INTRODUCTION

Contagious bovine pleuropneumonia (CBPP) is a disease of cattle that affects production through mortality and reduced productivity. It also retards genetic improvement and limits the ability of cattle to work. The Pan African programme for the Control of Epizootics (PACE) (this programme is implemented by the African Union Interafrican Bureau for Animal Resources [AU-IBAR] in 32 African countries and is funded principally by the European Commission with the support of the participating African countries) has identified CBPP as the second most important transboundary disease in Africa after rinderpest. Contagious bovine pleuropneumonia is now a major focus of activity for the programme. However, before the programme embarks on a control strategy, it is essential that the economic importance of the disease be established and the returns to investments in its control be estimated. National veterinary authorities and donor organisations require this information for decision-making in CBPP control.

Unlike some parasitic animal diseases whose impacts are confined to a single farm, the impact of CBPP is often felt beyond a single farm. The outbreak of CBPP in one herd poses a threat to neighbouring herds in a production system where there is poor control of cattle movements. The control of CBPP therefore goes beyond the ability of an individual farmer and should be undertaken at the national or regional level. The economic impact of CBPP should therefore be examined beyond the farm level.

This study estimates the economic impacts of CBPP in 3 Northern regions ( Savana region, Northern region and North East region. These Regions were chosen because of the increasing number of outbreaks of CBPP reported Nationwide in the last decade. Contagious bovine pleuropneumonia is therefore a major threat to cattle production and the lives of millions of cattle owners. The veterinary authorities of these regions regard CBPP as a disease of strategic importance and are seeking internal and donor funding for its progressive control. The purpose of this study is to provide estimates that will assist both the veterinary authorities and donors in making investment decisions regarding the control of CBPP.

**Population at risk**

Cattle (both *Bos taurus* and *Bos indicus*) are the main species that are susceptible to CBPP. The domestic buffalo (*Bubalus bubalus*) is also susceptible although the disease is difficult to produce experimentally in this species (31). The African water buffalo (*Syncerus caffer*) is resistant to CBPP.

The disease

Contagious bovine pleuropneumonia is a highly infectious acute, sub-acute, or chronic disease, primarily of cattle, affecting the lungs and occasionally the joints. It is caused by a bacterium, *Mycoplasma mycoides mycoides* sc (small colony, bovine biotype) (21). It is spread almost exclusively by direct contact between animals, although indirect spread is also possible (43). Contagious bovine pleuropneumonia is an OIE notifiable disease and was included among the former List ‘A’ diseases (44). When the disease spreads for the first time within a sensitive cattle population, it generally causes high mortality.

**Outbreaks and distribution**

Contagious bovine pleuropneumonia was introduced in the Cape Province of South Africa in 1853 through cattle imports from the Netherlands and in 1868 it was introduced in East Africa by British troops. It is not clear if CBPP had existed in sub-Saharan Africa before that time. Following the first outbreak, CBPP quickly spread to neighbouring countries and is now present in many parts of Africa. In 1904 it was eradicated from Zimbabwe followed by South Africa in 1924 and Botswana in 1939. Angola has never managed to eradicate the disease. Namibia succeeded in eradicating the disease in the southern part of the country although it remains endemic in the northern part because of incursions from neighbouring Angola where the disease is endemic. Civil strife in Angola has made it difficult to control the disease that is now a major threat to Zambia and northern Botswana.

During the 1960s and 1970s, extensive research on CBPP in Kenya, Chad and other African countries, coupled with the massive efforts of the international campaign Joint Project 16, resulted in the disappearance of clinical disease

from most parts of Africa. However, because of the economic and financial difficulties that affected the ability of governments to adequately fund Veterinary Services, the disease came back in the late 1980s and early 1990s. Today, CBPP is present in Central, East, West and parts of Southern Africa but is absent in North Africa. Reports from the OIE indicate that there are about 27 sub-Saharan African countries with cases of CBPP. During the Pan African Rinderpest Campaign (PARC), which started in 1986, fewer countries experienced outbreaks of CBPP, due in part, to the combined vaccination against rinderpest and CBPP. Many countries however, began to experience outbreaks in 1995 when some countries stopped the combined rinderpest and CBPP vaccination.

Morbidity

Morbidity refers to the proportion of animals affected in a given population. It includes prevalence and incidence, both of which measure the risk that a susceptible animal in a population has of contracting a disease (32, 37).

Prevalence and incidence

The prevalence of CBPP is the number of infections (old and new) that occur in a given cattle population at a given time. Incidence is the number of new cases that occur in a known population over a specific time period. Like prevalence, incidence refers to the number of cattle infected expressed in relation to the number of cattle at risk. The prevalence and incidence of CBPP vary according to the cattle production system concerned. Prevalence rates tend to be higher in extensive cattle production systems compared to more intensive dairy and beef production systems where animals are confined.

Mortality

Outbreaks of CBPP have been associated with various levels of mortality. In endemic situations mortality rates are generally low. However, higher mortality rates are not uncommon.

**Control measures**

There are four essential tools in CBPP control and eradication. These are movement control, stamping out, vaccination, and treatment. Each control measure acts by reducing the effective reproductive number of the agent in the population. However, not every country uses all of these control measures. The current policy advocated by AU-IBAR for the control of CBPP is as follows:

– collection of epidemiological data and information to determine and detect foci of infection

– effectivecontrolofanimalmovementsfromandtowards these foci

– mass vaccination of cattle regularly for at least five consecutive years

– repeatvaccinationofthesamecattleeachyear.

This implies close to 100% vaccination of all cattle twice a year for five years in addition to effective movement control.

Socio-economic conditions in many African countries have changed drastically in the last two decades. Many African governments are facing acute economic and financial problems that have affected their ability to fund programmes of national or regional importance in the animal health field. Livestock and animal health budgets are already small and are being cut further; this makes it necessary for countries to focus on less expensive control strategies. Control strategies involving movement control and stamping out are considered too costly and logistically difficult to apply. Many governments cannot afford the cost of compensation to the cattle owners whose cattle are slaughtered and cannot logistically police national borders that stretch for thousands of kilometres. This leaves vaccination and treatment as the main possibilities for CBPP control.

The use of antibiotics and CBPP control.

Antibiotic treatment of clinical CBPP cases is now standard field practice in many African countries and veterinarians, livestock owners and Community Animal Health Workers attest to its beneficial effects. Effective control of CBPP using a feasible treatment regime can reduce transmission by decreasing the duration of infection and the effective reproductive number. Recent studies by Mariner *et al.* (19) reveal that using treatment to reduce the infectious period by 50% resulted in a 64% reduction in mortality and a reduction in the prevalence of infected herds from 75.4% to 33.2%. The disease effects of CBPP can therefore be reduced by at least half when an appropriate treatment regime is used.

In ghana reports concerning the control and vaccination of cattle from CBPP is done at the community level and data gathered to submit at district level. From district to regional and to national level.