than two meals per day, compared to Ngamiland East's considerably lower proportion of 32%.

While this may be due to food shortage, it may also indicate child neglect. Boonstra (1996), found that there was a lot of alcohol abuse in a rapid assessment of malnutrition in Sehithwa, and that this led to child neglect. It is important to note, however, that child neglect can also be a result of mothers not finding enough time to care for their young because they are working, paradoxically, to raise food for the family.

In Ngamiland East, evidence points directly to a nutritionally unbalanced diet, with children who had up to four meals outnumbering those who had two or less meals in a day in the severely under-weight category at 48% and 41.5% respectively.

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Table 8b District Nutritional Status of Underfives based on Meals per Day

Ngamiland West							
No. of Meals /day	Level of Malnutrition based on Height for Age						Group Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
One-Two	211	37.0	461	54.9	1892	51.5	2564
Three-Four	278	48.7	313	37.3	1315	35.8	1906
Five or More	82	14.4	66	7.9	470	12.8	639
Total	571	100.0	840	100.0	3677	100.0	5109
Ngamiland East							
No. of Meals /day	Level of Malnutrition based on Height for Age						Group Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
One-Two	122	37.5	73	13.2	1414	34.3	1610
Three-Four	135	41.5	332	60.1	2031	49.3	2498
Five or More	68	20.9	147	26.6	678	16.4	892
Total	325	100.0	552	100.0	4123	100.0	5000
Ngamiland Totals							
No. of Meals /day	Level of Malnutrition based on Height for Age						Group Total No.
	Severe		Moderate		Normal		
	No.	%	No.	%	No.	%	
One-Two	333	37.2	535	38.4	3307	42.3	4174
Three-Four	413	46.1	644	46.3	3346	42.9	4403
Five or More	150	16.7	213	15.3	1168	14.9	1531
Total	896	100.0	1392	100.0	7821	100.0	10108

CBPP Survey '97

2.1.4.5 Other Variables

Other factors that are correlated with child health and indeed general community health were also included in the analysis. Among these were source of water for the household, type of toilet facility used, morbidity over the last two weeks, and weight of the child at birth.

With regard to source of water, the most striking feature is that only 2.6% of the households had a private source of water in Ngamiland West, compared to a relatively higher but unimpressive 5.7% in the East. Most of the residents depended either on public sources such as standpipes and water bowsers (54.6% in the West and 43.5% in the East) or "other" sources such as the river water (44.7% in the West and 43.4% in the East).

Households that sourced water privately had the least cases of malnutrition while there was not much difference between those who drank from public and other sources.

Across Ngamiland, only 17.4% of the household had access to a private toilet facility. Not surprisingly, there are almost no cases of severe malnutrition among this group.

The relationship between morbidity over the two weeks preceding the interview and nutritional status is most discernible in underweight and wasting status. In both districts combined, most of the severe and moderately underweight and moderately wasted children were those who had been ill within the two weeks leading to the interview.

This is not surprising as illness, especially within such a short space of time, cannot be expected to cause stunted growth (shortness), unlike weight which is very sensitive to illness.

* There were very few children (less than 1%) whose birth weight exceeded 2.5kg. Generally, children whose weight at birth fell below 2.5kg had a lower nutritional status than whose birth weight was 2.5kg or more.

2.2 Farm characteristics

Under this section the report highlights farm characteristics such as the structure of livestock ownership including smallstock and cattle, which farmers owned outside Ngamiland before and after CBPP eradication. Also, the reports focuses on arable crops and horticultural production, households' sources of food and their capacity to produce own food, collection of veld fruits and vegetables, as well as employment of farm labour before and after CBPP eradication.

2.2.1 Smallstock Ownership

Given the fact that smallstock features as an important source of livelihood (Table 3), the survey investigated the extent of smallstock ownership in Ngamiland.

Table 9 Smallstock Ownership in Ngamiland by District

Number of Smallstock	DISTRICT		TOTAL
	Ngamiland West	Ngamiland East	
1 - 10	2089	3082	5171
11 - 20	634	1254	1888
21 - 50	502	1361	7059
51 - 100	78	447	525
101 - 200	11	141	152
20 - 500	0	23	677

CBPP Survey '97

The data showed that 34% of households in Ngamiland West and 66% in Ngamiland East owned smallstock, respectively. Overall this represents 53% of all enumerated households.

Whereas in Ngamiland West 63% of the herds were between 1-10, in Ngamiland East only 41% of the herds were in this range. The majority, nearly 49%, owned between 11 and 50, indicating that there were more smallstock and larger herds in the East.

2.2.2 Cattle Ownership Outside Ngamiland

Under this section the survey investigated the extent to which farmers increased cattle holdings outside Ngamiland; i.e. were there more farmers keeping cattle outside Ngamiland as a result of CBPP, or as a strategy for restocking?

