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AFRICAN SWINE FEVER IN ZAMBIA: POTENTIAL FINANCIAL AND PRODUCTION CONSEQUENCES FOR THE COMMERCIAL SECTOR

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ABSTRACT

The first officially recorded outbreak of African swine fever (ASF) in Zambia was in Eastern province in 1965. The disease now covers almost the whole province and is endemic in the indigenous breeds. In 1989, an outbreak of ASF occurred on a commercial property in central Zambia for the first time and was eradicated by depopulation. In order to examine the justification of the drastic control measures and the continued ban on the export of pigs and their products, the impact of the outbreak on the affected property as well as the potential consequences on the commercial pig sector in the district was assessed in the present study. The affected property lost 421,238 Zambian Kwacha (ZK) (US$39,965) as a result of the outbreak and control measures. However, the cost to the district could have been at least ZK14,917,500 (US$1,415,323) if the measures had not been effected. Furthermore, not taking such measures would have increased the risk to the entire commercial pig sector along the line of rail in urban centers.

Key Words: African swine fever, porkers, litters, down time, depopulation, Zambian Kwacha.

INTRODUCTION

The first officially recorded outbreak of African swine fever (ASF) in Zambia was in Chipata and Katete districts of Eastern province in 1965 in "exotic" pigs[1)] (Fig. 1). Reports by Wilkinson[5,6)], Wilkinson et al.[7)] and Mwanaumo et al.[3)] have indicated that

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ASF is now endemic in indigenous pig breeds almost throughout the province (Fig. 1). Approximately 300,000 pigs, divided into the commercial (about 36,000) and traditional (about 264,000) sectors[2], are raised in Zambia. The former comprises mainly the Large white and Landrace breeds and their crosses, and is located mainly around urban centers, while the later is mostly made up of indigenous breeds. The Eastern province supports over 66% of the traditional pig population.

The presence of ASF in Eastern province and its devastating effect on commercial pig breeds has led to a long standing ban (since 1965) on the export of pigs and their products from the province to the rest of the country, thus drastically reducing the source and quantities of these products especially for the urban communities. The Luangwa river, where there is a permanent check point, and the Muchinga escarpment serve as natural barriers on the Southern, Western and North-western borders of the province, respectively. To offset this shortfall, livestock development policy has been directed, among other things, towards developing the commercial pig sector. The validity of this continuous quarantine has, however, been frequently questioned. Political leaders have openly condemned the continued existence of the ban and used it in their campaigns.

