

# EAST CAPRIVI SOCIO-ECONOMIC STUDY

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This study was carried out by the Epidemiology/Extension Section in Windhoek in collaboration with the State Veterinarian, Katima Mulilo and his staff. Our thanks are due to Dr Ron Mkandawire and Mr Alfred Chilinda for their help.

## INTRODUCTION

### Aims

The purpose of this study was to gain information on the situation in the Caprivi with respect to animal health in order to make recommendations for further action or research. Aspects enjoying particular attention are farming systems and the presence and impact of livestock diseases. The recommendations flowing from this refer to factors needing further research, and to specific actions which can be taken now by the Directorate of Veterinary Services.

### Geography

The East Caprivi is situated in the far north-east of Namibia, is bounded by four perennial rivers (Zambezi, Kwando, Chobe and Linyanti), and is largely flat with few natural undulations. There are flood plains adjacent to the four rivers, and belts of Mopaneveld and Sandveld. The total surface area is 11 533 km<sup>2</sup>.

The administrative capital is Katima Mulilo, on the banks of the Zambezi river. There is a reasonable network of gravel roads, and telephone communication between Windhoek and Katima Mulilo by automatic exchange.

### Vegetation and soils

Soils tend to be alluvial and loamy in the flood plain areas, and sandy in the other areas. Grasslands dominate the flood plains, with other forms of shrubs and trees being predominant in the Sandveld and Mopaneveld areas (*Colophospermum mopane*, *Terminalia* spp, *Burkea* spp, *Combretum* spp and *Acacia* spp.)

### Climate and rainfall

The average rainfall ranges from 500 to 700 mm, with the north-east being the wettest part of the region. There are often large gaps between storms which constitute a risk for crop-farming. The main months of the rainy season are January to March.

### Human population

According to the 1992 census, there are about 71 000 people living in the Caprivi. There is a division along tribal lines in the Caprivi, with the Masubia tribe (small, reasonably homogeneous) settled east of Katima Mulilo, and a larger more diverse tribe, the Mafwe, in the west. A number of Bushmen may also be found in this area, and are considered part of the Mafwe. Lozi is the language in general usage, and English is fairly widely understood.

There is a co-existence of Christian and traditional beliefs with polygamy being fairly common. There appears to be some class differentiation along lines of wealth (livestock being the main indicator) and education.

Inheritance is highly complex, organised along both matrilineal and patrilineal lines, with a specially convened family gathering deciding on the division of a deceased estate. The inheritance that is conferred includes not only the

deceased's possessions, but also his status, name, and family responsibilities.

## STUDY METHODOLOGY

The study rested upon two pillars: a formal survey and a rapid appraisal. These will be dealt with in turn.

The formal survey was a random sampling exercise stratified according to Stock Inspection Assistants (SIA) wards. The Veterinary Services register of stock owners (based on the stock card system) was used as the sampling frame, and from the list of stock owners for each ward, six owners were chosen at random and interviewed by Stock Inspection Assistants. The questionnaire used was the standard Veterinary Services socio-economic questionnaire.

Neither the CSF nor PPS methodologies were used: it could thus be argued that sticking to the six-owners-per-ward concept might lead to over-representation of some wards in the sample, with under-representation of others. While this shortcoming is admitted, it is also fair to say that total numbers in each ward were probably large enough to offset this kind of error, and that a total sample size of nearly sixty for the whole Caprivi is, in terms of socio-economic work, representative enough.

54 livestock owners were interviewed in the survey, spread most of the Caprivi. Unfortunately, one Stock Inspection Assistant was on sick leave, and his area was not included.

As far as the rapid appraisal is concerned, the following techniques were used:

- (a) Background knowledge was gleaned from other reports, maps and documents concerning the Caprivi, including Veterinary Services disease reports and stock census figures. (The fact that stock census figures coincide so well with extrapolations of livestock figures made from the survey suggests that the survey was fairly representative, after all!)
- (a) Interviews with key informants, including local government officials and farmers. During these interviews, information gained from other sources, including the formal survey, could be confirmed and cross-checked.

