

## Participatory rural appraisal to investigate constraints in reporting cattle mortalities in the Odi district of North West Province, South Africa

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### ABSTRACT

Mortalities in cattle can have severe financial implications for small scale and communal farmers in South Africa. They could also be a measurable indicator for surveillance of animal diseases, such as those listed by the *Office International des Epizooties* (OIE)<sup>16</sup>, or diseases included in the regulations of the South African Animal Diseases Act, 1984 (Act 35 of 1984). In order to prevent further mortalities and for accurate surveillance and monitoring of diseases, it is important that farmers participate in the determination of causes of mortality in their cattle. This paper reports on constraints of the reporting diseases to the state veterinary services, the study area being Odi district, in the North West Province. The method that was followed was based on participatory rural appraisal. The selected cattle owners participated in every phase. They were the ones who first spoke to veterinary services about ways to decrease the diseases and mortalities of their cattle. A questionnaire to verify the facts complemented the survey. A total number of 60 farmers were randomly selected from 12 villages. One farmer withdrew, leaving 59 farmers. Most of the farmers in the study were men ( $n = 55$ ). The area of study was communal and the farming system traditional and extensive. It was suspected that there was a communication problem and this was proven by the results of the research, as 23 farmers were not even aware that mortalities have to be reported by law. The real problem was that causes of death were not being diagnosed because farmers were not aware that a necropsy could give information on the causes of death. Farmers were keen to receive training in elementary necropsy techniques so as to be able to discuss the cause of death of cattle with the state veterinarian.

**Key words:** cattle, mortality, necropsy, participatory appraisal, South Africa, veterinary extension.

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### INTRODUCTION

Most people in Odi district of North West Province live in rural areas and depend on agriculture for their livelihood. Livestock may also be a form of saving, which can be realised through the sale of animals when needed<sup>12</sup>. Diseases of livestock can cause major losses, both to livestock owners and the country as a whole, particularly if notifiable diseases are involved<sup>14,16</sup>. The weakest link in the reporting chain is usually the livestock owner, who may not recognise the disease, or may fail to report it for other reasons<sup>3</sup>. A high mortality rate in a herd can decrease

profitability or even cause an overall loss for a farming enterprise<sup>4,20</sup>. According to the 2nd of April 2004 edition of the *Farmer's Weekly*, the then slaughter price of beef was R13.00/kg and the weaner calf live-weight price was R7.60/kg<sup>2</sup>. A weaner calf weighs about 200 kg, so its death would result in a calculated loss of R1400.00 of farming income.

Although it is not possible to eliminate stock losses completely, it is a controllable factor that can be minimised by means of an effective disease control programme and good management. According to Ristic and McIntyre<sup>19</sup>, it is important to determine the causes and level of mortality of cattle in order to be able to know which diseases cause mortality and be able to prevent and control primary agents and contributing factors. This is important, not only to the individual farmer, but to add value to routine surveillance of notifiable diseases of cattle, which is a function

of the state veterinary services<sup>14</sup>. This study used participatory appraisal to survey the opinions of cattle owners ( $n = 59$ ), in the Odi District of North West Province, on the reasons for lack of communication with state veterinary services about mortalities in their cattle.

### MATERIALS AND METHODS

Two-stage cluster sampling<sup>3,23,24</sup> was done where villages were the primary units and the farmers were the secondary units. Twelve villages were randomly selected from the 55 villages in Odi District. Non-random selection criteria (purposeful selection) was done according to Dargatz and Hill<sup>8</sup> to select farmers using the following criteria:

- Only farmers with cattle were selected.
- Farmers had to show a willingness to participate.
- A minimum of 2 farmers were selected from each of the 12 villages.

A Geographical Positioning System (GPS) was used to accurately locate the farms. The location of the farms and the names of the villages are shown in Table 1.

The study population comprised selected cattle farmers in the Odi district of North West province. Most of the people in Odi district, which was formerly part of the homeland known as Bophuthatswana, speak the Setswana language, although other languages such as Zulu, Xitsonga, Xhosa, Northern Sotho, Southern Sotho and Venda are spoken in this district. It was estimated by Malan and Hatting<sup>9</sup>, that 50 % of the population lives in Mabopane and Ga-Rankuwa, which are urban areas, and the rest of the population live in peri-urban and rural areas<sup>9</sup>. Most of the rural areas are poorly developed and lack infrastructure such as electricity, telecommunications, transport and water<sup>17</sup>. The communities maintain their traditional heritage, norms and values, which can be noticed from the way in which people cooperate with the chief and the headman<sup>11</sup>.

