

ECONOMIC FEASIBILITY OF PRIVATE VETERINARY PRACTICE IN NORTH-WESTERN NIGERIA**K. M. BABA¹ AND A. O. OGUNGBILE²**¹Department of Agricultural Economics and Extension, Usmanu Danfodiyo University, Sokoto²Department of Agricultural Economics and Rural Sociology, Ahmadu Bello University, Zaria**Abstract**

Using data collected from professional and para-professional veterinarians and from a veterinary products price survey, the paper examined the economic feasibility of private veterinary practice in north-western Nigeria. The results showed that there were 53,315 veterinary livestock units (VLUs) per veterinarian and 15,328 VLUs per paraveterinarian. These ratios suggest an under-supply of veterinary personnel in the area since they both exceed the recommended ratios of 20,000 VLUs per veterinarian and 1,000-3,000 VLUs per paraveterinarian. The results of the break-even analysis revealed that private practice was potentially feasible since the available livestock units and densities exceed those required to break even. It was also found that economic feasibility could further be enhanced if a private provider uses (at least in the first few years) a motorcycle, instead of a four wheel-drive vehicle. It is suggested, however, that privatization of veterinary services should begin on a pilot scale and that private providers should be given absolute right of practice over specific areas. But to preserve service quality and prevent possible exploitation of providers, a provider selection and regulation procedure in which livestock owners (or their representatives), the Nigerian Veterinary Medical Association and the Veterinary Council of Nigeria would play active roles, is advocated.

Keywords: Veterinary services, Economic feasibility, Private practice

Introduction

The livestock sub-sector plays a crucial role in the Nigerian economy. It provides animal protein (in the form of meat, milk and eggs) to the populace and serves as a source of revenue and foreign exchange to the country. In addition, it provides employment to those who are engaged in livestock production, processing and/or marketing (Kallah, 2001). For many people, livestock is also a form of stored wealth, a cushion against starvation when food is scarce, a source of fertilizer (organic manure), a means of transportation, and a source of traction in crop production (Umali *et al.*, 1992). Livestock also serve as source of raw materials for some industries (Afolabi, 2002) and have socio-cultural value as well (Oluremi and Maijankai, 2002). The benefits of the livestock sub-sector are, therefore, numerous.

It is generally believed, however, that the sub-sector has not performed some of the above-stated roles satisfactorily. This is particularly evident in the case of protein provision. For instance, the rate of growth in the supply of livestock products (estimated at about 1.8% per annum) continues to lag behind the growth in demand (estimated at about 5.1% per annum) (Mokah, 1990). Recorded per capita daily animal protein intake in Nigeria is estimated at about 6.8g (FAO,

1998) which is far below the Food and Agriculture Organization (FAO) recommended minimum requirement of 35g per capita per day. In terms of revenue generation, the sub-sector does not fare better. Livestock now contributes about 5.9% of the GDP, which is a decline from over 10% in 1960 (FOS, 1967, 1999). The poor performance of the livestock sub-sector could be partly attributed to the high prevalence of livestock diseases which have caused severe losses (Alonge and Ayanwale, 1984; Lamorde, 1984; Wosu, 1989). The high prevalence of livestock diseases could, in turn, be attributed to the ineffective veterinary services.

Since independence, governments in Nigeria have assumed almost exclusive responsibility for providing veterinary services. It appears, however, that government veterinary services have become ineffective due mainly to poor funding. Veterinary services are funded through annual budgetary allocation for livestock support services which appears to have been declining due probably to the current economic depression. For instance, in the erstwhile Sokoto State (comprising the present Sokoto and Zamfara States), capital allocation for livestock and veterinary services in real terms (i.e after deflation), decreased from ₦3,105,466.15 in 1993 to just ₦926,803.38 in 1996 (computed from SOSG, 1993,

1996; FOS, 1996, 1999).