In May, 1989, the first outbreak of ASF outside the endemic province was

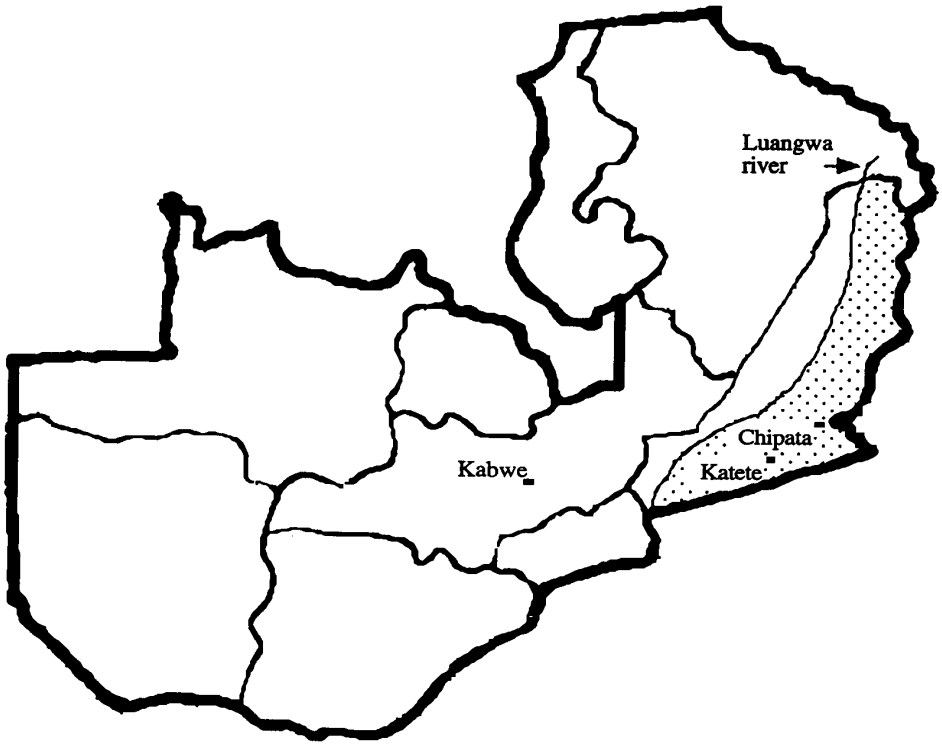

Fig. 1. Map of Zambia showing Kabwe where the ASF outbreak occurred. The shaded area shows part of Eastern province where ASF is endemic.

recorded on a commercial property in Kabwe urban district of Central province[4]. There were initially 164 pigs including 13 that comprised the parent stock on the affected property. The outbreak was eradicated by depopulation of the affected herd, a method which farmers complained about. At the time of the outbreak, there were approximately 10,000 commercial pigs in the district and at risk of infection. This article justifies the control methods used for eradication and subsequently, the continued quarantine of pigs and their products in the Eastern province. This is achieved by assessing the financial impact of the outbreak on the affected property and the potential consequences on the whole commercial pig sector in the district if the measures had not been effected.

Materials and methods

Probably the most appropriate way of justifying the use of these drastic measures is to assess the financial impact of the outbreak on the affected property and subsequently, the potential impact on the whole commercial pig sector in the district and then compare them (i. e. some kind of cost-benefit analysis). The difference could then be regarded as the benefit (if any) of implementing the measures. The financial impact of the outbreak on the affected property was assessed based on the following parameters collected during the course of investigating and controlling the outbreak :

1. The loss of 13 breeding pigs plus the loss of income from potential litters ;
2. The loss of 151 porkers ;
3. The cost of treatment drugs, disinfectant and diesel used to burn the infected and contaminated carcasses ;
4. Loss due to down-time.

All estimates were carried out using 1989 commercial prices and foreign currency exchange rate (US$1 = ZK10.54) and the reported production cost of approximately 25% of the earnings.

The loss of 13 breeding pigs and loss of income from potential litters

At the time of the outbreak, the average weight of the breeding sows and the boar was approximately 120 and 210 kilograms (kg), respectively. Thus 1650 (120 kg x 12 + 210 kg) kg or ZK38,610 (US$3,663.19) was lost due to death of the breeding pigs. In Zambia, the average weight of a piglet at weaning is 20 kg. Since piglets are more likely to be sold after weaning than before, the weight at weaning is used to estimate their monetary value at that age (ZK468). In Zambia a sow is expected to litter on average twice per year with an average live litter size of 9 piglets at weaning. As the sows died in May, it is assumed that one litter was lost to each of the 12 sows, i. e. 108 piglets with a total weight of 2,160 kilograms. Thus ZK50,544 (US$4,795.45) was lost through loss of potential litters.

The loss of 151 porkers

In addition to the parent stock, the property had 151 porkers with a total liveweight of 5,828 kg. These either died naturally of the disease (21 pigs) or were destroyed (130 pigs). This meant a gross loss of ZK136,375.20 (US$12,938.82). When reduced by 25% (the reported approximate production cost), there was a net loss of ZK102,281.40 (US$9,704.12).

The cost of treatment drugs, disinfectant and diesel

At the beginning of the outbreak, swine erysipelas was suspected and hence the breeding pigs (the first to show clinical symptoms) were put on a 3 day penicillin course costing ZK420. After laboratory confirmation of ASF, some 420 liters of diesel costing ZK821 were used to destroy the contaminated carcasses and 40 liters of disinfectant costing ZK3,257 to decontaminate the pens. The total cost of all these activities was ZK4,538 (US$431).

