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Assessment of Economic Impact Caused by Poultry Coccidiosis in Small and Large Scale Poultry Farms in Debre Zeit, Ethiopia

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Abstract: A study was conducted to assess the economic impact of poultry coccidiosis in small- and large-scale poultry farms in Debre Zeit, Ethiopia. Study population consisted of broiler and layer chicken in 8 farms. Data were obtained from farm records of the poultry farms. Records were collected on inputs and outputs. Questionnaires were used to obtain information that could not be obtained from farm records. They were also used to assess the farmer's awareness of the disease and its impact on flock performance. The economic impact was assessed in the context of how and how much the disease affected the level of inputs and outputs. Qualitative and quantitative assessment of the impacts of the disease was made at the farm level. Coccidiosis was identified as a cause of direct and indirect losses in all farms. Losses occurred in the form of mortalities, coccidiostat costs, reduced weight gains, reduced market value of affected birds, culling, delayed offtake and reduced egg production. Average losses due to mortalities, culling and coccidiostat costs were estimated at Ethiopian Birr 898.80 and 5301.80 per farm or 0.55 and 0.53 Ethiopian Birr per chicken in small scale and large scale poultry farms, respectively. This contributed to an average of 11.86% and 8.40% loss in enterprise profit per farm in small and large scale farms, respectively. Proportional mortality rates due to coccidiosis were 14.5% and 13.3% in small scale and large scale poultry farms, respectively. It was concluded that coccidiosis was a major cause of losses in surveyed farms.

Key words: Poultry, impact, *Eimeria*, coccidiosis, farm, Ethiopia

Introduction

In developing countries, animal production is being subjected to great pressure to satisfy the demand for animal protein required by the continued increase in human population, and also to have surplus for international trade (FAO, 1993; FAO, 1998). Among the animal production activities, poultry sector is the fastest growing. What started as backyard "village poultry industries" during mid of the 20th century have evolved into skilful and organized agribusiness in most of these countries (FAO, 1998). Thus, the production of poultry protein-products has greatly expanded in many of these countries in the recent past. Nevertheless, it has been adversely affected by a variety of constraints (FAO, 1998). Of these constraints, poultry diseases continue to play the major central role in hampering its development (FAO, 1998; Rushton *et al*, 1999).

The impact of disease on animal agriculture is typically assessed in quantitative terms. In poultry industry, these terms include for example lost revenues; costs of vaccination/prevention, eradication, decontamination and restocking. These have been referred to as a negative inputs (Thrusfield, 1995). In Ethiopia, diseases are among the major factors that hinder poultry development (Alamargot, 1987). In this developing country, poultry mortalities due to diseases are

estimated between 20% to 50% but they can rise as high as 80% during epidemics (Alamargot, 1987; Alemu, 1995). Poultry coccidiosis is one of these diseases causing significant poultry losses in Ethiopia.

In Ethiopia, poultry coccidiosis, caused by for example *Eimeria acervulina*, *Eimeria necatrix*, *Eimeria maxima* and *Eimeria tenella*, is endemic in all parts of the country and affects mainly young growing birds (Alamargot, 1987; Nasser, 1998). During the past years, coccidiosis used to be the most important cause of mortalities in all farms. Incidences of the disease were as higher as 80% usually occurring in the form of outbreaks (Alamargot, 1987). The disease continued to be a problem as reported by investigators such as Fessesse-work (1990); Kalifa (1997); Hagos (2000).

Despite the economic significance of the disease to the commercial and small scale poultry producers in the country, no substantial research has been done to assess its economic losses. The primary objective of this study was, therefore to assess the economic impact of the disease in small and large scale poultry farms in Debre Zeit, Ethiopia.

Materials and Methods

Description of study area and population: The study was conducted between February and August, 2001 in

Debre Zeit, Ethiopia. Debre Zeit is located 45 KM Southeast of the Ethiopian capital city of Addis-Ababa at an altitude of 1850 meters above sea level. Average annual temperature, rainfall and humidity are 18.7°C, 866 mm and 50.9%, respectively (CSA, 1998; NMSA, 1999).

The study population consisted of broiler and layer chicken in 8 poultry farms. The farms included 4 large-scale and 4 small-scale farms. Large-scale farms had flock sizes that ranged from 4000 to over 80,000 birds per farm. Small-scale farms had flock sizes that ranged from 300 to 3000 birds per farm. Breeds of poultry kept in these farms were exotic.

Study design: The study was a retrospective survey with the objective to assess the economic impact of the disease in the study area. It utilized historic data from farm records. The farm records were supplemented with questionnaires. Only farms in which coccidiosis was a problem were included.

Data collection: Records were collected on the value of major inputs and outputs. Structured questionnaires were used to obtain additional information on the disease and its economic impact that could not be obtained from farm records. They were also used to assess farmer's awareness of the disease and its impact on flock performance.

Data management and analysis: Data collected were managed as databases in MS-Access. Descriptive statistics were performed using MS-Excel. Qualitative and quantitative assessments for economic impact of poultry coccidiosis were performed using gross margin analysis (Martin *et al.*, 1987; Dijkhuizen and Morris, 1996; Rushton *et al.*, 1999). All figures were drawn using MS-Excel.

Results

Coccidiosis was identified to be a major cause of both direct and indirect losses in all farms. Losses occurred in the form of mortalities, coccidiostat costs, reduced weight gains, reduced market value of affected birds, delayed offtake and reduced egg production in layers. The disease also contributed to culling. Quantification of economic losses resulting from coccidiosis in small scale and large scale poultry farms is as shown in table 1, while table 2 shows farmers income from poultry production as compared to loss due to coccidiosis in the same poultry farms.