Participatory rural appraisal methods<sup>5,6</sup> were used to survey the opinions of cattle owners on the reasons for lack of communication with state veterinary services

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Table 1: GPS location of farms and number of participants per village.

Name of village	No.*	Name of farm	Farm no.	Geographical location
Sephai	6	Roodekuil	179 JQ	27°50'E, 25°15'S
Bethanie	8	Bethanie	405 JQ	27°37'E, 25°34' S
Rietgat	3	Rietgat	224 JQ	27°50'E, 25°25'S
Modikwe	4	Waaikraal	396 JQ	27°35'E, 25°33'S
Bapong	7	Modderspruit	458 JQ	27°41'E, 25°43'S
Boschpoort	3	Boschpoort	288 JQ	27°29'E, 25°31'S
Winterveld	6	Winterveld	101 JR	27°59'E, 25°24'S
Rabokala	5	Oskraal	248 JQ	27°55'E, 25°30'S
Hebron	5	Mamogales-kraal	258 JR	28°00'E, 25°36'S
Legonyane	6	Elandsfontein	180 JQ	27°47'E, 25°17'S
Maboloka	5	Klipgat	243 JQ	27°53'E, 25°26'S
Mmakau	2	Elandsfontein	432 JQ	25°27'E, 25°36'S

\*Number of participants.

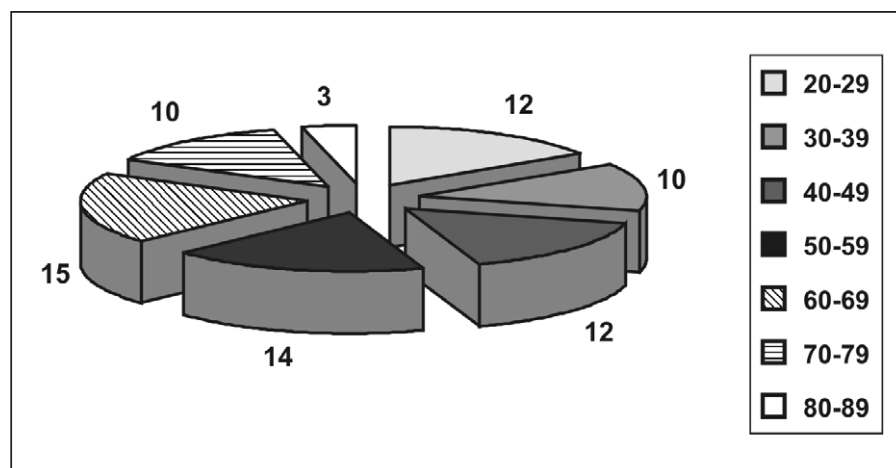


Fig. 1: Age of respondents in years ( $n = 59$ ) according to initial structured interview.

about mortalities in their cattle. A total of 60 farmers was selected for structured interviews. A structured interview is a procedure with scientific purpose by means of which the respondent, through a series of questions, is induced to give verbal information as part of participatory rural appraisal<sup>18,21</sup>. A questionnaire was developed for the structured interview in which farmer and cattle demographics, people responsible for managing the cattle, methods of disposal of carcasses, respondents opinions on whether they reported mortalities and the reasons for not reporting mortalities were used as variables

Monthly farm visits were done to interview farmers informally, observe the cattle and collect data on mortalities over a 12-month period from September 2000 to September 2001. The number of farmers selected from each village is shown in Table 1. One of the farmers at Mmakau could no longer participate and was eliminated from the trial. Data obtained from the questionnaire was captured into the software program Microsoft 2000 Excel<sup>®</sup> and analysed using simple descriptive statistical methods.