The results show a very contrasting picture between the two districts. In Ngamiland West, there is no evidence that people acquired more cattle outside Ngamiland after CBPP. In fact before CBPP only 58 households had owned cattle outside the region. This figure actually declined to 35 after CBPP. In contrast to this, the results suggest that in Ngamiland East farmers actually held more cattle outside Ngamiland after CBPP than before. Before CBPP 544 households owned cattle outside Ngamiland. This figure had risen by 27% to 693 after CBPP. Moreover households with mafisa cattle from this part of Ngamiland had also increased to 163 after CBPP from 64 before CBPP, respectively.

The difference in cattle ownership outside Ngamiland between the two districts may be due to the question of proximity. Unlike in Ngamiland east, which shares some borders with the non-CBPP affected districts of Gantsi and Central, cattle ownership in Ngamiland West is constrained by its unfavourable distance to other districts. Keeping cattle outside the district could thus not be economically feasible for farmers in this district.

2.2.3 Arable Crop Production

Since arable farming has now overtaken cattle to the extent that it is now the first most important source of livelihood in Ngamiland, crop production was a key area of the survey. Principally the major areas of concern were, firstly, did farmers plough, and if they did, did they produce enough food? Secondly, in the absence of cattle, the Government assisted farmers with donkeys for draught power. How did donkeys perform as substitutes for cattle as a source of draught power?

2.2.3.1 Own Food production

Sources of food varied significantly across Ngamiland, as Table 10 shows, as in their importance.

Table 10 Number of Households by District and Their Main Sources of Food

Source	Ngamiland West		Ngamiland East		Ngamiland	
	No.	%	No.	%	No.	%
Own production	4127	53.6	2780	35.2	6907	44.3
Market purchases	1659	21.6	3954	50.1	5613	36.0
Govt. food rations	1592	20.7	823	10.4	2415	15.5
Wages in-kind	32	0.4	32	0.4	64	0.4
Gifts from relatives	185	2.4	256	3.2	441	2.8
Other	102	1.3	54	0.7	156	1.0
Total	7697	100.0	7899	100.0	15596	100.0

CBPP Survey '97

* Comparison w/ 1996 though?

The three most important sources of food are own production, market purchases and Government food rations. While in Ngamiland West the majority of households depended on their own production, in the East market purchases tended to dominate. At the same time it can also be noted from the table that more households in the West depended on Government rations than did their counterparts in the East.

According to the survey, 4,183 and 4,206 households in Ngamiland West and East ploughed during the 1996/97 ploughing season, respectively. In contrast, 2,025 and 515 households in Ngamiland West and East, respectively, did not plough. Of the households that did not plough in Ngamiland West, 1,500 gave lack of draught power as the major reason for not ploughing.

~ 8389 and in '95/96? in total, west is 254 (30%)
 60% of total not ploughing and over

As in the previous survey, farmers who ploughed were asked whether they expected to produce sufficient food during the season. The prospects were not bright for most of them, as can be seen from Table 11. The results imply mean that in Ngamiland West only 21% of the households that usually depend on their own food production expected to produce

enough food during the ploughing under review. This contrasts, paradoxically, with Ngamiland East, where 58% of the households expected enough food. The situation is paradoxical since the major source of food in the East is market purchases, while it is "own production" in the West.

Table 11 Number of Households by District and Food expectation

District	Food expectations		Storage expectation	
	Enough	Not enough	Food storage	No storage
Ngamiland West	886	3317	940	3220
Ngamiland East	1599	2688	1676	2597
Total	2485	6005	2616	5817

CBPP Survey '97
 $\frac{29.2}{+} \frac{70.8}{=} 8490$

The results in the table above counteract the expectation of the study, as Ngamiland East households, who traditionally depend on market purchases, expected to produce enough food than in the West. This, however, may be explained by availability of draught power and climatic conditions during the reference ploughing season. Further, as will be shown in the next section, Ngamiland West farmers were relatively less familiar than their counterparts in the East with donkey use for draught power purposes. This probably affected, negatively, the area cultivated, which may explain why the expected harvest was so low.

2.2.3.2 Farmers' Views about Donkeys as Source of Draught Power

As was noted above, the major limiting factor to arable crop production during the 1996/97 ploughing season was lack of draught power. This problem was more acute in Ngamiland West, where traditionally cattle have been used as source draught power for ploughing operations, unlike in the East. However Government had anticipated this problem after the CBPP outbreak and consequently assisted farmers with donkeys. In fact donkeys were the main source of draught power during the 1996/97 ploughing season.

Generally, farmers in the East were more satisfied with donkeys than their counterparts in the West. While 14% of the 3412 households that used donkeys in the East said that they were dissatisfied with their performance, the corresponding proportion in Ngamiland West was 45%, out of 1285 households.

