

**SOCIO-ECONOMIC IMPACT ANALYSIS OF LIVESTOCK DISEASE CONTROL
PROGRAMMES WITH SPECIAL REFERENCE TO TICKS AND TICK-BORNE
DISEASES**

by

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DEDICATION

This study is dedicated in memory of my late father Mr Nndanganeni Johannes Randela whose untimely death on 10 July 1995 nearly made the furthering of my studies impossible. I will always miss him

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Rendani Randela

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ABSTRACT

The outbreak of East Coast fever in the beginning of the century lead to the introduction of the plunge dip system to control the disease. This approach focused on eradicating the vectors (i.e. ticks) that transmitted the disease. The successful eradication of the disease in 1954 was mainly through the intensive use of acaricides. The fundamental objectives of this study is to determine whether there is continued justification for controlling ticks and tick-borne diseases through dipping, as well as identifying the impact of tick control to the rural household.

The study was conducted in two veterinary zones located in the Venda region of the Northern Province, namely the Yellow Line and the Open area. A sample of 125 respondents was taken from livestock farmers in the selected areas within the aforementioned zones. Data was accumulated by the use of a structured questionnaire, observations, as well as discussions with farmers.

Cattle dipping is performed to achieve both the economic, cultural and the social role with the majority of respondents (97%) farming with cattle both for commercial and subsistence purposes. The value of cattle has been estimated to be R1 152. A number of criteria have been used to estimate this value. These are the value of sales, milk, draught power and manure, and are quantified using the replacement value method. Eleven percent of the respondents expressed some dissatisfaction with the classical tick control method (plunge dip). The development of tick resistance to successive acaricide compounds is a major problem stated by 79% of the dissatisfied farmers. As a result, most of the respondents (61%) supplement dipping with either modern or traditional tick control measures such as hand picking.

The surveys amongst rural households show a 3% mortality rate in spite of the existence of the programme. It is estimated that the mortality rate would have been 4% without the control programme. Cost-benefit analysis revealed a benefit-cost ratio of 0.8 (i.e.<1) indicating that the control of ticks and tick-borne diseases by the government is not economically justified. However, because of the economic nature of the service it provides (public good), the dipping of cattle still deserves government support. In addition, the provision of tick control services by the government leads to a socially optimal level of supply. The sensitivity analysis gives the benefit-cost ratio of 1.2 when the mortality rate is assumed to would have been 10% without the control programme.

The results of both the logistic regression model and the multivariate regression analysis revealed that the structure of production (e.g. breed of cattle kept), as well as human resource factors (e.g. educational qualification) influences the demand for tick control service and farmers' willingness-to-pay for such a service significantly. In addition, there is also a slight indication of regional differences with regard to the demand for dipping and willingness-to-pay for the service by farmers.

The manner in which cattle dipping should be continued by the government, however, needs some alterations. The currently envisioned tick control strategy is based on integrated tick management system where acaricides will be strategically applied. This

strategy will reduce the costs of tick control thereby improving the benefit-cost ratio. However, there is no easy and straightforward solution on the frequency of cattle dipping. A multi-disciplinary study needs to be conducted to ensure an optimal tick control strategy compatible with the needs of the resource poor farmers.

**SOSIO-EKONOMIESE IMPAK ANALISE VAN VEESIEKTE BEHEER MET
SPESIFIEKE VERWYSING NA BOSLUISE EN BOSLUIS GEDRAAGDE
SIEKTES.**

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UITTREKSEL

Die uitbreek van Ooskuskoors aan die begin van die eeu het gelei tot die implementering van die dompeldip stelsel ten einde die siekete te beheer. Die benadering fokus op die uitwissing van die vektore (bosluise) wat die siektes oordra. Die suksesvolle uitwissing van die siekte teen 1954 was hoofsaaklik die gevolg van intensiewe aanwending van akarisiëde. Die fundamentele doelwitte van dië studie is om te bepaal of daar volgehoue motivering vir die beheer van bosluise en buisluis gedraagde siektes is deur middel van dip, sowel as die identifisering van die impak van bosluisbeheer op die landelike huishoudings.

Die studie is gedoen in twee veeartsenykundige gebiede geleë in die Venda streek van die Noor Provinsie, naamlik die Geel lyn en Oop gebied. 'n Steekproef van 125 respondente is geneem onder veeboere in geselekteerde gebiede binne die genoemde gebiede. Data is versamel deur middel van 'n vraelys, waarneming en gesprekke met produsente.



Die dip van beeste word gedoen ter bereiking van beide ekonomiese, kulturele en sosiale funksies deur die meerderheid van die produsente (97%) wat boer met vee vir beide kommersiële en bestaansredes. Die waarde van beeste word geraam op R1 152. 'n Aantal kriteria is gebruik om in die raming. Dit is die waarde van verkope, melk, trekkrag en mis en is gekwantifiseer op basis van die vervangingswaarde metode. Elf persent van die respondente het 'n mate van ontevredenheid uitgespreek met die klassieke bosluis beheer metode (dompeldip). Die ontwikkeling van weerstand deur bosluis teen opeenvolgende akaraside samestelling is a groot probleem, soos aangetoon deur 79% van die produsente wat hul ontevredenheid aangetoon het. Gevolglik vul die meeste van die respondente (61%) die dipstelsel aan met of moderne of tradisionele bosluis beheer meganismes soos die verwydering daarvan met die hand.

Die opnames onder landelike huishoudings toon 'n 3% mortaliteit ten spyte van die bestaan van die program. Dit word geraam dat mortaliteit 4% sou beloop in die afwesigheid van die program. Koste-voordeel analise toon 'n voordeel-koste verhouding van 0.8 (<1) wat daarop dui dat die beheer van bosluis en bosluisgedraagde siektes deur die regering nie ekonomies geregverdig is nie. In die lig van die ekonomiese aard van die diens wat die regering verskaf (openbare goedere) verdien die dip van beeste egter steeds owerheidsteun. Die verskaffing van bosluisbeheer dienste deur die regering lei voorts ook tot 'n sosio-optimale vlak van aanbod. Die sensitiwiteitsanalise toon 'n voordeel-koste verhouding van 1.2 aan indien die mortaliteit 10% sou beloop in die afwesigheid van die program.

Die resultate van beide die logistiese regressie model en die multivariansie regressie analise toon dat die struktuur van produksie (bv. ras aangehou), sowel as menslike hulpbron faktore (bv. opvoedkundige kwalifikasie) 'n beduidende invloed het op die vraag na die bosluisbeheer diens en die bereidheid om te betaal vir die diens deur die produsent.

Die wyse waarop beeste gedip word behoort voortgesit te word deur die regering, maar sal egter aanpassing moet geniet. Die huidige voorsiene bosluis beheerstrategie is gebaseer op 'n geïntegreerde bosluis bestuurstelsel, waar akarisiertes strategies aangewend word.

Hierdie strategie sal die koste van bosluis beheer verlaag en sodoende die voordeel-koste verhouding verbeter. Daar is egter nie 'n maklike en eenvoudige oplossing ten opsigte van die dip frekwensie nie. 'n Multi-dissiplinere studie moet uitgevoer word om 'n optimale bosluis beheerstrategie versoenbaar met die behoeftes van die hulpbron behoeftige produsente te verseker.

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