Loss due to down-time

Finally, as part of the eradication measures, the affected property was ordered not to restock for at least one year (June 1989 through May, 1990). Assuming that during this time, another herd of at least 151 porkers could have been raised to market weight (85 kg), the net and gross down-time loss could be ZK300,339 (US$28,495.16) and ZK225,254.25 (US$21,371.37), respectively.

Estimating the Potential Impact of ASF on the Commercial Pig Sector in the District

This was estimated using the 1989 district commercial pig population of approximately 10,000, the average market weight of 85 kg, the price per kg of ZK23.40 (US$2.22) in 1989, and the reported cost of production of 25% (0.75) of the generated income (i. e. 10,000 x 85 x $2.22 x 0.75). The average market weight was used in the estimation due to non-availability of the district herd inventory information. Thus the resultant estimate was very conservative and could be much higher.

RESULTS

The total loss due to death of the parent stock and loss of potential litters was ZK89,154 (US$8,459). ZK102,281 (US$9,704) was lost due to the loss of 151 porkers; ZK4,538 (US$431) due to treatment and decontamination and, ZK225,254 (US$21,371) due to down-time. Thus the innumerable financial impact on the affected property totaled ZK421,227 (US$39,965) (Table 1). Assuming that the destroyed 130 porkers were to die from ASF later, the total loss by the property due to the control measures (items 3 and 4) alone was ZK310,487 (US$29,458).

The net market value of the commercial pig population in the district was estimated at ZK14,917,500 (US$1,415,323) (Table 2). This is also regarded as the potential impact of ASF on the commercial sector in the district if the disease was allowed to establish itself by not implementing the drastic control measures. Thus the benefit to the district, of implementing the drastic measures at a cost of US$39,965 was US$1,375,358 (or approximately US$1.4 million).

Table 1. Estimated financial impact of ASF on the affected property.

Parameter	Number	Pig lost	Estimated total liveweight (Kg)	Estimated value (US$)
Parent stock	13	13	1,650	3,663.19
Potential litters	9	108	2,160	4,795.45
Porkers	151	151	5,828	9,704.12
Drugs & diesel	—	—	—	431.00
Down time	151	151	12,835	21,371.37
Total				39,965.13

Table 2. Potential impact of ASF on the district commercial sector and approximate benefit from implementing depopulation and quarantine measures.

Parameter	Number	Estimated liveweight (Kg)	Estimated net value (US$)
District population	10,000	850,000	1,415,323
Estimated impact on affected property	—	—	39,965
Approximate benefit	—	—	1,375,358

Discussion

For ASF, depopulation and quarantine are currently the only available control measures. Experience in Eastern province[1)] has shown that once established, the disease spreads very rapidly in an area, aided by uncontrolled human movement in and out of the foci of infection to other piggeries as well as the proximity of these piggeries to the foci and each other. It is, therefore, possible that the disease could have quickly spread in the district, as there were several piggeries in the vicinity of the infected property (the nearest being just about 6 km away). The case fatality rates observed during the reported outbreak and in commercial pigs in Eastern province before it[1)] was 100%, suggesting that the approximately 10,000 such pigs in the district could have been wiped out or drastically reduced, causing a net loss of US$1,415,323. The supply of pig products to the nation would have been reduced by at least 30%. The benefit from implementing the measures of some US$1.4 million justifies their use as this amount could be equated to Zambia's budget at that time. Furthermore, once established in Kabwe district, no other measures (on a much larger scale) could have prevented the disease spreading rapidly north and south along the line of rail and throughout the entire commercial pig sector thus negating the current

efforts to develop the sector.

From the foregoing, it is clear that the drastic measures, taken to eradicate this outbreak were justified as the benefit of approximately ZK14.7 million or US$1.4 million was so large, under the Zambian economic standards. Lifting the ban on the inter-provincial exports of pigs and their products from Eastern province would be highly detrimental to the nation's concerted efforts to improve the supply of animal protein and reduce the cost of consuming it. The ban should, not only be maintained but strengthened to prevent the spread of ASF from the endemic province.

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