The main reasons of the dissatisfaction were;(a) in Ngamiland West farmers were simply not used to donkeys and (b) in both districts donkeys were perceived to be lazy, slow and weak animals. We feel these attitudes could be changed through farmer training.

It was also observed that there was a shortage of equipment compatible with donkey use for draught power purposes, eg harness, breast plates and bridles (see Table below). Consequently, farmers resorted to yokes, which are normally used for cattle. Needless to say, this adversely affected the performance of donkeys and contributed to most farmers' perception of donkeys as "weak" animals.

Table 12 Supply and Distribution of Equipment by District

District	Item	Applied for	Number Distributed	Distributed
Ngamiland West	Breast Plates	4400	4198	3048 to 664 farmers
	Bridles	1729	1002	954 to 477 farmers
Ngamiland East	Breast Plates	2412	2152	1047 to 194 farmers
	Bridles	987	325	418 to 209 farmers

Source: CBPP District Reference Group Report on ALDEP Packages (27 April, 1998)

2.2.3.3 Horticultural Production and Veld Products

"Environmental Impact"

Horticulture is a potential source of income, besides its nutritional benefits it brings for the growers. Preliminary indications from the survey show that there were more farmers engaged in horticulture in Ngamiland East than in the West. However the pertinent question to ask at this stage is whether, as a result of CBPP, more farmers were using the FAP to enter into horticultural production. This is a potential area to be addressed by future research.

The need to investigate the extent of veld foods collection arose from an environmental concern rather than a nutrition one. In the absence of adequate baseline data, the only two observations we can make at present are that (a) there were more households collecting veld products in Ngamiland East than in the West, (b) veld products still feature very low as sources of livelihood in Ngamiland.

Appears

2.2.3.4 Agricultural Labour

One of the likely effects of CBPP eradication was increased unemployment, especially among herd-boys, and in areas of heavy cattle concentrations before CBPP. Equally likely to be affected were villages or settlements that had strong direct linkages to the cattle economy. In an attempt to measure the actual outcome of CBPP eradication on agricultural labour, households were asked to provide the actual number of labourers they employed before and after the eradication exercise (Table 13A).

Although the analytical method used in the survey was a crude way of measuring employment, the results give important insights into the actual effects of the CBPP on agricultural labour (Table 13B)

Table 13A Number of Households Employing Agricultural Labourers by District

District	Before CBPP eradication				After CBPP eradication			
	No. and type of labourers				No. and type of labourers			
	Permanent		Temporary		Permanent		Temporary	
	Male	Female	Male	Female	Male	Female	Male	Female
Ngamiland West	427	44	161	82	333	579	179	240
Ngamiland east	898	389	909	350	551	226	889	283
Total	1325	433	1070	432	884	805	1068	523

CBPP Survey '97
 1755 1502 1689 ↓ 1591 ↑

Table 13B Net change in agricultural labour employment after CBPP

District	Net change in number of labourers				Overall change
	No. and type of labourers				
	Permanent		Temporary		
	Male	Female	Male	Female	
Ngamiland West	-94	535	18	158	617
Ngamiland East	-347	-163	-20	-67	-597
Total	-441	372	-2	91	20

** What of is self-employment?*
** Just Ag labour - what of other related sectors?*

⇒ definition of employment or simply not much ag. labour used?

** Sampling to be sorted out before this can be used.*

The results in Table 13B suggest that although the overall impact of CBPP on agricultural labour employment has been minimal, it has had three distinct features according to type of labour, sex of labour and district.

Permanent labour seems to have been more affected than temporary labour. There was a net reduction of 441 permanent male labourers in both districts combined. However, at the same time there was a net increase of 372 permanent female labourers, due to the 535 increase in Ngamiland West. Between the two districts, Ngamiland East experienced a larger decline in the number of permanent labour.

✗
Man
Temp
Perm

As for temporary labour, males show a net loss while female a positive increase of 91. Here again Ngamiland East shows a negative position in employment numbers.

related to gender roles
— forced into labour market?

These differential impacts could be partly explained by the fact that after CBPP eradication on commercial ranches of the Haina Veld, which are located in East Ngamiland, the farms had to retrench labour, which was probably predominantly male permanent workers. In the Ngamiland West cattle were mainly kept at cattle posts, where labour employment may not have been as high as on the commercial ranches. As for the net increase in female labour, it is probably due to the intensification of arable production that followed the removal of cattle. This is so because traditionally, women are the main providers of labour in crop production.

2.3 Cash Compensation and Restocking

This section highlights issues concerning cash compensation, including the choice of compensation method and use of the cash, restocking, farmers' views about restocking cattle, and herd rebuilding plans. It should be noted that since official records provide more complete information regarding the number of farmers who were compensated either with cash, cattle, or both, the aim here is to provide an analysis of the related issues among the sample households.