## RESULTS AND DISCUSSION

The fact that only 4 women were involved may be due to the fact that women in traditional African societies are not interested in large animals like cattle, but rather in small-stock such as goats, sheep and chickens<sup>12</sup>. In the communal system, there is still complete dominance by male farmers. In comparison with the findings of Nthakheni<sup>15</sup> where 14 % ( $n = 57$ ) of the female farmers were widows, in this study only 1 female farmer (1.69 %) was a widow. The difference may not be relevant, however, it means that these women might not have inherited their cattle from their husbands, but built up the herd themselves.

The ages of farmers ranged from 20 to 89 years with most farmers in the range of 50 to 69 years (Fig. 1). This is probably because young people are not interested in farming or that the older ones take up farming after taking packages from their work place and buy cattle as a form of security and investment or savings<sup>12</sup>. The older the farmer, the more forgetful they become. Most do not keep records and tire easily; this impacts on their management, which then becomes poor and

affects the productivity of their animals<sup>12</sup>. Because of their advanced age, it was observed that they had difficulty walking the long distances to State Veterinary Service Centres to report sick and dead animals. The age distribution of the respondents to the structured interview, as shown in Fig. 1, corresponds with similar interviews of other authors<sup>10,12,13</sup>.

The education level of the respondents varied; 35 % ( $n = 21$ ) went to high school, 31 % ( $n = 19$ ) had attended primary school, 16 % ( $n = 8$ ) completed the matriculation examination successfully, 8 % ( $n = 5$ ) went to a tertiary institution and only 10 % of them ( $n = 6$ ) did not attend school at all. In general, it is likely from the above findings, that the cattle owners in communal areas could be more prosperous and probably better educated than small-stock farmers and more well off as they require capital to acquire cattle. The respondents' main source of income was from full-time farming ( $n = 25$ ), state pension ( $n = 20$ ) and salary of family member ( $n = 20$ ). Only 4 had other businesses.

More than half of the participants tended their own animals ( $n = 41$  or 69 %), as they were not working or were on pension. Those who were working elsewhere, employed herdsmen ( $n = 10$  or 17 %). These herdsmen were also responsible for taking the cattle for vaccination during state veterinary vaccination campaigns and reporting any sick cattle to the owner. Other members of the family also looked after the animals ( $n = 7$  or 12 % by children and  $n = 1$  or 2 % by the wife of the farmer). Sometimes sick or dead animals were not reported in time to the state veterinarian, as the owners worked far from home and only saw their animals over the weekend.

The sex/age distribution and total number of cattle owned by communal cattle farmers in the survey is shown in Table 2.

It was found that communal farmers in Odi preferred a type of cattle breed that does not get sick or die easily, because they farm extensively and parasite control is costly. The Afrikaner and Brahman breeds are considered by the farmers to be resistant to most cattle diseases as well as ticks, that is probably why they were the preferred breeds. Farmers interviewed were of the opinion that the cross-bred Afrikaner/Brahman has the advantage that calves grow faster and have a better slaughter percentage than purebred indigenous Afrikaner cattle. The distribution by breed of cattle is shown in Fig. 2. If the number of Brahman/Afrikaner crosses shown in Fig. 2 is added to the number of Afrikaner/Brahman cattle (described as such by their owners, depending on the breed of

Table 2: Sex and age distribution of cattle as estimated by farmers during the structured interviews.

Age/sex	Number*
Bulls	38
Cows	686
Heifers	475
Bullocks	97
Oxen	46
Calves	357
Total	1699

Number estimated by farmers during the structured interview.

the mother) it can be seen that this cross-bred far outnumbers the purebred Afrikaner or Brahman cattle.

According to the results of interviews with farmers over a period of 12 months, the total percentage of cattle that died over that period was 4.47 % of the cattle population under study ( $n = 76$ ). The accepted percentage is 5 %. The total percentage of 4.47 % in this study was comparable to that of 4.91 %, as previously recorded by Mokantla<sup>12</sup>. The age and sex distribution is shown in Table 3.

The data in Table 3 reflects the highest mortality is in the calves. Adult cows and bulls also have a relatively high mortality, probably because they are more easily stressed by lack of food in the winter than non-breeding animals (oxen, heifers and bullocks) and therefore their disease resistance is lower. The mortality resulting from infectious diseases, as suspected by the farmers over this period, is shown in Table 4.

The mortality of cattle from non-infectious causes, as reported by the farmers over the same period, is shown in Table 5. It should be noted that the cause of death was unknown in more than half ( $n = 43$ ) of the total deaths recorded ( $n = 76$ ).

