

ECONOMIC ANALYSIS OF INVESTMENT IN ANIMAL TRACTION IN KANO STATE

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ABSTRACTS

The study aimed at evaluating the profitability of investment in animal traction or otherwise, with particular reference to Kano State. The study was conducted in three Local Government areas of Kano State noted for animal traction activities. Data was collected from the respondents in 2011 using structured questionnaire and multistage sampling technique was used during the collection. The collected data was analyzed using descriptive statistics in form of frequency tables, maximum, minimum, mean, standard deviation, net farm income, and rate of return models. The result obtained indicated that, majority of the respondents are in their active age group (31-52 years), have 3-15 years of experience with average literacy level. The results indicated that investment in animal traction for farming in the study areas is relatively a high capital investment, but with relatively high pay off. Furthermore, the study has also revealed that, the estimated NFI, NPV, IRR and PBP were N, 372,756.00 (3yrs), N71,888.00, 55.5% and 1 respectively. These calculated indices indicated that, the investment is profitable given the bank lending rate of 25%. However, constraints such as inadequate capital; high prices of animals and equipments among others things are key factors militating against increase in returns in animal traction investment. The study then concludes that, investing in animal traction in Kano State is a worthwhile venture and a cheap and a better substitute for manual labour but with its attending capital inadequacy and high prices of inputs as constraints.

KEYWORDS: Investment, Animal traction, Net farm income (NFI), Rate of return models (NPV, IRR, PBP).

INTRODUCTION

The development of smallholder agriculture has received considerable attention from government and development planners in Nigeria and in many African countries. In Nigeria, small-scale farmers constitute about 90% of the farming households, and have been the major producers of food and agricultural raw materials (Abahi, 1986, Adesimi, 1991).

Animal traction or animal draft, is the use of animal mainly bullocks for a wide range of purposes in agriculture including its utilization in ridging, weeding and transportation and these farming activities are becoming increasingly important to small scale farmers in Nigeria. The animal power needs in agriculture have grown rapidly in the world and Nigeria in the recent past. More power and greater speed are required to cope with the opportunities for increased food and cash crop production offered by high yielding varieties, fertilizers and other modern farming technologies. This situation has led to an increase in both engine and animal power in Asia, Latin America and Africa. Animal traction is increasingly used in the farming systems of sub-Saharan Africa and has therefore played and still plays an important role in meeting the farm power requirements of many developing countries.

One of the many problems of the agricultural sector is the acute shortage of labour and increasing farm drudgery encountered by small-scale farmers using hand tools especially at the peak of the farming season. The period following the mid-1970s Nigeria has witnessed considerable pressure on rural labour supply, largely due to the rural urban drift of youths, in search of better wage in the expanding high

income service sectors (Oyejide, 1986). Labour shortages not only limit the scale of production but also adversely affects yield (Norman, 1973). In order to bring a solution to this problem, the government introduced mechanical power in the form of subsidized tractor via the tractor hiring scheme. However, the scheme failed not just because of the administrative problems, but also because the technology was inappropriate to the small scale farmers' situation (Fashina, 1980; Pingali et al; 1987). Is it against this background that the study seek to analyze the economics of investment in animal traction and its use as a substitute for manual labour and high sophisticated tractor power.

METHODOLOGY

The study was conducted in 2011 in three local government areas of Kano State using multi-stage sampling technique. The first stage of sampling involved a random selection of one Local Government Area (LGA) from each of the three zones of Kano State Agricultural and Rural Development Authority (KNARDA) noted for high density of animal traction activity. The Local Governments selected were Bunkure, Gaya and Dambatta. The second stage involved a random selection of two villages from each of the 3 LGAs already selected. Finally a random sampling of 15 farmers (respondents) using one pair of animals from each of villages was carried out thereby constituting a total of 3 LGAs, 6 village and 90 animal traction owners (respondents).

The primary data collected were based on 2011 cropping season using structured questionnaire and interview schedules. Variables on which data were collected include:

- Socio-economic variables, such as Farmers age, household size, level of education, contact with extension service, farming experience investment goals, farm size, food consumption habit, land acquisition and cost.
- Production variables, such as Land area cultivated (ha), farm output (kg), prices of input and output (N/kg), cost of family and non-family labour used (N/man-hr) and average cost of use of pair of bulls per day.
- Animal traction investment variables such as sources of traction equipment and accessories, sources of capital, sources of work animal and its price (N/bull) resale of animal (N/bull) and additional income from hiring services. In addition, key informants such as village heads, opinion leaders, agricultural extension agents, local fabricators and market commission agents were also asked to provide information concerning local farming systems, production problems, process historic events and community expectation.