2.3.1 Choice of Cash Compensation method

By the time the survey was conducted most of the farmers had already received their cash compensation, so the results represent a fairly good picture of the compensation situation in Ngamiland as presented in both Table 14 and Fig 3.

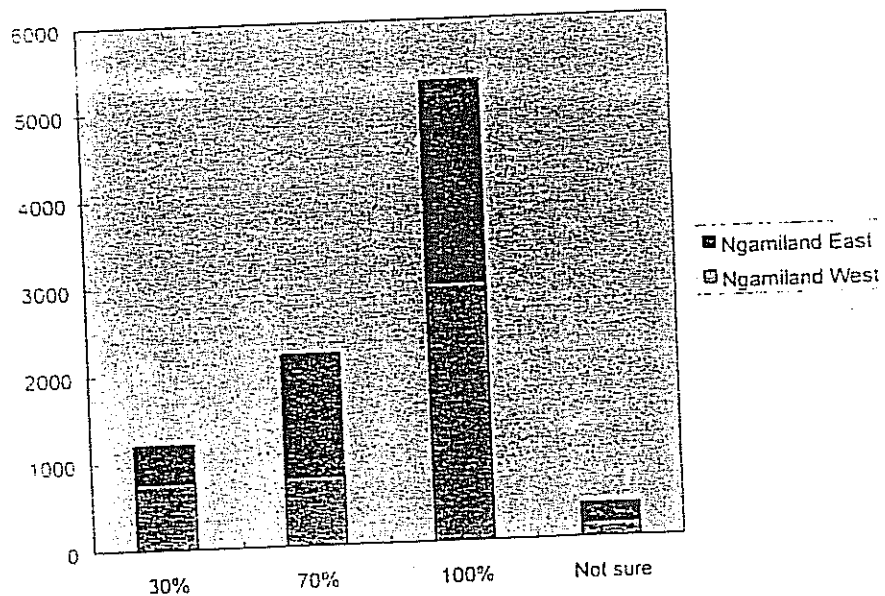
✗✗

From Table 14 it can be seen that one year on after CBPP eradication, the majority of farmers were able to understand the cash compensation system that was used. Overall, nearly 19% of the farmers reported that they did not understand the system, with 17 and 19% in Ngamiland West and East, respectively.

Table 14 Number of Households by their Understanding of Compensation Methods and Type of Method Chosen

District	Did understand		Type of cash compensation			
	Yes	No	30%	70%	100%	Not sure
Ngamiland West	3961	824	759	788	2957	165
Ngamiland East	3531	882	440	1410	2338	215
Total	7492	1706	1199	2198	5295	380
		9198	13%	24%	58%	3%

Fig 4 Type of Cash Compensation Received by Households



* Further, the survey did actually confirm what is already known, i.e. that an overwhelming majority of the farmers did get 100% cash compensation. In Ngamiland West there was little difference between farmers who got 30 and 70%, respectively. However there was few farmers who were not sure about the type of cash compensation they received.

2.3.2 Use of Cash Compensation

Farmers were asked how they had *actually* used their cash compensation, unlike in the previous survey during which farmers were asked how they had used their money as well as about their spending *intentions*. Table 15 gives a breakdown of how the surveyed households had used their cash compensation.

Table 15 Number of Households by Use of Cash Compensation

Uses	Ngamiland West	Ngamiland East
52% Routine h/hold expenditure	4422	3576
23% Major h/hold expenditure	1429	2058
18% Deposited in bank	1116	1714
2% Invested in business	206	160
4% Bought cattle	106	575
0.2% Paid as FAP deposit	38	0
	<u>7317</u>	<u>8083</u>

CBPP Survey '97

57%
 25%
 20.2
 4.4%
 13992
 15400

With the exception of FAP deposits in Ngamiland West, the pattern of the use of cash compensation is similar in the two districts, with routine household expenditure featuring the highest, and then tapering off as cash is channelled into investment. In Ngamiland East however many more households used the cash to buy cattle than in the West.

2.3.2.1 Cattle Purchases

As discussed in 2.2.2, it was found that households in Ngamiland East were able to increase their number of cattle they had kept outside Ngamiland before CBPP eradication. Table 16 further confirms that these households had indeed bought more cattle than their counterparts in the West.