As a result of the decline in funding and the consequent ineffectiveness of veterinary services, livestock morbidity and mortality have been high, leading to calls for the privatization of veterinary services in the country generally (Suleiman, 1990; Kela, 1991). The Federal Department of Livestock and Pest Control Services (FDLPCS), which formulates livestock disease control policies in Nigeria, commissioned a study of the state of veterinary services throughout Nigeria and the feasibility of their privatization. The report of the study recommended privatization as the only way out of the present situation (Kela, 1991). In Zamfara State, the European Economic Community-assisted Zamfara Environmental Protection Agency (ZEPA) introduced cost-recovery in the provision of veterinary services as a first move toward the market. The State Second Pilot Livestock Development Project in Sokoto also introduced cost-recovery in its veterinary services, and moved a step further by establishing a credit scheme for veterinarians wishing to establish private practices in the State.

Livestock development planners, in making these moves toward the market, believe that the privatization of veterinary services will increase their effectiveness, reduce the economic losses associated with livestock diseases and increase the productivity in the livestock sub-sector. But the success of privatization will depend on a number of factors, prominent among which is the economic feasibility of private practices. Private entry into veterinary services depends on whether economically profitable practices could be sustained in an area. This study, therefore, examines the economic feasibility of private provision using break-even analysis. The specific objectives of the study are:

- (1) to estimate the costs and returns of a private practice in north-western Nigeria,
- (2) to determine the number of veterinary livestock units (VLUs) a provider must treat to break even,
- (3) to estimate the livestock densities required for a provider to make additional income,
- (4) to ascertain whether such livestock densities are available in the area and,
- (5) to draw implications of the findings of the study for policy on veterinary services privatization in the area.

Materials and Methods

The Study Area

North-western Nigeria (10°-14°N; 3°-7°E) refers to Sokoto, Kebbi and Zamfara States. The vegetation of the area is savanna, with the boundary between Northern Guinea savanna and Sudan savanna cutting across the center (Abdullahi, 1985). It is an important livestock producing zone in Nigeria.

Data Collection

Data for this study were obtained from a survey on

structural reform of veterinary services in north-western Nigeria conducted between 1996 and 1997. The survey covered 300 Fulani pastoralists and 15 professional and paraprofessional veterinarians. The list of equipment and materials required for establishing a private practice and their expected lifespans was obtained from the questionnaire responses of the professional and paraprofessional veterinarians who were randomly sampled out of the list of veterinary staff of Sokoto State Ministry of Agriculture and Natural Resources, ZEPA and Faculty of Veterinary Medicine of Usmanu Danfodiyo University Sokoto (UDUS). Information on the cost of the items was obtained through a survey of veterinary stores at Sokoto, Birnin Kebbi and Gusau in 1997. Prices of some equipment which were not available in these cities were obtained in Kaduna. Information on the number of veterinary personnel in the area was obtained from UDUS, the ministries of agriculture of the three states and from a number of local governments visited.

Data Analysis

The data collected were analysed through farm (break-even) budgeting (Umali *et al.*, 1992). The break-even model used is of the form:

$$BVLU = (TFC + TVC - MOD)/FPVL \dots\dots\dots(1)$$

Where:

BVLU = break-even veterinary livestock units [a veterinary livestock unit (VLU) is defined as the equivalent of one cow or one camel or two horses or two donkeys or two pigs or ten small ruminants (sheep and goats) or 100 fowls (De Haan and Bekure, 1991)],

TFC = total fixed cost consisting of depreciation on veterinary equipment, transport facilities, office, furniture and refrigerator; cost of utilities; salary of staff; rent on clinic building,

TVC = total variable cost consisting of fuel and maintenance cost, cost of capital and cost of drugs and veterinary supplies,

MOD = margin on drug sales and

FPVLU = fee charged per veterinary livestock unit treated.

Equation (1) was used to determine the break-even veterinary livestock units (BVLUs) in the study area. The concept of the BVLU indicates the number of VLUs that a provider must treat to break even. To determine the feasibility of private practice, the break-even veterinary livestock units have to be compared with the actual livestock density (i.e. number of VLUs per unit area). If the actual livestock density exceeds the BVLU, then private practice is potentially feasible; otherwise, it is not.