## FARMING AND THE IMPORTANCE OF LIVESTOCK

### Crop farming

The main crops are maize, millet, sorghum (in the west), melons, groundnuts (being introduced west of Katima Mulilo) and vegetables (around Katima Mulilo). Ox-ploughing is generally used for soil preparation (a few use tractors - around ten are privately owned, according to informants), but no manure is ploughed into the soil, except sometimes for vegetable cultivation. Informants were of the opinion that the labour costs in transporting and spreading manure would be too high.

Crop residues are grazed by livestock for a few days to a few weeks after harvest (December-January in the flood plains, April to May in the other areas). They may also however, be ploughed in or burned - a loss to cattle.

Ploughing times vary by area: July-August in the flood plain areas, and November to January in the other areas. Harvest follows four to five months later. Weeding is done manually, mainly by women.

For cereal crops, there is only one planting season per year. Cultivated area is estimated at about 3 ha per household (figure unreliable, varies greatly).

## Livestock Farming

The main livestock types are cattle, goats and chickens. There are currently estimated to be nearly 95 000 cattle in the Caprivi, with over 4 000 goats and nearly 17 000 poultry.

Livestock are kept for various reasons:

**Social & cultural:** a sign of status - cattle are most important, followed by goats. There is still a strong tendency to cattle ownership, with 49/54 interviewees indicating a desire to expand their herds.

Ceremonial slaughter at weddings, funerals, etc (cattle).

Traditional healers use chickens and goats in various rituals.

**Output functions:** cattle are sometimes sold on informal markets (where hides and other parts of the integument are wasted) or to the MeatCo abattoir at Katima Mulilo for cash.

Milk is a main output of cattle, being about 4-5 l per day in the wet season, but dropping to 1 l or less daily in the dry season, when milk often has to be purchased. Milking is done in the mornings, usually by herdboys.

Goats are also sometimes slaughtered for food.

Chickens and ducks are virtually a staple food.

**Input functions:** manure accumulates in corrals, and is rarely used as a fertiliser. Fresh manure is used in building, however.

Oxen are widely used for ploughing and draft purposes (pulling sledges rather than carts). Four oxen comprise a team.

Livestock linkages to crop farming are not substantial, with ox-ploughing being the main input function, and some grazing of residues occurring (this removes crop stubble and puts a little manure into the ground).

Caprivi is characterised by a dearth of horses, a possible source of draft power. It seems that they were wiped out by an unknown disease (probably *Trypanosoma brucei*) in the 1970's, and for many years there were no horses in the area. There is now one.

## Herd sizes and structures

Although the average herd size is around 81 per family in the sample surveyed, nearly half (20) of the households surveyed recorded herd sizes less than fifty, and 11 had less than ten cattle.

As far as herd composition goes, on average, cows make up 49% of a herd, bulls 3%, calves < 1 year are 14%, calves 1-2 yr 12% and oxen 22%. It thus seems that many households would have a reasonable marketable surplus.

The average goat flock size was estimated at 17.3 per household for the 15 goat-owning households in the sample.

## Management practices

Children (often herdboys from Zambia) do most of the herding, and grazing is generally away from villages so that crops are not damaged. Crops are also usually fenced to prevent livestock feeding on them, and residue grazing is practised for a short while after harvest. The herdboys are also generally responsible for milking. Farmers complain of herdboy unreliability, but this is probably due to poor remuneration. There is a high turnover of herdboys, with resultant consequences: herdboys rarely build up a good knowledge of local conditions.

Transhumance is common on the fringes of flood plains, with 37% of those surveyed using this practice.

Farmers owning plough-oxen will often lend their oxen to neighbours who own none.

Selection of bulls (according to informants) is based on a number of factors, including size of rump, body length, height, birth weight, colour, tail length and horn size. When bulls are castrated, it is done (usually with a burdizzo) at around two years of age. Owners of burdizzos will hire them out for a nominal fee.

Only 17 of the owners in the sample used lick, this seems to be mainly salt blocks, with little emphasis on true mineral supplementation.

Chicken management is normally left in the hands of women or herdboys. They are sometimes fed husks, left-over food, but mainly forage for themselves. They are confined at night in raised chicken houses, but roam freely during the day.