Farmers ( $n = 59$ ) were also asked what they did with the carcasses of animals that died and their responses to the suggested alternatives are shown in Table 6.

Proper disposal of carcasses is important both to prevent livestock disease transmission, and prevent environmental contamination. The carcass must be disposed of as soon as possible. It appears that three farmers were not aware that it is against the law to use animals that have died of diseases for human consumption or sale<sup>14</sup>. However there is a great deal of poverty in the area and, as has been recorded in other developing areas, food safety may be disregarded by those who are hungry<sup>7</sup>. As regards the answer that 'dogs eat them' – this also probably includes other non-domesticated predators common in South Africa, such as vultures and the black-backed jackal<sup>7</sup>.

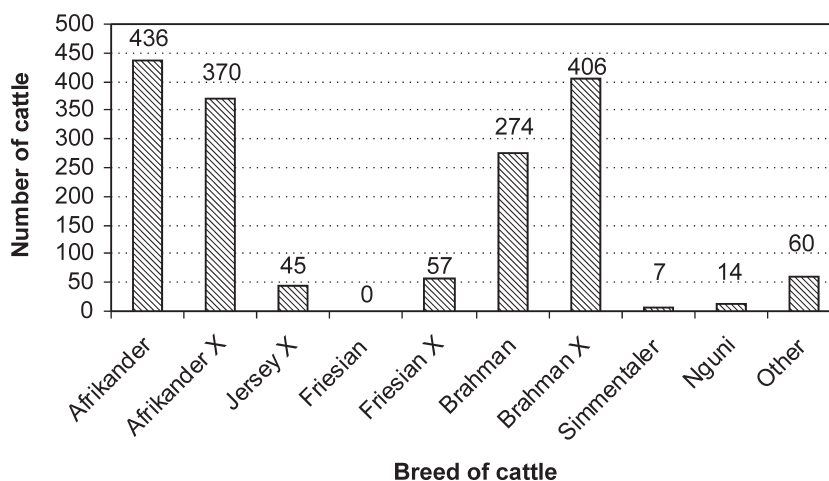


Fig. 2: Distribution of cattle by breed, according to respondents.

Table 3: Percentage mortalities according to age and sex of cattle belonging to the respondents, from September 2000 to September 2001 as recorded during monthly visits (total  $n = 1699^*$ ).

Age/sex	Number of cattle*	Deaths**	% Mortality
Bulls	38	2	5.26
Cows	686	33	4.81
Heifers	475	13	2.74
Bullocks	97	2	2.06
Oxen	46	0	0
Calves	357	26	7.28
Total	1699*	76	4.47

\*Number of cattle, based on results of interview.

\*\*Number of deaths based on reports to Animal Health Technicians by farmers during monthly visits.

Table 4: Infectious causes of mortality in cattle belonging to the respondents, that died ( $n = 11$ ) between September 2000 and September 2001, as recorded during monthly visits (total number of cattle  $n = 1699$ ).

Disease	Number of cattle that died
Lumpyskin disease	6
Heartwater	2
Sweating sickness	1
Blackquarter	1
Anaplasmosis	1
Total	11

Farmers were asked for reasons why they failed to report cattle deaths to the state veterinarian, animal health technologist (AHT) or extension officer. Deaths are only reported when the AHT routinely visits the farms in his ward. Their responses are ranked in order of frequency in Table 7.

Possible constraints for not reporting diseases were listed in the questionnaire and farmers were allowed to give more than one reason and these were rated as 'always', 'sometimes' or 'never'. The most important constraint to communication by respondents with the veterinary services, as may be seen from Table 7, was not

Table 5: Non-infectious causes of mortality in cattle ( $n = 65$ ) belonging to respondents, between September 2000 and September 2001 as recorded during monthly visits (total number of cattle  $n = 1699$ ).

Cause of death	Cattle mortality
Unknown	43
Dystocia	10
Plastic bags	6
Diarrhoea	2
Hairball	1
Snake bite	1
Fractured leg	1
Motor vehicle accident	1

being aware that they should report the dead animals to the state veterinarian, AHT or extension officers. It is important to report dead animals to the state so that

Table 6: The fate of meat from dead animals.