Table 16 Number of households by number of cattle bought

District/ Number bought	Number of households buying				
	Heifers	Cows	Bulls	Total adult cattle	Calves
Ngamiland West					
1-5	13	58	0	71	34
6-10	0	14	0	14	0
11-20	0	0	0	0	0
21-50	0	13	0	13	0
51-100	0	0	0	0	0
Subtotal	13	85	0	98	34
Ngamiland East					
1-5	194	219	228	641	19
6-10	136	24	6	166	17
11-20	8	10	0	18	0
21-50	6	27	0	33	0
51-100	0	6	0	6	0
101-150	6	0	0	6	0
Subtotal	350	286	234	870	36
	363	371	234	968	70

CBPP Survey '97

No. of
cattle owned
by h's?
(my tsebe
data?)
* Compare:
→ Ag. survey
for avg. herd
size

Since there is no evidence from the data, as seen in 2.2.2, that farmers in Ngamiland West bought and kept cattle outside Ngamiland, where then did the ones who bought cattle keep their cattle before restocking? It is highly probable that these households bought these cattle from fellow farmers after restocking. The some argument may hold for some farmers in Ngamiland East as well.

2.3.2.2 Business Investment and FAP Deposit

The type of business investment included those listed in Table 17. Investment into fishing was restricted to Ngamiland West. The "Other" category comprises of projects such as brick moulding, sewing, juice-making, saddle-making, etc, all of which were funded through FAP.

The majority of farmers restocked with herds ranging from 1-5, Table 18, meaning that the modal herd size is in the range of 1-5 cattle. However this may undergo modifications depending on whether cattle purchases or sales continue in the region.

Table 18 Number of Households by Number of Cattle Received and District

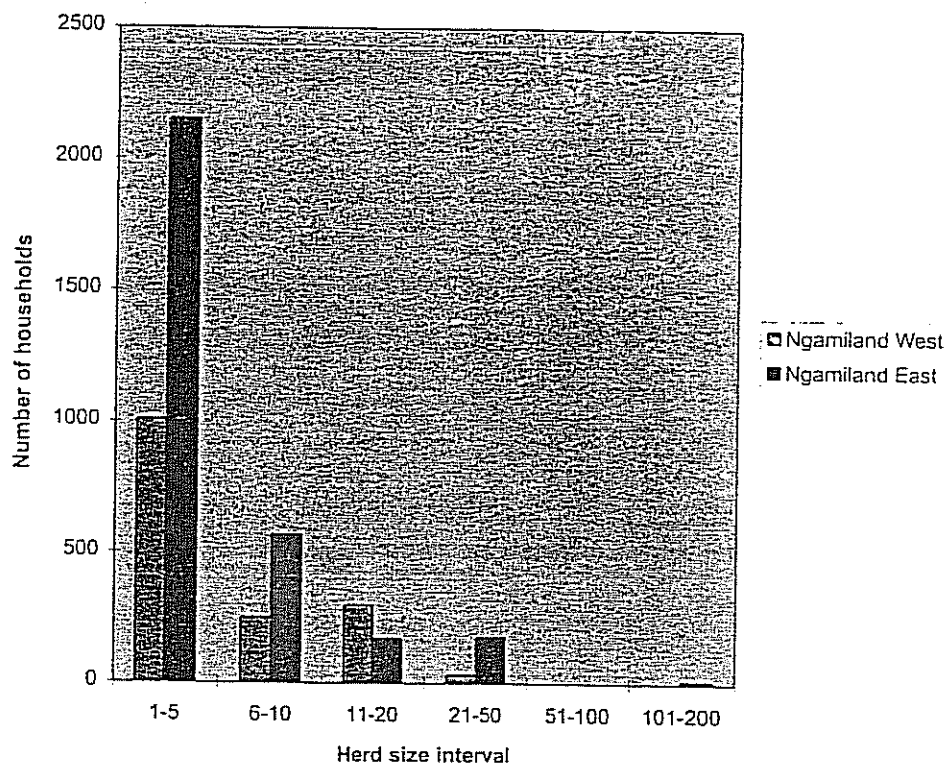
District/ Number received	Number of households receiving			
	Heifers	Cows	Bulls	Total
Ngamiland West				
1-5	244	181	583	1008
6-10	228	22	0	250
11-20	141	159	0	300
21-50	33	0	0	33
51-100	0	0	0	0
Subtotal	646	362	583	1591
Ngamiland East				
1-5	740	497	914	2151
6-10	467	91	11	569
11-20	105	66	0	171
21-50	158	19		177
51-100	0	0	0	0
101-200	11	0	0	11
Subtotal	1481	673	925	3079
Ngamiland	2127	1035	1508	4670

CBPP Survey '97

}
rec'd 70'000
?
avg. of
=> +15 an
per hh

* Bear in mind
most farmers
did not receive
joint stockers!

Fig 5 Herd Size Structure of Restocked Households



2.3.3.2 Farmers' Views about Restocking

All farmers who had already received cattle were asked about their opinions on the restocking cattle.