## Livestock Marketing

Disposal of cattle is along a number of lines: own slaughter (usually ceremonial), the informal ("bush") market, and the formal market (via MeatCo). The marketing offtake via MeatCo was about 2.3%. The informal market (more lucrative, since the owner gains the full retail price) took 2.1% of the herds, while own slaughter claimed 1.5%. The total annual offtake (from the sample) is thus estimated at 5.9%. Most of the animals slaughtered are younger steers and heifers.

According to informants most marketing takes place early in the year, to pay school fees for children. The possibility that there may be a second peak period later in the year during times of drought (to gain income for provision purchase) still needs investigating. A Stock Marketing Committee (consisting of representatives from the Likwama Farmers' Association, MeatCo and Veterinary Services) organises formal marketing. Cattle are bought up at auctions arranged by this committee for abattoir slaughter.

Market pricing is poorly understood: owners cannot see why younger, smaller oxen fetch better prices than older animals, nor why there is such an emphasis on slaughter age, especially when the meat in butcheries has no age tag on it! Seasonal price variations (due to times of over- and under-supply) are also not appreciated.

## OTHER MEANS OF LIVELIHOOD

The main means of making a living - for most families - centres on livestock and crop farming. The main consumed outputs are cereal grains, poultry and milk.

Of the 54 household heads sampled, 31 indicated that other means of living outside of farming. Informants provided more insight into these:

Fishing - done mainly by men, who dry the fish in the sun, and have women sell it (alternatively, some women buy fish and resell it at village markets).

Salaried occupations - normal centre around the civil service - police, teachers, officials, also clergy, small businesses and banks.

Vegetable farming - mainly around Katima Mulilo.

Natural Products - some common resources are gathered and sold, or processed and sold, eg. grass, reeds, firewood, wild fruit, wood carvings.

Shops - many rural shops have had to close down since the end of the South African occupation.

Ploughing - there are about ten tractor-owners who hire them out for ploughing at about N\$70-120/ha (in competition with government tractors at N\$12/ha).

Clothing - this is bought in Zambia and resold in Katima Mulilo.

The gathering and selling of forest resources (natural products) is important, as this is often a buffer against poverty for the poorest households in many rural areas, and also often a means of subsistence for women.

## THE HOUSEHOLD

As stated earlier, the average household size in the sample was 9.7. The average age of household heads interviewed was 58.3 years, and most of them (43) were males. Most households are cultivation-oriented.

There is some form of inter-household co-operation with regard to ploughing - ploughs are often lent by those who own them, while oxen may be lent out by those who have trained ox-teams.

Poorer families may tend cattle for richer families and receive some calves in payment: this so-called Mafisa system is a form of patronage given at the discretion of the wealthier stock owners, and serves as a "social safety net" for the poor.

Households are strongly male-centred with all input and output decisions made by the husband. All income is appropriated by him, and women given allowances determined by the male head. Household management is by the woman, who is responsible for domestic chores, child-raising, forest gathering, poultry management, etc. They work a typical double day, and some male informants conceded that the workload of women is unfairly high.

## LIVESTOCK DISEASES

Information regarding livestock diseases in the Caprivi is gathered by one of two means:

- (a) data collection by stock inspection assistants (diagnoses based on their own observation or on farmers' histories).
- (b) state veterinarian's disease reports.

The first system may lack somewhat in diagnostic accuracy, but it gives wide coverage, as SIA's visit all cattle kraals on a programmed basis. While the state vet's reports will be diagnostically accurate, they are incident-based, meaning that the state vet is not likely to gain a good reporting coverage.

The diseases occurring in the Caprivi are well-known to veterinary staff and farmers and alike, and thus it is considered "safe" to use SIA data, with its broader coverage, to get a better quantitative idea of the disease situation in the area.

For the sake of this study, the diseases of importance to cattle in the Caprivi have been classified into three broad categories (see graphs in appendix):

- (1) Diseases with an estimated average annual incidence of 1000 to 9000 cases/100 000/year.
- (2) Diseases with an estimated incidence of 500 to 1000 cases /100000/year.
- (3) Diseases with an estimated incidence of 10 to 500 cases /100000/year.