Data were analyzed using the following methods:

- Descriptivestatistics:**Such as mean, median, standard deviation, frequency distribution and percentages.
- Net farm income:**Which is given by the formula $NFI = \text{Gross Income} - \text{TC}$

Gross Income (GI) = total value product (TVP) and is given by total output multiplied by price per unit of the output. The open market price of manual and animal drawn labour of year 2011 was used for the calculation of the gross income.

Therefore:

$$NFI = TVP - TC \quad (I)$$

Where NFI = Net farm income
 TVP = total value product
 TC = total cost

And $TC = TVC + TFC \quad (II)$

Where TVC = total variable cost
 TFC = total fixed cost

The model used for estimating net farm income can be represented by the equation

$$NFI = \sum_{i=1}^n P_i Y_i - \sum_{j=1}^m P_j X_j - \sum_{k=1}^k F_k \quad (III)$$

Where:

- NFI = Net farm income
- y_i = enterprise product(s) (Where $i = 1, 2, 3, \dots, n$ products)
- P_i = unit price of the product(s)
- X_j = Quantity of variable input (where $j = 1, 2, 3, \dots, m$ inputs)
- P_j = unit price of variable input
- F_k = cost of fixed input (where $k = 1, 2, 3, \dots, k$ fixed inputs).

The total variable cost (TVC) included items like the cost of labour, fertilizer, seeds etc. while total fixed cost included depreciation on farm equipment, farming tools and farm buildings. The straight line depreciation method which assures instant return on annual depreciation was used in calculating the depreciation.

- Average rate of return:** This used to measure the rate of investment (ROI). It is the net profit divide the cost and given by the following formula:

$$GI - TC/TC \dots \dots \dots (IV)$$

Where: GI= Gross income, TC=Total cost

- Rate of return model:** This model was purposely used to assess the efficiency in resource allocation. Here return to investment was compared with the cost through both the discounted and undiscounted cash flow measures. Discounted cash flow however are themost accepted criteria of investment analysis (Gitinger, 1994).The discounted measures include Net PresentValue (NPV) and Internal Rate of Return (IRR). The undiscounted measure used was the Payback Period (PBP) and they are specified as follows:

- The Net Present Value (NPV):**- This is a measure of the present worth of the incremental net benefit of an investment. It is an investment evaluation tool obtained by discounting the streams of net benefit using suitable interest rate (i). The rate that is chosen should be the opportunity cost of the funds invested or the current bank lending rate. In other words NPV measure the present worth of benefit stream less the present worth of the cost stream. Using suitable interest rate. It is mathematically represented by the formula:

$$NPV = \sum_{t=1}^n \frac{B_t - C_t}{(1+i)^t} \quad (IV)$$

- Where: B_t = benefit total
- C_t = total cost
- n = number of years
- t = time period in years ($t = 1, \dots, 12$) which is the terminal end of the investment.
- i = interest rate assume to be constant over the relevant period.

ii. **The Internal Rate of Return (IRR):-** This is the percentage interest rate at which the present value of cost exactly equals the present value of benefits. In other words, it is the discount rate that makes the net present value (NPV) equal zero. The general principle is to evaluate the IRR against some suitable rate (by trial and error) of investments such as bank borrowing rates or the return earnings in an alternative investment. If the IRR from the investment exceeds this rate, then the investment is worthwhile.

The mathematical formula for IRR is expressed as follows

$$IRR = 0 \dots \dots \dots \sum_{t=1}^n \frac{B_t - C_t}{(1+i)^t} = 0 \dots \dots \dots (V)$$

Where:

- B_t = net return for period 't'
- C_t = total cost of capital for period 't'
- n = number of years
- t = time period in years
- i = interest rate

NOTE:

1. The labour cost of animal training shelter and insurance was not included because they are permanent structure and activities and therefore are overlooked by farmers in the study area.
2. Straight-line depreciation schedule was used.
3. The salvage value of equipment and resale value of animal was based on subjective valuation of farmers.