Table 19 Number of Households by their Opinions of Restocking Cattle

Opinions and reasons	Ngamiland West		Ngamiland East		Ngamiland	
	No.	%	No.	%	No.	%
Satisfied	625	68	1431	79	2057	75
Not satisfied	294	32	389	21	683	25
Total	919	100	1820	100	2740	100
Reasons for dissatisfaction						
Expensive to maintain	11		28		39	
Poor adaptation	69		38		107	
Breed perceived as poor	76		57		133	
Not preferred breed	107		134		241	
Other	—		43		43	

CBPP Survey 97

Generally farmers were satisfied with the cattle they had received as Table 19 suggests. However, some farmers, who said that they were not satisfied, mainly pointed to the fact that they did not get the breed of their preference. On the other hand, asking this question might have been too early as farmers may not have had the chance to evaluate their cattle.

2.3.3.3 Plans for Herd Rebuilding

Trade in restocking cattle was already taking place during the restocking exercise. During the survey farmers were asked whether they intended to rebuild their herd; and if they did, about the strategies they would follow towards this end. The results are tabulated in Table 20. Nearly 88% of the farmers reported that they intended to rebuild their herd as opposed to 12% who said they had no intentions of doing so. The major strategy would basically be through delaying sales, improved management and increasing purchases. In contrast, there was no overriding reason why some farmers did not want to rebuild their herd.

Table 20 Number of Households by Herd Building Plans

Intentions and reasons	Ngamiland West	Ngamiland East	Ngamiland
Intend to rebuild herd	1282	2265	3547
Do not intend to rebuild	189	344	533
Rebuilding strategy			
No cattle sales	411	1088	1499
Improved management	500	538	1038
More cattle purchases	297	796	1093
Other	148	168	316
Reasons for not rebuilding			
Invest in other enterprise	38	29	67
Fear of theft/predators	16	8	24
Scarcity of herd-boys	—	52	52
Shortage of water	—	82	82
Other	71	213	284

CBPP Survey 97

2.4 Future Coping Strategies

2.4.1 Effects of Loss of Cattle

Loss of cattle will affect farmers in many ways. However Table 21 lists the main ones, according to the farmers whose cattle were destroyed and have to cope with reduced herd sizes or no cattle at all.

Table 21 Effects of Loss of Cattle on Households

Rank	Ngamiland West		Ngamiland East	
	Effects	Number	Effects	Number
1	Lack of meat/milk	3070	Lack of meat/milk	3277
2	Lack of draught power	2924	Loss of income	2277
3	Loss of income	1617	Lack of draught power	517
4	Other effects	485	Increased h/hold expenditure	275
5	Will not be affected	218	Other effects	245
6	Increased h/hold expenditure	189	Will not be affected	182

CBPP Survey 97

8503

+

6773

Overall, the effects are similar in both districts, although loss of draught power features 15 very high in Ngamiland West, unlike in the East.

Asked about what their alternative sources would be as a result of loss of cattle income, the majority of farmers mentioned arable farming, with food rations the immediate second, as Table 22 shows. There was no difference in the ranking of the alternatives between the two districts, although in Ngamiland East salary/wage featured higher than in Ngamiland West.

Table 22 Number of Households by Alternative Sources of Income

Rank	Sources of Income	Ngamiland West	Sources of Income	Ngamiland East
1	Arable farming	3099	Arable farming	1848
2	Food rations	1099	Food rations	1164
3	Salary/wages	768	Salary/wages	1131
4	Other	373	Other	647
5	Business	280	Business	538
6	Smallstock	134	Smallstock	381
7	Cattle	59	Cattle	140
		5472		5499 = 10971

Handwritten notes: 9% (next to 3099), 45% (next to 1848), 21% (next to 1164), 17.3% (next to 1131), <1 (next to 538), <1 (next to 381).
 CBPP Survey '97

2.4.2 Utilisation of Government Programmes

Government programmes that are aimed at improving level of employment and incomes such as FAP, ALDEP, SLOCA, Labour Intensive Public Works Programme and Livestock Water Development Programmes (LWDP) may offer possibilities of mitigating the effects of CBPP. The survey therefore investigated the extent to which the population in Ngamiland actually utilises these programmes. If they used the programmes were the programmes effective, and did they have any relevance to their current plight?

2.4.1.1 Labour Intensive Public Works Programme and Food Rations

As the previous sections suggest, participation in food ration programme was quite high. At nearly 55% across Ngamiland, it was higher than participation in the Labour Intensive Public Works Programme, which stood at 23%.

24

Table 23 Number of Households by Participation in Relief Programmes Activities

Activity	Ngamiland West		Ngamiland East		Ngamiland	
	Yes	No	Yes	No	Yes	No
Food rations	5118	2597	3449	4445	8567	7042
%	66.3	33.7	43.7	56.3	54.9	45.1
Public works	2300	5415	1425	6448	3725	11863
%	29.8	70.2	18.1	81.9	23.9	76.1

CBPP Survey '97

Between districts, more households participated in food rations in Ngamiland West relative to Ngamiland East. A similar pattern in participation emerges for the public works programme. What is not clear at this point, however, is whether the low participation in the public works programme was voluntary, or as a result of inadequate coverage of projects across the region. ?