Mathematical formulae have been used to convert what was essentially disease prevalence data gathered by SIA's into incidence data, which was then calculated as a figure per 100 000 per annum (see tables in appendix).

Comments will only be made on the more important diseases.

### *Lumpy Skin Disease*

This disease assumed epidemic proportions in the Caprivi in 1990, although it had always been present. The spread during 1990 was not only particularly rapid, but many mortalities were reported. At that stage, the government helped with vaccine distribution and application; the incidence has dropped somewhat, but appears not to have dropped back to pre-1990 levels. 30 of the owners sampled thought the disease to be of major importance.

## DISCUSSION AND RECOMMENDATIONS

It is obvious from the foregoing that further studies are needed in some areas. There are also areas where production could conceivably be improved with a resultant improvement in household food security, and improvements in cash flow. The farming systems are typically "minimum input" systems, where improvements could possibly be built in, provided they did not impinge on domestic time (particularly leisure time) or impose unwarranted extra workloads. It must also be realised that the main emphasis in the Caprivi is on cultivated agriculture, and that there are thus conflicting demands being made on farmers' time and resources by crop cultivation and animal husbandry.

### **Suggestions for further study**

#### *Nutritional status of cattle*

An improvement in supplementary feeding during winter months may possibly increase milk yield during those months and reduce dependence on purchased milk. Fertility may also be improved. Manure samples collected on a regular basis from identified herds over the course of a year will indicate the nature and extent of mineral deficiencies, and liver sample analyses will reveal microelement problems. Phosphate and vitamin A deficiencies seem likely problems in the area. This kind of procedure is simple enough to institute and should be done as soon as possible. Once a diagnosis of the problem has been made, meaningful extension could be carried out in the area of lick supplementation.

#### *Goat diseases*

There is obvious data gap here, about which something must be done urgently. It is proposed that three or four goat flocks be identified which could be visited regularly by the veterinarian in Katima Mulilo for the purpose of observation, faecal sampling (internal parasites) and blood sampling (serology). The presence of Bluetongue, Rift Valley Fever, Brucellosis, Heartwater and possibly other more "exotic" diseases in small ruminants needs investigation.

#### *Poultry Diseases*

The lack of attention given to poultry diseases and management is alarming, and sample flocks must be studied in a similar manner to that suggested for goats. Management techniques also need investigating. Poultry production is obviously seen as a low opportunity cost activity, and could be improved with very little extra input.

The aim of new poultry production technology must be carefully focused. Male interviewees were unconcerned about the high mortality rate amongst poultry as they felt that there would not be an additional market for any extra poultry produced. Boosted poultry production need not necessarily be marketed (although this is debatable!) - this could provide a shot in the arm for household food security. It is proposed that any extension message developed from a study of poultry diseases be directed at women, and that women's workload be evaluated before this is done. It would serve no purpose to introduce a technology that would be unacceptable to women because of its time allocation implications.

#### *Brucellosis*

Regular seroprevalence studies need to be undertaken in cattle and small stock. Encouragement of stock owners (via extension messages) to control Brucellosis may well improve calf/lamb %.

#### *Helminthiasis*

Little is known of helminthiasis in the area, although it is probably a problem in the more riverine areas. As sugges-

ted above, faecal sampling (with worm egg flotation being done in Katima Mulilo) could go a long way to elucidating this. The practice of long-term corralling in the same pens may also have a bearing on helminthiasis, and must be investigated.

It is imperative that the state veterinarian and the Epidemiology Section work out appropriate strategies for the studies proposed above as soon as possible.

### Extension messages

Extension messages need to be carefully targeted - "crush-pen extension" is only likely to reach temporary herdboys. Pamphlet campaigns conducted at home compounds and schools are more likely to reach household decision-makers, as are radio programmes.

Matters for immediate attention as far as extension is concerned, include:

- \* Awareness-creation regarding specific diseases, especially with regard to the targeting of scheduled diseases. The state veterinarian should, in conjunction with the extension section, develop an appropriate package as soon as possible.
- \* More information re marketing, age of slaughter, meat grading, etc needs to be disseminated. It is suggested that this be done in co-operation with the Meat Board of Namibia.
- \* Marketing should be encouraged before any major efforts are made to increase production. It is obvious from the formal survey results, that as far as cattle are concerned, many farmers have a fair marketable surplus, and the off-take rate is low.
- \* Large numbers of hides, skins, horns, etc are wasted in the informal markets. Farmers need to be made aware of the economic value of these products, and MeatCo should be approached with a view to securing a market. Another aspect needing attention is that of a possible market for bones (bone-meal production).