Questionnaire survey combining expert opinion indicated that the disease was among major causes of morbidity and mortalities in all surveyed farms.

Fig. 1a and Fig. 1b shows the cost of major inputs as compared to coccidiostat cost in small and large scale poultry farms, respectively. Small scale farms incurred

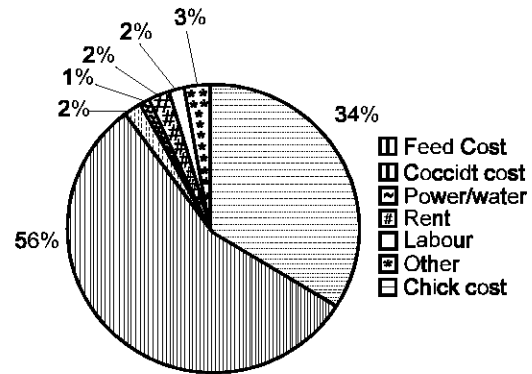


Fig. 1a: Cost of major inputs as compared to coccidiostat cost in small scale poultry farms in Debre Zeit, Ethiopia. (n=4). (Coccidcost = Coccidiostat cost)

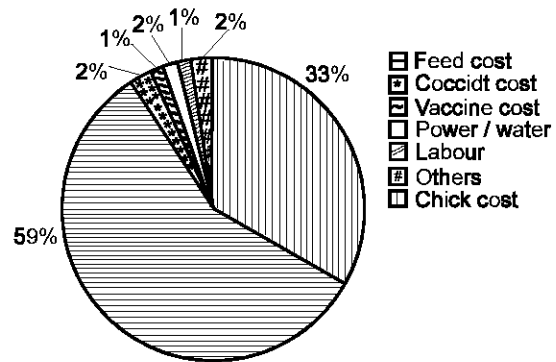


Fig. 1b: Cost of major inputs as compared to coccidiostat cost in large scale poultry farms in Debre Zeit, Ethiopia. (n=4). (Coccidcost = Coccidiostat cost)

more losses compared to large scale farms. Total average losses due to mortalities, culling and coccidiostat costs were estimated at Ethiopian Birr 898.80 and 5301.80 per farm or 0.55 and 0.53 Ethiopian Birr per chicken in small scale and large scale poultry farms, respectively. This contributed to an average of 11.86 and 8.40% loss in enterprise profit per farm in the respective production systems. Average proportional mortality rates due to coccidiosis were 14.5 and 13.3% in small scale and large scale poultry farms, respectively.

Discussion

The result of this study showed that coccidiosis is still an important health problem causing significant economic losses in the study area. Average total losses were estimated at 898.8 and 5301.8 Ethiopian Birr per farm or 0.55 and 0.53 Ethiopian Birr per chicken in small scale and large-scale farms, respectively, which contributed to an average of 11.86 and 8.4% loss of

Table 1: Quantification of economic losses resulting from coccidiosis in small scale (n=4) and large scale (n=4) poultry farms in Debre Zeit, Ethiopia

Loss factor		Loss (Ethiopian Birr)	
		Small scale farm	Large scale farm
Mortalities	(1)	429.24	3028.80
Coccidiostats cost	(2)	457.75	2273.00
Culling	(3)	11.78	0.00
Total loss	(1+2+3)	898.80	5301.80
Loss per chicken		0.55	0.53

1USD = 9 Ethiopian Birr.

Table 2: Farmers income from poultry production as compared to loss due to coccidiosis in small scale (n=4) and large scale (n=4) poultry farms in Debre Zeit, Ethiopia

Income factor		Amount (Ethiopian Birr)	
		Small scale farms	Large scale farms
Output	(1)	28883.05	156610.10
Variable costs	(2)	20116.50	91479.53
Gross margin	[3=(1-2)]	8766.55	65130.57
Fixed costs	(4)	1187.00	2181.50
Profit	(3-4)	7579.55	62949.07
Profit/chicken		4.64	6.33
Total loss as percentage of profit		11.86	8.42

enterprise profit per farm in the respective production systems. This indicated that small scale poultry farms incurred more losses compared to large scale farms. However, when losses due to coccidiostats was compared, it was observed that both farms spent 2% of their overall expenditure on inputs for coccidiostats. This observation meant that the excess financial losses that small scale poultry farms incurred were due to mortalities and (to a small extent) culling. This observation was supported by a parallel study that showed that small scale farms had more clinical cases as compared to large scale farms (24.5% and 17.4%, respectively). Furthermore, proportional mortality rates due to coccidiosis were higher in small scale farms as compared to large scale farms (14.5% and 13.3%, respectively).

This study did not attempt to quantify economic losses due to reduced weight gains although it is known that they contribute the biggest portion of all losses due to coccidiosis (Braunius, 1980; Gordon and Jordan, 1982; McDougald and Reid, 1997; Vermeulen *et al.*, 2001). It was not easy to quantify reduced weight gains in the study area due to other contributing management and environmental factors. However, the three causes of losses which were quantified (mortalities, culling and costs of medication) showed significant economic losses.

Most questionnaire responses ranked coccidiosis as second or third disease as a cause of economic losses after broiler ascites, colibacillosis or cannibalism. This was attributed to the fact that incidences of clinical

coccidiosis and mortalities had decreased due to improvements in management practices and implementation of effective control measures such as use of coccidiostats in feeds. However, taking into account the higher incidence of subclinical coccidiosis, the weight loss that it causes and the higher cost of medication, our opinion and conclusion is that coccidiosis is still an important disease to the poultry industry in the study area.

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