Measurement of the Variables in the Model

Durable Equipment and Facilities

The durable capital items required for a private practice include veterinary equipment, office furniture, refrigerator and transport facility. The prices of veterinary equipment were obtained through a price survey

in the study area. Prices of those items not found in the study area were obtained in Kaduna. The items were depreciated using the straight-line method and assuming zero salvage value.

The furniture required were pegged at two tables and six chairs, and their prices were obtained in the same survey indicated above. The furniture were assumed to have 10 years life span and they were depreciated also by the straight-line method. The price of refrigerator was determined during the same survey as veterinary equipment and furniture, and depreciation was equally by the straight-line method, assuming five years life span.

Two alternative forms of transport facilities - a motorcycle and a four wheel-drive vehicle - were considered. The prices of a four wheel-drive vehicle and a motorcycle were computed as averages of prices of different brands obtained from dealers in Sokoto town in June 1997. Both the vehicle and motorcycle were assumed to have life span of five years (Umali *et al.*, 1992, had assumed a life span of four years for both motorcycle and vehicle) and were depreciated using the straight line method.

Rent and Utilities

The cost of renting a clinic building in a peri-urban area were determined from estimates made by three real estate agents in Sokoto and Gusau. The costs of electricity and water were estimated from the annual bills of the States Zonal Veterinary Clinics located in Sokoto, Gusau and Birnin Kebbi.

Fuel and Maintenance

The fuel and maintenance costs were estimated from the four wheel-drive vehicle used in the survey to be ₦4.40/km. Fuel and maintenance cost for a motorcycle was assumed to be one quarter of that of a four wheel-drive vehicle. It was assumed that a provider will cover 100 km per trip (as did Umali *et al.*, 1992, in Cameroon, Guinea, Kenya and Uganda). However, in addition to the scenarios of 240, 200 and 100 trips per year assumed by Umali *et al.*, a scenario of 50 trips per year was also considered.

Drugs and Expendable Supplies

Figures from Zamfara Environmental Protection Agency and Veterinary Teaching Hospital of Usmanu Danfodiyo University Sokoto suggest that a private practice may require drugs and supplies worth about ₦55,000 a year at 1997 prices and this figure was used. The mark-up on drug sales was assumed to be either 25% or 50% (after Umali *et al.*, 1992).

Fee Per Veterinary Livestock Unit (FPVLU)

A service fee per VLU of ₦400 was used. This amount was chosen because it was the recommended consulting fee per cow (NVMA, 1996).

Operational Set-up

Two operational set-ups - a veterinarian working alone and a veterinarian employing a paraveterinarian - were considered. The salary of a paraveterinarian as at 1997 was fixed at ₦40,000 per annum.

Results

Veterinary Personnel and Livestock Population

The ratio of veterinary personnel to the livestock population could be used as an indicator of the availability of veterinary services in an area (Umali *et al.*, 1992). There are about 46 professional and 160 para-professional veterinarians in the area. It is estimated that there are 1.7 million cattle, 2.6 million sheep, 2.5 million goats, 6.5 million poultry, 250,000 donkeys, 40,000 camels and 25,000 horses in the area (FDLPCS, 1992), which give a total of 2,452,500 VLUs or 23.92 VLUs/km². Therefore, there are 53,315 VLUs per veterinarian and 15,328 VLUs per para-veterinarian. These ratios exceed the recommended 20,000 VLUs per veterinarian or 1,000-3,000 per para-veterinarian (Sandford, 1983) suggesting an undersupply of veterinary personnel in the area.

Costs and Returns of a Private Practice

Table 1 shows that a prospective private practice would require, at 1997 costs, about ₦203,375 initial investment in veterinary equipment, about ₦150,000 in transport facility for a service using a motorcycle or ₦2,500,000 for a service using a four wheel-drive ve-

Table 1: Fixed initial investments for a private practice

Item	Cost (₦)	% of total	Lifespan (yrs)	Depr./yr (₦)
Motorcycle	150,000	37.75	5	30,000
(Four wheel-drive vehicle)	(2,500,000)*	(91.00)	(5)	(500,000)
Office furniture	4,000	1.01 (0.15)	10	400
Refrigerator	40,000	10.07 (1.46)	5	8,000
Veterinary equipment	203,375	51.18 (7.40)	2-5	58,085
Total	397,375	100.00	-	96,485
	(2,747,375)	(100.00)		(566,485)