### Crop farming

Although strictly outside the scope of this study, a few remarks bear making at this point. Cereal crop output is low, and could be increased with the use of manure - although the opportunity cost of manure usage is perceived to be high. It is possible that the proceeds derived from increased crop yields could outweigh the expenditure on labour needed for manuring - this would need to be proved in an FSR exercise carried out by the Directorate of Research and Training. Livestock could make a much greater contribution to crop output in this manner, and employment may well also be generated in a new area of agriculture.

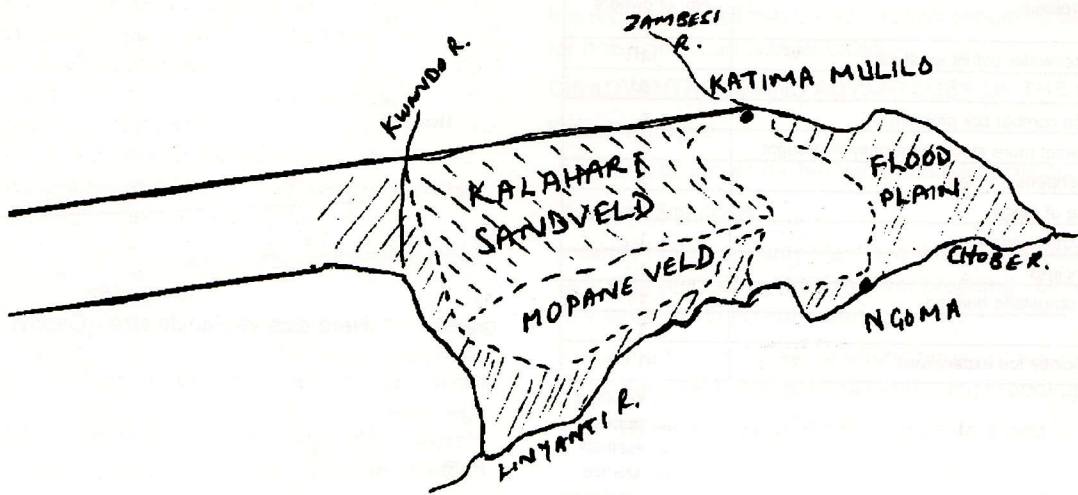
### REFERENCES:

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- Masdar Zambia Ltd/Burmeister Van Niekerk & Partners (1993) - NRDP Interim Report
- Schneider, H (1994) - Animal Health & Veterinary Medicine in Namibia (Agrivet)

### Acknowledgements

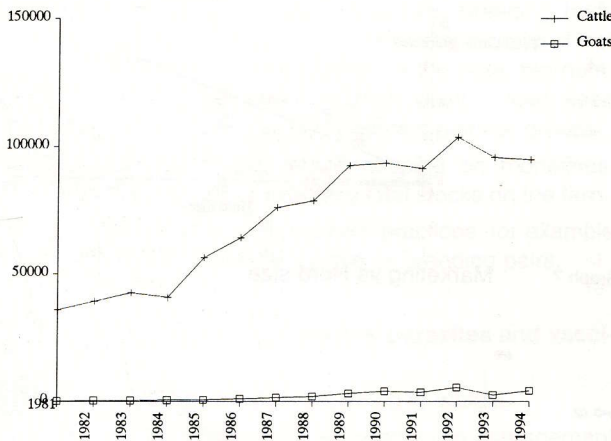
The authors would like to thank staff members of the Directorate of Veterinary Services who so willingly participated and assisted in this study, as well as the Caprivian farmers who allowed themselves to be interviewed. The formal survey was carried out in March/April 1995, and the rapid appraisal in June 1995. The references noted above were a source of background information only; the bulk of the information came from the people of the Caprivi themselves, and it is hoped that the information thus gained will be put to work for their benefit.