2.4.1.2 Beneficiaries' Evaluation of Labour Intensive Public Works Programme and Food Rations

All participant households were asked about the adequacy of these programmes in meeting their needs. As Table 24 shows, there were some inter-district differences in the way the programmes were viewed. In Ngamiland West the main concern about food rations was the inadequacy of the food quantity, while in the Ngamiland East it was the quality. However, more households complained about the quantity than did those for quality. Irregularity of supply was the second concern in both districts. Lastly, relatively more people in Ngamiland East were concerned about the nutritional balance of the package than in Ngamiland West.

Concerning the Labour Intensive Public Works programme, the majority of beneficiaries complained about low wages they were paid. This complaint was voiced in both districts. In Ngamiland East, residents also complained about delayed payments, which, in sharp contrast, was not a major concern in the West.

Respondent households were asked whether the programmes should continue. Almost 95% of all recipient, or beneficiary households said that the programmes ought to continue mainly because although the cattle were back, they were not yet in productive phase. Moreover, many people had no alternative source of income.

Table 24 Number of Participant Households by their Evaluation of Relief Programmes

Rank	Opinion	Ngamiland West	Opinion	Ngamiland East
	Food ration			
1	Inadequate supply	1364	Poor quality	826
2	Irregular supply	885	Irregular supply	549
3	Poor quality	530	Inadequate supply	506
4	Other	176	Other	274
5	Unbalanced package	81	Unbalanced package	263
	Public works			
1	Low wages	1398	Low wages	727
2	Other	75	Delayed payment	178
3	Delayed payment	16	Other	55

CBPP Survey '97

2.4.1.3 Other Income and Employment Generating Programmes

Included under this category of programmes are FAP, ALDEP, SLOCA, and Water Development Programmes. Apart from ALDEP, very few households had used these programmes. However, more farmers said that these programmes will become more relevant now than ever before as a result of loss of cattle income.

CHAPTER 3

3 Conclusions and Recommendations

The eradication of cattle in Ngamiland has caused major social and economic hardships. Some of the economic dislocations are irreversible and vary across the region. Even if Ngamiland has been restocked, many household will have small herds, which will take a long time to reach sustainable levels. Besides, there are households that opted for 100% cash compensation. The majority of these households used the cash for routine household expenditure to meet their immediate needs. Although there are some indications that some of them may restock, the evidence is still scanty. These people will continue to experience the effects of CBPP for many years to come.

1. In the short term the Government has managed to implement several programmes that have had mitigating effects on the population of Ngamiland. Many people are now heavily dependent on Government relief programmes. Efforts must be made to create conditions for sustainable sources of livelihood in the area. A report prepared by Karkari and Mphathi in mid 1996 outlines projects that could be undertaken across Ngamiland in order to cushion the residents from the effects of CBPP, particularly in the medium and long term. Some of these projects have not been implemented, yet they offer the much needed option to diversify the Ngamiland economy away from cattle. Until conditions are put in place for sustainable sources of livelihood, the current programmes ought to continue but with increased targeting and efficiency.
2. Before the outbreak of CBPP, the rate of malnutrition among under-fives was on the decline in Ngamiland. Available information indicates that this trend was drastically reversed after CBPP, particularly in Ngamiland East where the rate of malnutrition jumped from 5% to above 12%. In Ngamiland West the rise was not so drastic, but it is still continuing, unlike in the East where it has started to decline. The sudden rise in malnutrition rates casts doubt over the adequacy, consistency and quality of the food ration that was introduced as a relief measure. Residents have also complained, as shown earlier, about the irregularity of food supplies. It is recommended that in future operations of this nature and magnitude, a lot of attention be paid to the

adequacy and quality of the food ration. Further, factors that may militate against smooth delivery of food, for example, transport, location of food distribution points, and effective supervision of ration clerks, must also be tackled.