Assumption of the model:

To facilitate data analysis, the following assumption were made

- Each pair of draft animal and accessories will be replaced after 3 years while equipment will be replaced after 5 years, but its maintenance is on annual bases.
- The commercial banks' lending rate of 2011 (25%) was used as discount factor.
- That majority of the farmers have more than 3 years farming experience using animal traction.

iii. **Pay-Back Period:-** This is an undiscounted measure of investment worth. The pay back period is length of time from the beginning of the investment until when the net value of

incremental production stream reaches the total amount of the capital invested. It is obtained simply by dividing initial investment outlay by the annual net cash flow. As a non-discounted measure of investment worth, the PBP uses the investment cash flow without taking the time value of money into consideration. It is given by the formula:

Payback period (PBP) = Initial investment / Gross annual profit:

$$PBP = I / GAP$$

GAP = Total gross profit / Total number of years

SENSITIVITY ANALYSIS:

This was conducted to test the effect of economic parameters on the rates of return on investments (NPV and IRR). This was done by varying the cost of production and returns separately while holding other parameters constant. This was done to determine the impact of that change on the attractiveness of the investment with respect to the values of NPV and IRR as estimates of quantities of inputs and outputs and their prices are subject to change. The parameter or sensitivity analysis is a tool used to explore how sensitive benefits are to change in assumed levels of inputs, output and prices (Ahmed, 1995). The assumptions for sensitivity analysis include:

- i. 10% decrease in returns (revenue)
- ii. 10% increase in costs (expenditure)

RESULTS AND DISCUSSION

SOCIO-ECONOMIC CHARACTERISTICS:-

The socio-economic characteristics of farmers in the study areas were examined and they include age, level of education, farming experience using animal traction, source of capital, and household size of the farmers (respondents).

Age of the respondents:

The result presented in table 1 show that 85% of the respondents were between the age bracket of 31 and 60 years with mean age of 52, a median of 49 and standard deviation (SD) of 17 meaning that majority of the farmers using animal traction in the study areas are in the productive and active age group.

Table 1: Age of Respondents

AGE	FREQUENCY	PERCENTAGE
21-30	3	3.3
31-40	23	25.6
41-50	33	36.7
51-60	23	25.5
61-70	23	78
71-80	7	1.1
Mean=52	TOTAL	90
Median=49,	SD=17	Max=80,
Min=30		

Source: field survey 2011

Level of education of the respondents:

The result presented in table 2 shows that, a large percentage of the farmers (44%) had Islamic education but 56% of the respondents have tertiary, secondary primary and adult education. It therefore means that the level of

literacy in the study areas is average. The implication of this is that the ability of farmers in making decision with regards to perception, adoption and diffusion of innovations is also average.

Table 2: Educational Status of the Respondents

EDUCATIONAL LEVEL	FREQUENCY	PERCENTAGE
Primary	14	15.5
Secondary	14	15.5
Tertiary	10	11.1
Adult education	12	13.5
Islamic education	40	44.4
	90	100

Source: field survey 2011

Experience using Animal Traction by the Respondents:

The result presented in table 3 shows that, majority of farmers (96%) had 3-15 years of experience using animal traction technology with mean of 10, median of 12 and standard deviation of 4, this means that a lot of farmers have passed

the critical years of learning by experience (1-3 years) and therefore have attained some measures of efficiency in the use of the technology, translating into higher output and income, holding other factors of production constant.

Table 3: Experience Using Animal Traction by the Respondents

YEARS OF EXPERIENCE	FREQUENCY	PERCENTAGE
1-3	4	4.4
4-6	15	16.7
7-9	16	17.8
10-12	20	22.2
13-15	35	38.9
TOTAL	90	100

Mean=10, Median=12, SD=4 Max=15, Min=1,

Source: field survey 2011

Source of capital:

The result presented in table 4 shows that majority of farmers (70%) obtain their capital for investment in animal traction through personal saving. These indicated little presence or even complete absence of financial institutions in the

study areas. In a situation where the financial institutions are present, the farmers may not be aware of their activities or that the conditions they attach for obtaining agricultural loan may be stringent.

Table 4: Source of Capital

SOURCE	FREQUENCY	PERCENTAGE
Formal	9	10
Informal	18	20
Personal savings	63	70
Total	90	100

Source: field survey 2011

Household Size and Composition:

The result presented in table 5 & 6 revealed that majority of the farmers (80%) had a household size ranging between 6-15 persons with a mean and median of 9 persons per household and standard deviation (SD) of 4. However, majority of the household are non-working adults (Housewives) and children (69%), while the

working adults are only 31%. The implication of this is that, there is high demand of farming activities such as, weeding, harrowing, harvesting processing and storage; hence the need for labour using animal traction to augment the demand - supply gap of labour in the study areas.

