An Overview on the Economic Impacts of Animal Trypanosomiasis

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ABSTRACT

Animal diseases constitute a major impediment to development goals (Aluwang and Bello (2010). Their negative impact can be manifested in term of the reduction in the output 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 becomes 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 during 1979-2013 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 include the detection, treatment of infected animals, fly control and research (Finelle, 1974; Shay, Tort, Waiswa, Cecchi Wint, Mattioli, and Robinson, 2013). The indirect impact of Trypanosomiasis mostly lies on crop production; through the availability and cost of feed, and the productivity of the calf and the overall animal. For example, 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.

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, Jennings, 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 tsetse though, it was more economical to protect the animals by drugs rather than tsetse control (Holmes & Scott, 1982). Putt and Shay (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 where 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 to 10% 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, Abengga, 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.

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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 oxen.

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, Dwinger, Jeannina, Lepereea, 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.
Camel trypanosomiasis, (surra) is the most important single cause of eco-
nomic 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, and Ndung’u, 2002).
Joyal (2011) conceived that the economic losses caused by surra in Asia
may be estimated US$ 1.3 billion in relation to cost of meat and milk.

Based on Bauer, Amsler-Delafosse, Kaboré and Kamauanga (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 milk and
milk production, allowing the sale of dairy products in Léo, thus creating
a gross income of about US$3/day for the Fulani women.

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

The studies on economic loss in Africa are more than that in South America.
The 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 trypanosomiasis
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) in-
dicated 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 testa eradication campaign increased the year
round carrying capacity of the natural rangelands of Nigeria by approxi-
ately 2.6 million head during the period 1955 to 1978 (Putt and Shaw, 1982).

For Onyiah (1997) if trypanosomiasis is controlled or eradicated, testes in-
fested 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 Bolivi-
ian lowlands is. 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 justi-
iable, 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 in-
terested 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 PATC, Africa still needs more collaboration in combating the
disease.