*Figures in parentheses are for a practice using a four wheel-drive vehicle instead of a motorcycle
Source: Field survey, 1997

hicle, about ₦4,000 in office furniture and about ₦40,000 in cooling facility (refrigerator), making a total of ₦397,375 (or ₦2,544,000 for a vehicle user). Table 2 shows the annual costs made up of depreciation on fixed capital items, cost of utilities, rent on clinic building, salary of paraveterinarian, cost of fuel and vehicle maintenance, cost of drugs and supplies, as well as cost of capital or interest rate (which was assumed to be 21%). Cost of fuel and maintenance as well as cost of capital were computed under four assumptions about the number of trips a provider may

make in a year (i.e either 50, 100, 200 or 240 trips). The total annual cost for a service using a motorcycle varies from ₦266,345, if 50 trips are made per annum, to ₦291,664 for 240 trips. For a service using a four wheel-drive vehicle, on the other hand, the cost ranges from ₦855,040 to ₦956,196. Therefore, there is an increase of more than 220% in annual cost for a service using a vehicle over one using a motorcycle. The returns consist of consultation fee (i.e FPVLU) of ₦400 and margin on drugs of ₦13,750 and ₦27,500 for a provider charging 25% and 50% margin, respectively.

Table 2: Estimated annual costs and returns for a private practice*

Item	Cost (₦/year)
Fixed costs:	
Depreciation:	
Motor cycle (Vehicle)	30,000.00 (500,000.00)
Office furniture	400.00
Refrigerator	8,000.00
Vet. equipment	58,085.00
Rent - clinic	15,000.00
Utilities	8,160.00
Salary	40,000.00
Total fixed cost	159,645.00 (629,645.00)
Variable costs:	
Fuel and maintenance - ₦1.1 (₦4.4)/km; 100km/trip:	
50 trips/yr	5,500.00 (22,000.00)
100 trips/yr	11,000.00 (44,000.00)
200 trips/yr	22,000.00 (88,000.00)
240 trips/yr	26,400.00 (105,600.00)
Drugs and supplies	55,000.00
Cost of capital or interest rate (21%):	
50 trips/yr	46,230.45 (148,395.45)
100 trips/yr	47,385.45 (153,015.45)
200 trips/yr	49,695.45, 315.45 (162,255.45)
240 trips/yr	50,619.45 (165,951.45)
Total costs:	
50 trips/yr	266,375.45 (855,040.45)
100 trips/yr	273,030.45 (881,660.45)
200 trips/yr	286,340.45 (934,900.45)
240 trips/yr	291,664.45 (956,196.45)
Revenue:	
Fee per VLU	400.00
25% margin on drugs	13,750.00
50% margin on drugs	27,500.00

* Figures in parentheses are for vehicle
Source: Field survey, 1997

Break-Even Veterinary Livestock Units (BVLUs)
The BVLUs computed are presented in Table 3. There is a decrease of about 34 units in the BVLUs, as the practice moves from pure veterinary service to veterinary service with 25% mark-up on drugs. A decrease

of the same magnitude is also observed in moving from 25% to 50% mark-up. However, the BVLUs increase (by 100 units) as the operational set-up changes from a veterinarian working alone to a veterinarian employing a paraprofessional. Similarly, the BVLUs increase

as the number of trips per year increases. But the most spectacular increase is observed in the case of a practitioner acquiring a four wheel-drive vehicle instead

of a motorcycle. The increase is more than 1,500 VLUs or 340% in most cases.