Table 5: Household Size

HOUSEHOLD SIZE	FREQUENCY	PERCENTAGE
1-5	14	15.6
6-10	44	48.9
11-15	28	31.1
16-20	4	4.4
Mean=9, Total Median=9, SD=4	90	100

Source: field survey 2011

Table 6: Average Household Composition/Respondent

AGE CATEGORY	FREQUENCY	PERCENTAGE
Working Adult	4	30.7
Nonworking Adult	3	23.1
Children	6	46.2
Total	13	100

Source: field survey 2011

Analysis of Animal Labour Cost and Utilization:

The result presented in table 7, shows the types of crop which determine the contribution of animal labour for the operation. The manual labour requirement for ridging, manual weeding and moulding was highest for groundnut (46.8%) and least for cereal crops (24.5%). Groundnut field was not normally remoulded rather a second weeding was done manually. That was the reason for high labour cost of groundnut. The result presented in table 8 also showed the contribution of animal labour in cereal production was highest (44%) and it was least for groundnut (25%).

However, it should be noted that the use of animal drawn cultivator for weeding does not ensure thorough weed removal on the centre ridges but by and large the employment of animal labour in cereals leads to reduction of total labour from 75 man-hour per hectare to 35 man-hour per hectare which represent 53% reduction in total labour, the major disadvantage of animal drawn cultivator is that it can not be used for close growing crops like vegetables, groundnut, cowpea and other shallow rooted crops who need supplementary weeding and thinning.

Table 7: Labour Requirement for Manual Ridging, Weeding and Moulding (Man-hour/ha)

CROP	MANUAL RIDGING	MANUAL WEEDING	MANUAL MOULDING	TOTAL	PERCENTAGE
Cereal	10	75	12	99	24.5
G/nut	14	175	-	189	46.8
Cotton	14	90	12	116	28.7
Total	-	-	-	404	100

Source: field survey 2011.

Ave. cost of manullabour=N115/man-hr

Table 8: Labour Requirement for Animal Power Ridging & Cultivator Weeding (man-hour/ha)

CROP	MANUAL RIDGING	ANIMAL WEEDING	TOTAL	PERCENTAGE
Cereal	5	30	35	44
G/nut	5	15	20	25
Cotton	5	20	25	31
Total	-	-	80	100

Source: field survey 2011

Average cost of animal labour=N300/man-hr

Average total cost and Returns:

The feed, medication and repair of tools constitute the variable cost which was found to be N6288.00 and it represents 100% of the total variable cost and 4.4% of the total cost. The accessories, equipment, hand tools and the animals constitute the fixed cost and were found out also to be N137, 677.90 representing 100% of the total fixed cost and 95.6% of the total cost. The total cost was found out by the addition of the total variable cost and total fixed cost which turned out to be N143, 965.90.

However the return was calculated using the following procedure:

Based on the response from the respondent in the study areas, the average cost of working with a pair of work bulls is N300.00/man-hour, if the bulls will work for an average of 6 hours in a day then the average return per day is N1800.00. And according to Monga Bay (2010), the number of days it rains in a year in Kano State is about 130 days on the average.

It was also gathered from the respondents that, they usually engage their work bulls a day after it rains, this in order to avoid working when the soil is heavy. Therefore the possibility of working with the bulls in a year is about 65 days during the raining season. This implies that, the average total revenue that may accrue the work bull owner can be calculated as follows:

$$(i) \quad \text{Total Revenue} = \text{Average cost of working with pair of bulls per day} \times \text{Average number of days it rains in a year} \times 3 \text{ years}$$

$$= \text{N}1800.00/\text{day} \times 65 \text{ days} \times 3 \text{ years} + \text{value of two animals in the third year (N}200,000.00)$$

$$= \text{N}551,000.00$$

$$(ii) \quad \text{Total cost (3yrs)} = \text{Total fixed cost (3yrs)} + \text{Total variable cost (3yrs)}$$

$$= \text{N}159,379.70 + \text{N}18,864.00 = \text{N}178,244.00$$

$$(iii) \quad \text{Net farm income for 3yrs} = \text{Gross income} - \text{Gross cost}$$

$$= \text{N}551,000.00 - \text{N}178,244.00 = \text{N}372,756.00$$

In this research, initial investment was defined as the acquisition cost of two bulls, a ridger, a cultivator, a yoke nostril rope, two muzzle and hand tools (hoe and cutlass). The calculation presented in table 9 shows that major portion (91.2%) of the initial investment cost was accounted for by the two pair of work bulls, while the animal traction equipment and their accessories accounted for the remaining 8.8%. To

obtain the fixed cost, the cost of animal traction equipment and hand tools were depreciated over their useful life using straight.