3. Half of the under-fives in Ngamiland West and 32% in the East did not have more than two meals a day. This situation is cause for concern, particularly given the food ration that government is extending to households in an attempt to meet their nutritional needs. There are two possible explanations for this trend. First, the size of the ration may be insufficient, which lends weight to residents' complaint of inadequate supply (see Table 19). Second, it is possible that parents, particularly mothers, may be spending less time caring for their young as they are engaged in income generating activities, chief among which is the Labour Intensive Public Works programme. The latter explanation, if substantiated, could symbolise a classic clash between government programmes meant to achieve a common end. Another factor that may be contributing to child neglect is the high incidence of alcoholism that has been observed by other researchers in the district. This is one area that future research should focus on in order to guide appropriate remedial action.
4. Stunting is the most serious nutritional problem in Ngamiland, while wasting is very low. This is an important finding because stunting is "...closely associated with poor overall economic conditions, especially mild to moderate, chronic or repeated infections, as well as inadequate nutrient intake" (WHO, 1986). Further, it represents the accumulated consequences of retarded growth, thus it takes longer to be established and also to reverse. Wasting, on the other hand, indicates a deficit in tissue and fat mass and can occur or be reversed within a short space of time. Against this background, it follows that food rations have been successful in controlling the incidence of wasting. The same cannot, however, be said about stunting. This implies that food rations will have to be continued before significant gains can be realised with regard to stunting. Alongside food rations, there also ought to be close nutritional surveillance to monitor progress and provide a basis upon which future evaluation will be made. The current system of nutrition data collection needs to be revised to include other critical measures such as height.

As it currently stands, only weight-for-age can be calculated from the available nutrition information, thus nothing can be said about stunting and wasting.

5. Draught power relief through provision of donkeys went a long way towards meeting the demand resulting from cattle destruction. However, few farmers benefited from this exercise because many of them were not trained to use donkeys. In addition, there was serious shortage of equipment that is required for using donkeys to plough. It is therefore recommended that farmers not only be trained on how to use donkeys for draught power purposes, but also to secure reliable suppliers for equipment that form part of critical packages such as ALDEP. In fact, the failure of external suppliers to meet the demand for such equipment provides a great opportunity for local production of such equipment as the market clearly exists.
6. Arable farming has now overtaken cattle as the major source of livelihood in Ngamiland. However, many arable farmers still cannot produce enough food to meet their household needs. For farmers to derive significant incomes levels from arable activities the Government should ensure complementarity in delivery of extension services for similar programmes. Further, the farming community in Ngamiland, and indeed in the rest of the country, needs to be encouraged to produce cash crops in order to generate income. Horticulture is a potential area that can be pursued in this regard.
7. Overall, given the huge financial and material cost of eradicating CBPP, it is imperative for the Government of Botswana to put in place tighter disease control measures. Farmer awareness on the importance of vaccinating livestock must be enhanced, for it is only with their co-operation and participation that diseases like CBPP can be contained.
8. It is further recommended that in addition to the annual Livestock Census carried out by the Department of Animal Health and Production, an in-depth national study be undertaken to establish the responsiveness of farmers towards Government disease control programmes as well as to identify factors that limit farmer participation.

9. In addition to the above recommendations, this study identifies other areas that need to be addressed by future research.

- a) The outbreak of CBPP triggered numerous changes in the pattern of life in Ngamiland. For example, many people migrated from cattleposts to either lands or villages as a result of CBPP. Included among this group are herd-boys, who were also dependent on cattle in the form of employment, for a living. It is in the interest of policy formulation to find out how these people have adapted to a new way of life without cattle. Of particular interest is what efforts, besides government relief programmes, this group has made to overcome the hardships posed by CBPP eradication.
- b) It has also been hypothesised, in different fora, that cattle may soon regain their position as the number one source of livelihood in Ngamiland. Using the restocking figures as a baseline, it is recommended that a system be put in place to monitor the re-distribution of cattle among Ngamiland residents, as it is possible that some farmers delayed restocking so as to buy cattle from others within the district. Pertinent questions include:
 - i) Is there any re-distribution at all? If any, in what form?
 - ii) Are there any Ngamiland farmers keeping cattle outside the district? If so, what proportion, and do they intend moving their cattle to Ngamiland in the future?

This information will be useful not only for socio-economic purposes but for rangeland monitoring as well.

- c) One of the most important questions that still remain unanswered is: When should government assistance to Ngamiland be terminated? As long as there are no objectively verifiable indicators upon which such a decision can be based, the answer to this question will remain elusive. Clearly, an increase in the cattle population alone cannot provide a basis for this

decision since, as shown in this report, ownership of cattle is now more skewed than ever before.

It is therefore recommended that the government set clear and measurable targets as soon as possible to guide this inevitable decision. Failure to do so may lead to a premature withdrawal, which could result in increased poverty levels, malnutrition and other social ills that would be very expensive to reverse. On the other hand, it is also possible that CBPP relief programmes might outlive their necessity, in which case resources that could have been re-deployed elsewhere in the country will be under-utilised.

- d) A great deal of socio-economic and other forms of data have been collected over the past years since the outbreak of CBPP. Anthropometric data were also collected in this survey. Although monitoring the evolving socio-economic situation is imperative, there is a need to make the whole process more flexible and cost effective. Priority should be given to in-depth analysis of the data that has already been collected.

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