Table 3: Break-even veterinary livestock units

	Break-even veterinary livestock units					
	Pure vet service		Vet service + 25% margin		Vet service + 50% margin	
No. of trips/yr	Motor-cycle	4 wheel-drive vehicle	Motor-cycle	4 wheel-drive vehicle	Motor-cycle	4 wheel-drive vehicle
Single Vet						
50	428	1,900	394	1,866	360	1,831
100	445	1,967	411	1,932	376	1,898
200	478	2,100	444	2,065	410	2,031
240	492	2,153	457	2,119	423	2,084
Vet + paravet						
50	528	2,000	494	1,966	460	1,931
100	545	2,067	511	2,032	476	1,998
200	578	2,200	544	2,165	510	2,131
240	592	2,253	557	2,219	523	2,184

Source: Field survey, 1997

Table 4: Break-even and actual veterinary livestock units per square kilometre

	Break-even veterinary livestock units per square kilometre					
	Pure vet service		Vet service + 25% margin		Vet service + 50% margin	
No. of trips/yr	Motor-cycle	4 wheel-drive vehicle	Motor-cycle	4 wheel-drive Veichle	Motor-cycle	4-wheel-drive Veichle
Single Vet						
50	0.19	0.85	0.18	0.84	0.16	0.82
100	0.20	0.88	0.18	0.87	0.17	0.85
200	0.21	0.94	0.20	0.93	0.18	0.91
240	0.22	0.97	0.21	0.95	0.19	0.93
Vet + paravet						
50	0.24	0.90	0.22	0.88	0.21	0.87
100	0.24	0.93	0.23	0.91	0.21	0.90
200	0.26	0.99	0.24	0.97	0.23	0.96
240	0.27	1.01	0.25	1.00	0.23	0.98
Actual VLUs						
100%			23.92			
60%			14.35			
40%			9.57			
30%			7.18			
20%			4.78			
10%			2.39			
5%			1.20			

Source: Field survey, 1997

Table 4 presents the BVLUs/km². These were computed by dividing the BVLUs by the estimated area of coverage of a private practice (2,229.02 km²). The area of coverage was, in turn, obtained by dividing the size of the study area (102,535 km²) by the total

number of professional veterinarians in the area. If it is assumed that the practice will attend to all the animals in its area of coverage, the actual VLUs on ground per square kilometre (23.92), as presented in Table 4, exceed the VLUs/km² required to break-even in all cases.

If it is assumed that only 60% of the actual VLUs would require medical attention in a year, the number drops to 14.35/km², and to 9.57/km² if only 40% will require treatment, all of which still exceed the VLUs/km² required to break even. The Table shows that private practice remains economically feasible even if the VLUs/km² requiring medical attention in a year falls to 5% of the actual VLUs.

Veterinary Livestock Units Required to Make Additional Income

Table 5 shows the VLUs/km² required to make additional income after breaking-even. The results presented are with respect to a practice employing a paraveterinarian and charging 25% margin on drugs. Comparing these VLUs/km² with the actual VLUs/km² presented in Table 4, it can be seen that for a practice using a motorcycle, the livestock densities could allow up to ₦1,400,000 annual income as long as at least 10% of the available livestock population is treated. If only 5% of the livestock require medical attention within the year, the available densities could support an income of about ₦800,000. In contrast, a practice using a four wheel-drive vehicle could earn

just about ₦200,000, if only 5% of the available livestock is treated. However, if such a practice treats up to 10% of the livestock, available livestock densities could support up to ₦1,200,000.

Discussion and Policy Implications

The results presented in the foregoing section indicate that the available livestock units and densities in the study area exceed those required for private providers to break-even. In fact, in virtually all the scenarios simulated, available livestock could support earning of additional income by a private practice after breaking-even (Table 5). This shows that private veterinary practice in the area is potentially feasible. The results of the study compare well with those of Umali et al. (1992) who reported a similar feasibility of private veterinary service in the pastoral areas of Cameroon, Guinea, Kenya and Uganda.