The average net farm income analysis in table 10 indicates that the average total cost of buying a pair of work bulls with attachment, tools, feeding and medication was N143,965.90. While the average gross revenue was N117,000.00 per season as indicated net farm income was found to be -N26,965.90. The average rate of return (ARR) which indicates average rate of return on investment (ARR) is about -0.19 (19%), implying that for every naira invested there is a loss of 19k in the first year of the project. However, similar calculations show NFI of N99,861.30 and ARR of 583% for the second; and NFI of N299,861.30 and ARR of 1750% in the third year indicating that for every naira invested in the second year, N5.83 is generated as profit. Whereas for every naira invested in the third year, N17.50 is generated as profit. The high NFI and ARR in the third year was as result of the resale of the two animals. Moreover, the animal cost was incurred during the first year of investment (N126,827.00) only, which implied that in subsequent two years, the farmer is expected to accrue additional revenue because no cost of animals which constituted (91.2%) of the total cost was not incurred again.

Table 9: Average Initial Investment Costs for Animal Traction

ITEMS	AMOUNT (N)	PERCENTAGE
A pair of work bull	126,827	92.1
Animal traction equipment	10,000	7.3
Accessories	480	0.3
Hand tool	370.90	0.3
Total	137,677.90	100

Source: field survey 2011

Table 10: Average Cost and Returns of Buying and Using a Pair of work Bull and their attachment per annum (1st year)

Items	Amount (N)	% TVC	%TC
Variable Costs:			
-Feed/ medication/ repairs	6288.00	100	4.4
(A) Total VC=	6288.00	100	
Fixed Cost:			
-Accessories/Equipt.	10,480.00	7.6	7.3
-Hand tools	370.90	0.3	0.2
-Two animals	126,827.00	92.1	88.1
(B) Total FC=	137,677.90	100	100
(C) Total Cost (A+B)=	143,965.90		
(D) Gross Income	117,000.00		
(E) NFI=(D-C)	-26,965.90	ARR=	-19%

Source: Researcher's calculation

Table 11: Average Cost and Returns of Buying and Using a Pair of work Bull and their attachment per annum (2nd year)

Items	Amount (N)	%TVC	%TC
Variable Costs:			
-Feed/ medication/ repairs	6288.00	100	36.69
(A) Total VC=	6288.00	100	
Fixed Cost:			
Accessories/Equipt.	10,480.00	96.60	61.15
Hand tools	370.90	3.40	2.16
(B)Total FC=	850.70	100	100
(C)Total Cost (A+B)=	17,138.70		
(D) Gross Income	117,000.00		
(E) NFI=(D-C)	99,861.30	ARR=	583%

Source: Researcher's calculation

Table 12: Average Cost and Returns of Buying and Using a Pair of work Bull and their attachment per annum (3rd year)

Items	Amount (N)	%TVC	%TC
Variable Costs:			
-Feed/ medication/ repairs	6288.00	100	36.69
(A) Total VC=	6288.00	100	
Fixed Cost:			
Accessories/Equipt.	10,480.00	96.60	61.15
Hand tools	370.90	3.40	2.16
(B)Total FC=	850.70	100	100
(C)Total Cost (A+B)=	17,138.70		
(D) Gross Income	317,000.00		
(E) NFI=(D-C)	299,861.30	ARR=	1750%

Source: Researcher's calculation

The result presented in table 13, which was derived from further calculation done on tables 7 & 8 reveals that one of the real affect of animal traction investment was reducing the farmers cost of production. It is evident from the result that a farmer was able to save an average of N22,460.00/ha through employment of animal traction labour.

