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An Overview on the Economic Impacts of Animal Trypanosomiasis

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ABSTRACT

Animal diseases constitute a major impeder to the development process. Zoonoses in particular are an important constraint to human development and ability for increased agricultural production. Setting priorities for disease control is an essential element for decision making process especially in resource deficit conditions. The socio-economic studies play a vital role for the priority setting of diseases control. The objective of this review was to focus on what had been written in literature on the socio–economic aspects of Animal Trypanosomiasis. More than 20 papers on the subject were consulted, and the findings were categorized to qualitative and quantitative impacts. The result showed that worldwide the disease has serious socio-economic impacts especially in Africa. The results were discussed and conclusions were drawn.

KEYWORDS : AAT; economic loss; disease control

Introduction

Animal diseases constitute a major constraint to development goals (Aluwang and Bello (2010). Their negative impacts can be manifested in term of the reduction in the outputs and output quality, inefficient utilization of inputs, costs of disease control, human health impacts, animal welfare impacts and trade implications (Bennett & Kitching , 2000). Animal Trypanosomiasis is caused by protozoa of the genus Trypanosoma affects all domestic animals. The disease either transmitted cyclically by tsetse and other biting insects or mechanically, the primary clinical signs are intermittent fever, anemia, and weight loss. Cattle usually have a chronic course with high mortality (Merck, 2012).

Trypanosomiasis is an expensive disease to control and thus, an economic analysis become essential to show the extent of socio-economic losses due to the disease (Thrusfield, 1986).The socio-economic impact of Trypanosomiasis control is very important in setting up priority control measures (Budd, 1999).

Methodology

Several journals, books, annual reports, conferences proceedings and periodicals during1979 -2013 were consulted. Accordingly these impacts were classified to qualitative and quantitative assessments.

Results and Discussion

Qualitative assessment of the economic loss

The economic impacts of trypanosomiasis consisted of direct and indirect losses. Direct costs involve decreased livestock productivity (mortality, fertility, meat and milk yields, and ability to work as traction animals (Finelle, 1974; Thrusfield). The direct cost also includes the detection, treatment of infected animals, fly control and research (Finelle, 1974; Shaw, Torr, Waiswa, Cecchi Wint, Mattioli, and Robinson, 2013). The indirect impact of Trypanosomiasis mostly lies on crop production; through the availability and cost of animals traction power (Swallow, 2000a; Omotainse,. Kalejaiye, Dede and Dada, 2004).

In India Juyal (2011) reported that most of the direct losses in the animals are due to mortality and chemotherapeutic cost. The indirect losses remained an important factor due to severe immunosuppression produced by the disease leading to failure of vaccination against bacterial and viral infections (Holmes, Mammo, Thomson, Knight, Lucken, ,Murray, Murray, Jenning,. and Urquhart, , 1974).

The cost evaluation of tsetse control against chemoprophylaxis has been done in cattle where it was found that the lower the land carrying capacity and the lower the trypanosome challenge, it was more economical to protect the animals by drugs rather than tsetse control (Holmes & Scott, 1982). Putt and Shaw (1982) studied the economic effects of Tsetse eradication in Nigeria, at the local level in Sokwa district, the benefits to livestock included reduction in morbidity and mortality rates, the saved Trypanosomiasis treatment costs, the extra productivity in terms of meat production and the increased agricultural production due to the use of work oxen whose use had hitherto been precluded by trypanosomiasis. Although the direct negative impacts had been thoroughly investigated, yet some indirect impacts such as animal welfare impacts need more investigation.

Quantitative assessment of the economic loss

African Animal Trypanosomiasis (AAT) costs Africa US$5 billion a year and Africa spend every year at least $30 million to control cattle trypanosomiasis in term of curative and prophylactic treatments (PAAT, 1998). Direct losses due to Trypanosomiasis are estimated to between US$ 1-1.2 billion each year. The total losses for the total tsetse-infested lands in terms of agricultural Gross Domestic Product are US$ 4.75 billion per year (FAO, 2000).

In Africa calving rates reduced by 0 to 12%, 11 to 20% in tolerant and susceptible animals respectively, the calf mortality increased by 0 to10% in tolerant breeds and by 10 to 20% in case of susceptible. Moreover, in Sub-Saharan Africa the cattle numbers decreased by 14, 27 and 77% in arid, sub humid and humid areas respectively (Swallow, 2000). Samdi Samdi, Abenga, Attahir, Haruna, Wayo, Fajinmi, Sumayin, Usman, Hussaina, Muhammad, Yarnap, Ovbagbedia and Abdullahi (2010) mentioned that trypanosomiasis reduces meat and milk off take by 20%, calving rate by 20%, increase calf mortality by 20%, decreases both lambing and kidding rates in sheep and goat.

According to Leak, Mulatu, Rowland and d' Iteren (1995) and Swallow et al (1995). Oxen in the high risk area were 38% less efficient than oxen in the low risk area.

It was clear that the disease has negative impacts on input utilization people tend to use the less productive tolerant breed resulting in less availability of animal food. Agricultural product also reduced as result of use of less efficient oxens.