# APPENDIX - TABLES, GRAPHS & MAPS

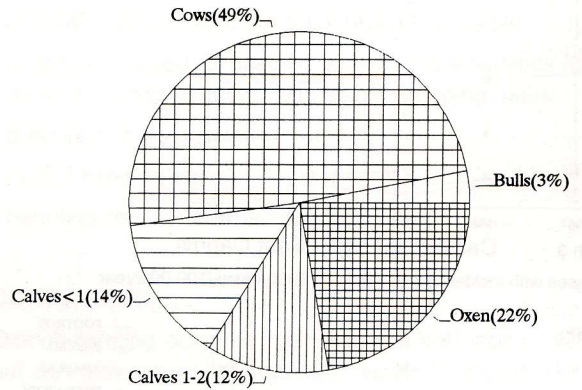


Map 1

East Caprivi - veld types and rivers



Graph 1 Livestock numbers - East Caprivi



Graph 2 Herd structure - East Caprivi  
(Average herd size = 81)

Table 1  
Estimated disease incidence /100 000/year, based on stock inspection assistant disease reporting.

DISEASE	YEAR					
	1987	1988	1989	1990	1991	1993
Keratoconjunctivitis	8458	7046	3752	4505	3255	2685
Dermatophilosis	784	664	94	72.5	93	45
Papillomatosis	826	460	260	440	291	215
Abscess	3036	2846	1644	1485	1428	1055
Abortions	3864	1682	762	660	957	580
Lumpy Skin Disease	416	644	392	4113	2322	1960
Footrot	928	1284	878	482.5	1347	745
Pasteurellosis	634	608	408	202.5	186	785
Anaplasmosis	530	228	354	332.5	681	830
Black Quarter	n/a	n/a	n/a	n/a	n/a	635
Predators	514	402	88	117.5	264	320
Nagana/tsetse	410	68	32	75	393	435
Mastitis	122	42	24	35	42	30
Hygroma	78	38	22	32.5	18.6	20
Actinomycosis	12	5	6	5	1.2	3.5
Sweating Sickness	90	128	40	62.5	20.4	95
Heartwater	80	192	1	2.5	51	11

Table 2  
Table showing owners' opinions as to the importance of diseases affecting their livestock.

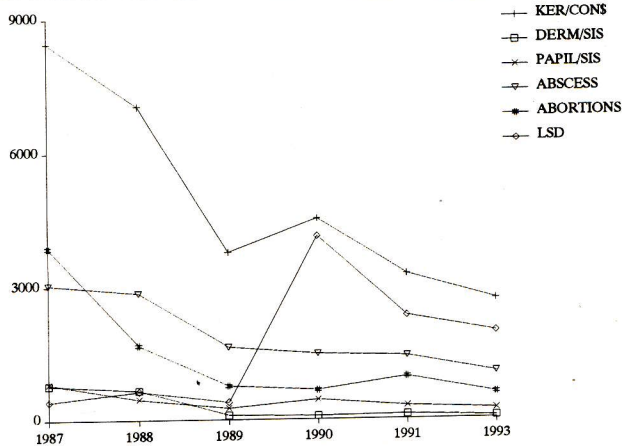
DISEASE	No. of owners seeing the disease as a problem
Lumpy Skin Disease	30
Black Quarter	30
Pasteurellosis	25
Brucellosis/abortions	13
No disease problems	11
Foot-and-Mouth	10
Keratoconjunctivitis	9
Diarrhoea	6
Toxic Plants	5
Anaplasmosis	4
Heartwater	4
Nagana/tsetse	3
Hygroma	3
Sweating Sickness	2
Papillomatosis	1
Abscessation	1
Footrot	1
Internal parasites	1



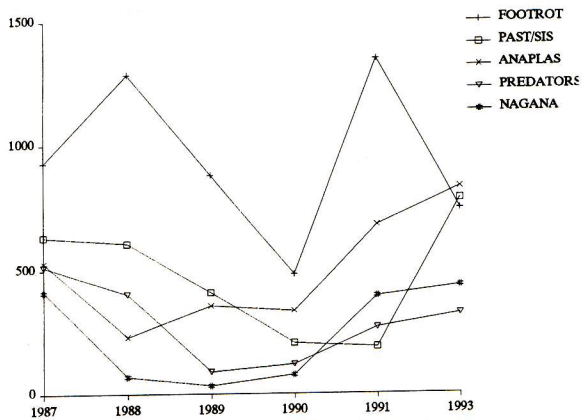
Table 3

Non-disease problems as specified by various stock owners:

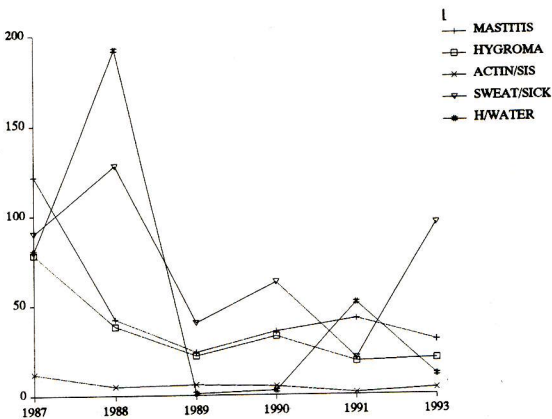
Nature of problem	No. of owners
Lack of water/water points for stock	14
Drought	5
Need dips to combat tick problem	4
Need to market more stock, especially in drought	3
Lack of crushpens	3
Overgrazing of range	3
Crushpens in disrepair	1
Lack of vaccines	1
Deliberate rangeland burning	1
Predators	1
Stock medicines too expensive	1



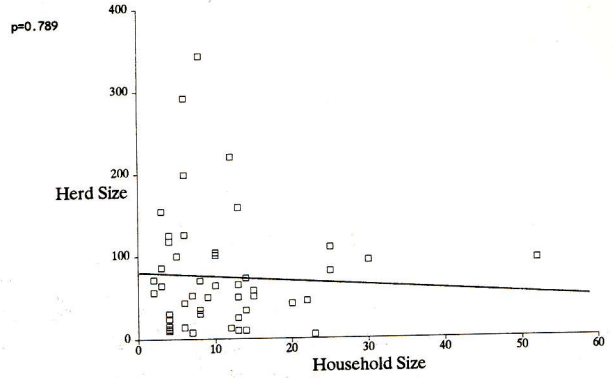
Graph 3 Cattle diseases – East Caprivi  
Diseases with incidence from 1000 to 9000 cases/100 000/year



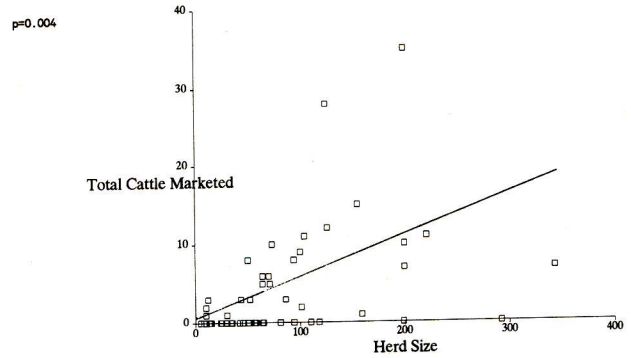
Graph 4 Cattle diseases – East Caprivi  
Diseases with incidence from 500 to 1000 cases/100 000/year



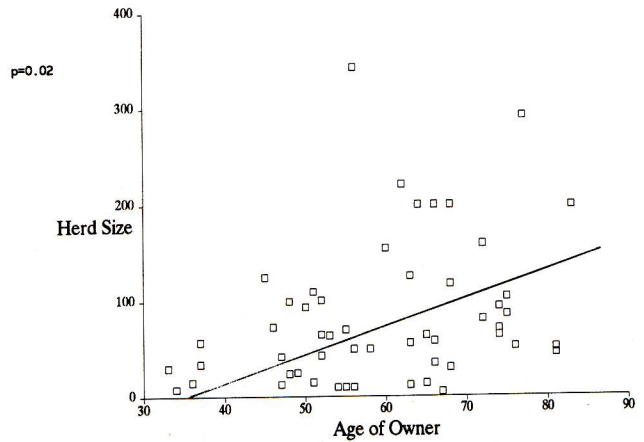
Graph 5 Cattle diseases – East Caprivi  
Diseases with incidence from 10 to 500 cases/100 000/year