Table 13: Cost Saved Through the use of Animal Traction/ha

Operation	Cost of Manuallabour (N)	Cost of Animallabour (N)	Cost saved (N)	% TC saved
Ridging	23,700.00	12,240.00	11,460.00	51
Moulding	13,891.00	7,141.00	6,750.00	30
Weeding	8,869.00	4,619.00	4,250.00	10
Total	46,460.00	24,000.00	22,460.00	100

Researcher's calculation

Analysis of rate of return to investment:

The result presented in table 14 shows a positive net present value (NPV) of N71,888.00 (at 25% interest rate) indicating that the investment is worth undertaking and is profitable.

Table 14: Net Present Value at 25% interest rate

Year	Return (N)	Discount factor	Present Value (N)
1	117,000.00	0.8000	93,600.00
2	117,000.00	0.6400	74,880.00
3	117,000.00	0.5120	59,904.00
		ΣPV	228,384.00
		Lesstotal cost	156,496.00
		NPV	71,888.00

The result presented in table 15 shows an internal rate of return (IRR) of 55.5% and a corresponding NPV of zero. Since the current interest rate is 25% which is less the calculated IRR, the IRR result further confirmed that, animal traction

investment in the study areas is profitable, and the result is similar to that obtained by research conducted by Panin (1988) in Northern Ghana (IRR=51%).

Sensitivity Analysis

The result presented in table 15 also shows the effect of a 10% reduction in the revenue on investment rate of return (holding all other variables fixed) and a 10% increase in the investment costs (Ceteris Paribus). When the cost of investment was increased by 10%, the IRR change from 55.5% to 46.2% in other words, the investment still remains profitable. Also holding all other variables constant, if the total revenue

was reduced by 10%, the IRR change from 55.5% to 45.5%. The result also revealed that the investment is more sensitive to decrease in revenue. Furthermore the result of this analysis confirmed that even if errors were committed probably due to data inadequacies by underestimating the investment cost or overestimating the return by about 10%, the investment still remains profitable.

Table 15: Effect of 10% change in total revenue and cost

Activity/Item	T.Rev (N)	T.Cost (N)	NPV (N)	IRR (%)
No change	351,000.00 (3yrs*117,000)	156,469.02	Nil	55.5
10% decrease in revenue	315,000.00 (3yrs*105,300.00)	156,469.02	Nil	45.5
10% increase in cost	351,000.00 (3yrs*117,000)	172,115.92	92.04	46.2

Researcher's calculation

Payback Period:

The result presented in table 16 shows a payback period of approximately 1, indicating that project

has the ability to recover the capital invested in a year and the remaining two is purely for profit making.

Table 16: The Payback Period

Year	Revenue (N)	Cost (N)	Profit (N)
1	117,000.00	143,965.90	-26,965.90
2	117,000.00	17,138.90	99,861.10
3	317,000.00	17,138.90	299,861.10
TGP=			372,756.30
GAP=	TGP/YRS	372,756.30/3=	124,252.10
PBP=	O.I/GAP	137,677.90/ 124,252.10=1.1	

Constraints that affect Investment in Animal Traction:

The result presented in table 17 shows identified constraints militating against increased return on animal traction investment. The major constraint was that of lack of capital and credit (40%). This is not surprising as 99% of the farmer source their capital through personal effort and savings. Investment in animal traction is capital intensive

and hence the need for agricultural credit in the rural areas.

The second factor identified was prices of animals, implements and equipments (30%). Other factors identified were occasional drought, inadequate animal feed and sometime incidence of diseases that tend to reduce animal productivity in term of work to be done and value of the animal when it is sold thereby decreasing the revenue.

Table 17: Identified constraints that decrease return on animal traction investment

Constraints	No. of respondent	Percentage	Ranking
Capital & Credit	36	40	1 st
High price of animal & equip	27	30	2 nd
Drought	14	16	3 rd
Animal feed & Med.	12	13	4 th
Human labour	1	1	5 th
Total	90	100	

Source: Field Survey, 2011

CONCLUSION

Investment in animal traction for farming in Kano State is a high capital investment within the context of Nigerian economic situation but it has a relatively high pay offs. This study has clearly demonstrated that investments in the animal

traction technology in the state have been very successful with estimated NPV of N71, 888.00 and IRR of 55.5% which means that the investment is highly profitable given the Bank lending rate of about 25%.

However, the study identified the factors militating against increase in the returns for the

investment in animal traction which include; inadequate capital, high prices of animals and equipment among others.

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