Based on Onyiah (1997) the Nigerian institute for trypanosomiasis research estimated the economic loss due to cattle trypanosomiasis in six states at N837.20 million annually.

Experimental study in Gambia revealed a decreased by proportionately 0.25 in milk extracted during the 1st month of infection in infected group, while the corresponding figure in the uninfected was 0.02 (Agyemang, Dwingera, Jeannina, Leperrea, Grievea, Baha, and Littlea, 1990). The mean daily milk extracted from uninfected cows during a 6-month period was proportionately 0.26 higher than that for the infected cows. It was estimated that the decline in milk extracted due to trypanosome infections amounted to an average of £1 per month per cow.

Griffin and Allonby (1979) studied the economic effects of naturally acquired trypanosomiasis in sheep and goats over a period of 35 weeks under range conditions in the Kiboko area of Kenya. They revealed that the financial loss from reduced weight gain and death amounted to 36•2 and 62•9 Kenya shillings per head for goats and sheep respectively.

Camus (1980) evaluated the economic losses caused by bovine trypanosomiasis in the north of Ivory Coast. The mortality rate in calves less than one year was 15.3% compared with 10.4% in uninfected herds; while in cattle over one year was 3.1% and 1.5%. The abortion rate was 2.1% in infected herds and 1.8% in uninfected herds. If these figures are applied to all sedentary herds in the region (300 000 head) the economic loss over 10 years could exceed 2000 million CFA.

On Galana Ranch, Kenya, Wilson (1986) estimates the economic loss due to trypanosomiasis for one year (July 1980–June 1981). The potential losses in beef production were estimated at around K.Shs. 8900/km2, when the stocking rate was 14.2 Tropical Livestock Units per km2. The estimated potential loss in the total population at risk was approximately K.Shs. 5 million (around US$ 700,000 at 1981 values).

Camel trypanosomiasis, (surra) is the most important single cause of economic losses in camel rearing areas, causing morbidity of up to 30.0% and mortality of around 3.0% (Ngerenwa, Gathumbi, Mutiga, Agumba, 1993; Pacholek et al., 2001; Njiru, Bett, Ole-Mapeny, Githiori, andNdung'u, 2002). Juyal (2011) conceived that the economic losses caused by surra in Asia may be higher than those caused by the African trypanosomes, which are estimated to be US$ 1.3 billion in relation to cost of meat and milk.

Based on Bauer, Amsler-Delafosse, Kaboré and Kamuanga (1999), AAT was found to be the major constraint in the agropastoral zone (ZAP) of Yalé, with high mortalities in cattle justifying a tsetse control programme. The improvement in the overall health resulted in a resumption in fertility and milk production, allowing the sale of dairy products in Léo, thus creating a gross income of about $US3/day for the Fulani women.

In South America Seidl, Dávila,and Silva (1996) estimated the financial impact of the first outbreak of Trypanosoma vivax in the Brazilian Pantanal wetland and Bolivian lowlands at more than 11 million head of cattle, valued at more than US$3 billion. They also reported that untreated T. evansi will have an anticipated impact of about US$ 2.4 million per year on the Pantanal region.

The studies on economic loss in Africa are more than that in South America. This may be attributed to the efforts done to control the disease in South America more emphasis were direct to control of the disease

The benefits of controlling animal trypamsomiasis

Kristjanson, Swallow, Rowlands, Kruska, and de Leeuw (1999) estimated potential benefits of improved trypanosomiasis control, in terms of meat and milk productivity alone at $700 million per year in Africa, whereas the cost of the livestock disease to producers and consumers was estimated $1340 million annually.

The cost benefit analysis of trypanosomiasis control and treatment in Northern Ghana conducted by Wahab and asuming – Brempong (2007) indicated average net benefit and the financial rate of return of $504,274 and 35.06 and overall B/c ratio of treatment and control was 1.35.

It was estimated that the tsetse eradication campaign increased the year round carrying capacity of the natural rangelands of Nigeria by approximately 2.6 million head during the period 1955 to 1978 (Putt and Shaw, 1982).

For Onyiah (1997) if trypanosomiasis is controlled or eradicated, tsetse infested areas of Nigeria could support additional 2.5 to 3.2 times the current estimated livestock population.

Seidl (1996) mentioned that the implementation of an annual curative strategy (Diminazine aceturate) in the Brazilian Pantanal wetland and Bolivian lowlands . This strategy results in an annual expected net benefit to the region of over US$2 million. A seasonal curative strategy and a preventive strategy (Isometamidium chloride) are also found to be economically justifiable, but are less attractive on economic grounds than the annual curative strategy.

Conclusion

It was concluded that the economic analysis covered different aspects, some studies dealt with the losses due to the disease and others were interested in cost – benefit comparisons the disease control. Moreover, experimental studies on the impact of the disease were also conducted. All studies on disease control demonstrated the benefits of controlling the disease, hence the importance of implementing such programmes. Despite the effort of PATTC, Africa still needs more collaboration in combating the disease.

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