The results further reveal that livestock units and densities required to break-even and/or make additional income would be substantially increased if a practice chooses to use a four wheel-drive vehicle instead of a motor-cycle. This is due to the relatively high cost of

Table 5: Veterinary Livestock Units per square kilometre required to make additional income

Amount of income (naira/yr)	VLUs per required per square kilometre			
	50trips	100trips	200trips	240trips
Motor cycle				
200,000	0.45	0.45	0.47	0.47
400,000	0.67	0.68	0.69	0.70
600,000	0.89	0.90	0.92	0.92
800,000	1.12	1.13	1.14	1.15
1,000,000	1.34	1.35	1.37	1.37
1,200,000	1.57	1.57	1.59	1.60
1,400,000	1.79	1.80	1.81	1.82
Vehicle				
200,000	1.11	1.14	1.20	1.22
400,000	1.33	1.36	1.42	1.44
600,000	1.55	1.58	1.68	1.67
800,000	1.78	1.81	1.87	1.89
1,000,000	2.00	2.03	2.09	2.12
1,200,000	2.23	2.26	2.32	2.34
1,400,000	2.45	2.48	2.54	2.57

Source: Field survey, 1997

acquiring and maintaining such a vehicle. Therefore, profitability could be enhanced if a private practice opts for a motor-cycle instead of a four wheel-drive vehicle, at least in the first few years. This, of course, would imply sacrifice of some travel comfort. But it has been suggested that the travel comfort demanded by veterinary personnel tends to increase with their level of training (Leonard, 1993; Baba and Ogungbile,

2001). Therefore, a professional veterinarian would normally demand more travel comfort than a paraprofessional. However, if a private veterinarian adopts the operational set-up in which a paraveterinarian is employed, the latter would do most of the routine travel and the professional would need to travel out only occasionally to attend to cases beyond the competence of the paraprofessional. It may be argued that employing

a paraveterinarian would also add to the cost of a practice. But as the results have shown, it is far less costly to hire a paraprofessional than to acquire and maintain a four wheel-drive vehicle.

It is also evident from the results that livestock units required to break even could be reduced by charging some margin on drugs. For instance, the VLUs and VLUs/km² required to break even were reduced by about 16% (Tables 3 and 4) when 50% margin was charged on drugs, as against pure veterinary service without sale of drugs. Therefore, to further enhance feasibility, sale of drugs should be an integral part of a private practice.

The fact that private practice shows potential profitability is an indication of possible feasibility of privatization of veterinary services. But it should be stressed that the ultimate feasibility of privatization also depends on the willingness and ability of Fulani pastoralists, whose production systems are generally not commercialised and who have been accustomed to free government services, to pay the full cost of veterinary care. A recent study (Baba and Ogungbile, 2000) has shown, however, that the Fulani pastoralists in north-western Nigeria may be willing to pay for veterinary services. Furthermore, it was observed during the study that the pastoralists procure wide-ranging drugs from untrained weekly market retailers to treat their animals. Therefore, it does not seem that the idea of paying for veterinary services would be entirely strange to them. Nevertheless, before proceeding on privatization, efforts should be made to enlighten them on the need to charge fees for veterinary services and the likely increased delivery effectiveness they should expect.

Furthermore, there is the question of the appropriate institutional environment that would guarantee the success of privatization, particularly with respect to provider selection and regulation procedures which would ensure easy access of herders to services, preserve service quality and prevent exploitation of herders by providers. As suggested in a study by Baba and Ogungbile (2001), herders themselves (or their representatives), the Nigerian Veterinary Medical Association and Veterinary Council of Nigeria, should be involved in designing and operating such institutions. In addition, private providers may need to be given absolute right of practice over specific geographic areas, the sizes of which would be determined by the available livestock population densities. This would not only enhance profitability, but would also provide an incentive for private providers to want to keep out quacks who presently dominate the veterinary drugs retail market in rural communities in the area. It may be rightly argued that such an arrangement would put a private practice in a monopoly position and create the attendant problem of opportunistic behaviour. But solutions, based largely on appropriate selection and regulation mechanisms, have been proffered against

such problem (Williamson, 1984; Leonard, 1993; Baba, 1999; Baba and Ogungbile, 2001).

Another important aspect of private practice feasibility is the issue of take-off capital. The study has shown that a provider would require close to ₦400,000 to establish a practice, even if a motor-cycle would be used. To permit fair competition among prospective providers, a special credit scheme may be required to provide take-off loans to them.

Finally, any attempt at privatization should be pursued as a guided policy of the government and on a pilot scale since the area has little prior experience of public service privatization. The experiences gained from the pilot schemes would then guide future expansion.

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