Estimation of impact of contagious bovine pleuropneumonia on pastoralists in Kenya

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ABSTRACT

Contagious bovine pleuropneumonia (CBPP) is an infectious disease which impacts cattle production in sub-Saharan Africa. To adequately allocate resources for its control, there is a need to assess its impact on cattle producers. The present study estimated the impact of CBPP on pastoralists through analysis of various strategies employed for its control in cattle herds including: preventive vaccination, antimicrobial treatment, slaughter of clinical cases and other combinations of these control strategies. The assessment was based on a loss-expenditure frontier framework to identify a control strategy with minimum cost from both expenditures on control strategies and output losses due to mortalities, reduced milk yield, reduced weight gain and reduced fertility rate. The analysis was undertaken in a stochastic spreadsheet model. The control strategy with minimum cost per herd was preventive vaccination with an estimated cost of US$ 193 (90% CI; 170–215) per 100 cows per year, while slaughter of clinical cases had an estimated cost of US$912 (90% CI; 775–1055) per 100 cows per year. The impact of CBPP to the nation was estimated at US$ 7.6 (90% CI; 6.3–8.7) million per year. Yet, if all pastoralists whose cattle are at high risk of infection adopted preventive vaccination, the aggregate national impact would be US$ 3.3 (90% CI; 2.9–3.7) million per year, with savings amounting to US$ 4.3 million through reallocation of control expenditures. The analysis predicted that control of CBPP in Kenya is profitable through preventive vaccination. However, further research is recommended for the technical and financial feasibility of implementing a vaccine delivery system in pastoral areas where CBPP is endemic.

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1. Introduction

Approximately 70% of the cattle population in Kenya are raised in the arid and semi-arid lands, and these areas constitute over 80% of the total surface area of the country’s land mass (Nyariki et al., 2009; MoLD, 2010b). The cattle population is currently estimated at 17.5 million head, out of which 3.4 million head are dairy breeds kept in highland production system and 12.2 million head are kept in a pastoral system in areas that are arid and semi-arid (Dheke and Mathani, 2011). The remainder are dual-purpose breeds found in the mixed crop-livestock system in humid and sub-humid areas (KARI/ODA, 1996; MoLD, 2007; KNBS, 2010). The average herd sizes within pastoral areas are 100 head of cattle per herd (Roderick et al., 1998; Onono et al., 2013c). While in the smallholder dairy pastoralists in Kenya. PREVENT (2014), http://dx.doi.org/10.1016/j.prevetmed.2014.03.022.