Reason	Always ( $n = 59$ )	Never ( $n = 59$ )
People eat them	3	56
Dogs eat them	44	15
They rot away in the veld	22	37
Bury them	26	33
Burn them	21	38
People sell the meat	3	56

Table 7: Constraints identified by respondents, to communication with state veterinary services about mortalities in their cattle, ranked in order of importance.

Code	Constraint	n	Rank order
(a)	No idea of reporting	23	1
(b)	Not interested	13	2
(c)	No telephone at home	11	3
(d)	No cell-phone	10	4
(e)	No transport	10	4
(f)	What can the Vet do?	9	5
(g)	Not his business	7	6
(h)	Carcass is eaten	5	7
(i)	Vet is not in office	3	8
(j)	I work in town	2	9

the cause can be identified and the disease controlled, especially in cases of infectious diseases that spread quickly and causes economic losses to the farmers. It is an offence not to report diseases listed in the Animal Diseases Act, 1984 (Act 35 of 1984). Almost a third of the participants did not know that they should report dead cattle.

Communication has a vital role to play in any agricultural and rural development situation. Ideally the flow of information between the farmer, veterinary services and researchers should be optimised. From the structured interview it was found that lack of telecommunications, that is, having no cellular phone and no telephone at home, were not major constraints to reporting mortalities. Veterinarians and technicians should ideally always be readily available for farmers to report dead animals. However, the possible constraints of 'veterinarian not being in office' and 'what can the veterinarian do?', were not considered major reasons for not reporting mortality.

The respondents did not consider lack of transport to be a major factor in reporting diseases and mortalities. This is despite the fact that most areas in Odi are rural and farmers are old and do not have access to transport. Some of the Veterinary Service Centres are very far from their dwellings and the only mode of transport that they use are busses. The busses run infrequently and often arrive and depart at times that are inconvenient for the farmers<sup>22</sup>.

Odi district consists of villages and most of the cattle farmers in this study work in surrounding cities and towns such as Pretoria, Johannesburg and Brits resulting in the owners, who are traditionally the decision-makers regarding cattle husbandry, being absent during weekdays. This leaves the herdsman stranded, with no mandate to make even urgent decisions, including reporting of mortalities, during weekdays, when state veterinary staff are available.

From Table 7, where the results of

the structured interview are ranked, suggestions can be made regarding ways in which these constraints could be addressed. Constraints (a), (b), (f) and (g) can be addressed by motivating farmers through extension that explains the benefits for them in knowing the causes of diseases. Constraints (c), (d), (e), (h) and (i) could possibly be addressed by the farmer being trained to perform a necropsy when he finds the carcass and reporting back to the veterinarian who can then suggest possible causes of death and what to do about it. This will also circumvent the problem of the cadaver decaying or being consumed before the veterinarian can reach it.

## CONCLUSIONS

It is concluded that mainly men in the age group 50–69 years were involved in cattle farming in the study area, which agrees with the findings of other authors. It may have been expected that their advanced age was the main reason for them not communicating with the state veterinary services when cattle mortalities occurred. Lack of transport was not found to be a main constraint (Table 7).

It was also observed that the respondents mainly owned breeds of animals known to be resistant to ticks and tropical diseases. The mortality rates were highest in the calves (7.28 %), followed by adult bulls (5.26 %). This could be explained in terms of endemic stability to tick-borne diseases, as calves may not have acquired resistance and as it was observed during the study that farmers bought bulls in to the herds from other areas. It was noted that in the majority of mortalities (43 of a total of 76) the cause could not be determined by the cattle owners.

From the answers to the question on the disposal of meat from dead animals, it was obvious that a majority of carcasses are opened – when people cut them up to eat or sell the meat, or when they are torn apart by dogs or rot away in the veld. This not only holds a significant risk of environmental contamination but is also a

health risk and can facilitate the spread of diseases such as anthrax.

When the constraints to communication identified by respondents were ranked, it was surprising to find that the main cause was that farmers were unaware that they should report mortalities to the state veterinarian. Many of the farmers were not interested in reporting to the veterinarian and a lack of telecommunication was only 3rd on the list. From this study, it became obvious that the first priority was to call the farmers together and discuss with them the advantages of reporting mortalities to the state veterinary services.

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