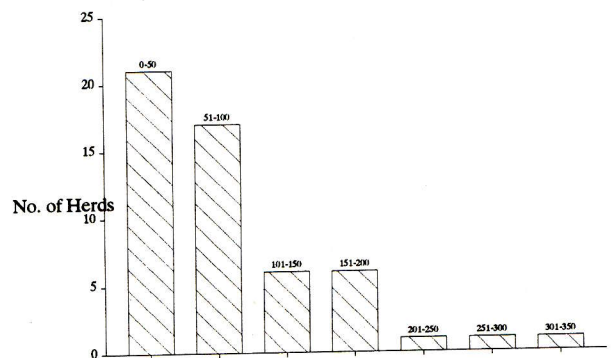
Graph 6 Herd size vs Family size - Caprivi



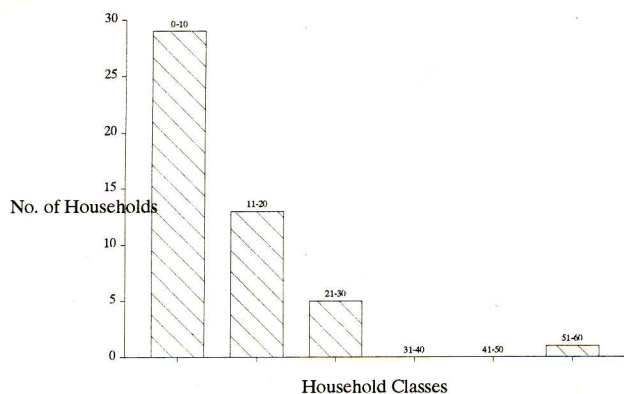
Graph 7 Marketing vs Herd size



Graph 8 Herd size vs Owner's Age



Graph 9 Histogram - Herd sizes



Graph 10 Histogram - Household Sizes

SUMMARY STATISTICS ON SELECTED VARIABLES				
Variable	Mean	Std Dev	Min	Max
Age of owner	58.3	12.8	33	83
Household Size	9.7	9.03	2	52
Herd Size	80.9	73.9	5	343

Table 5

FIGURES RELATING TO CATTLE	
No of herds in sample	54
Total cattle in sample	4373
Average herd size	81
Average bulls/herd	1.4
No cows/herd	22.7
Calves < 1 year	6.5
Calves 1 - 2 year	5.4
No oxen/herd	10.2
% cows in herd	28
No cows/bull	15.9
Average calf %	28.8
% offtake formal market	2.3
% offtake bush market	2.1
% own slaughter	1.5
Total annual offtake %	5.9

Table 6

ATTITUDINAL SURVEY OF STOCK OWNERS	
Figures given refer to the percentage of respondents (n=54)	
Those supporting vaccination campaigns	90.7
Those finding vet medicines readily available	77.7
Respondents finding vaccines readily available	77.7
Those finding extension readily available	88.8
Those finding crushpens sufficient	72.2
Owners wanting to acquire more cattle	90.7
Those wanting to acquire more small stock	79.6
Owners wishing to acquire more material possessions	70.3
Those preferring livestock to possessions	70.3
Preferring possessions to livestock	12.9
Would like to own a motor car	16.7
Wanting better clothes	16.7
Those desiring better education	62.9
Respondents wanting money in the bank	35.2
Respondents desiring better housing	18.5
Willing to sell livestock for money/possessions	83.3
Willing to buy own stock remedies/vaccines	79.6
Willing to erect own crushpens	3.7
Presently using lick/supplementary feeding	31.5
Dissatisfied with present marketing opportunities	42.6
Wishing to market more animals in future	33.3

Table 7

OTHER LIVESTOCK OF IMPORTANCE	
No. of goat owners in sample	15
Average size of goat flocks	17.3
% offtake to formal and informal markets	5
% goats slaughtered for own use	16
Total % goat offtake	16.5
Average poultry flock size*	20
* all respondents owned poultry, but flock sizes were not available from all of them. This average is calculated from those who gave flock sizes.	