EVALUATION OF ANIMAL TRACTION FOR CROP PRODUCTION IN KATSINA STATE

BY

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PGD/AGRIC .ENG./2007/201

BEING A POSTGRADUATE DIPLOMA (PGD) PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF AGRICULTURAL AND BIORESOURCES ENGINEERING, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF PGD IN AGRICULTURAL AND BIORESOURCES ENGINEERING.

NOVEMBER, 2010.

DECLARATION

I declare that the work in this thesis entitled Evaluation of Animal Traction on Crop Production in Katsina State has been performed by me in the Department of Agricultural and Bioresources Engineering under the supervision of Engr. Dr. A. A. Balami. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this project report was previously presented for another Post Graduate Diploma at any Institution.

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Date

CERTIFICATION

This project report entitled "EVALUATION OF ANIMAL TRACTION FOR CROP PRODUCTION IN KATSINA STATE" by BALA IBRAHIM PGD/AGRIC.ENG/2007/201 meets the regulations governing the award of Post Graduate Diploma of Federal University of Technology Minna, Nigeria and is approved for its contribution to knowledge and literature presentation.

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ABSTRACT

This project presents a survey to determine the impact of animal traction. Different agricultural operations carried out by the farmers with respect to draught animal utilization were identified and analysed in the study area. The result shows that majority of the farmers in the survey (56%) are self sponsored while cooperative society, government aid and non government accounts for 23%,12% and 9% respectively, indicating little assistance from government and non-governmental organizations. It was also found that the white Fulani constituted the largest proportion of (43%) Red Bororo (39) and Ndama (18%) while the number kept having an overall mean value of (5) in each locality. Majority of farmers 83% interviewed in the study area are familiar and conversant with utilization of draught animals for their farming operations while 8% and 9% used draught animals for transportation and farming operation respectively.

ACKNOWLEDGEMENT

All thanks and praise be unto Allah who teaches man by pen and teaches manking what he knows not, for making it possible to start and complete this programme.

I am also extremely grateful to my supervisor and also head of department. Engr. Dr. A.A. Balami who despite his tight schedules and commitments was able to take me through this project infact he left doors open for me anytime. Thank you and Allah's blessing.

I wish to thanks all the lecturers in the department for their words of advice and encouragements, infact their memories will remain indelible it my mind. Thanks.

Also wish to thank the family members of late Alhaji Dandadi Ibrahim Wurma the management of Hassan Usman Katsina Polytechnic for sponsoring my programme.

Finally I wish to express my profound gratitude to my wife (Badiya) and my loving children (Abdullahi,Aisha, Al-Amin, Sa'adatu and Hamzat).

DEDICATION

Dedicated to the memories of my late father Alh. Dandadi IbrahimMohammed Wurma

ABBREVIATION

AFRC = American Farmers Research Centre

AT = Animal Traction

ITDG = Intermediate Technology Development Group

KTARDA = Katsina State Agricultural Development Authority

KTFF = Katsina State Trust Fund Foundation

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the study

Animal traction (AT) is the process through which animals such as ox, donkey, camel, mule etc are used to perform farming operations and other domestic activities. Several types of draft animals are used in Nigeria, the important being the bull to pull or draw tillage implements for ridging, ploughing, weeding and transportation etc. The use of animal power has been considered in many cases as a transitory from hand operated tools to animal drawn (Akinsoye 1985).

Over the years, agricultural practices in Katsina state, and indeed in Nigeria in general, have been carried out by small holders cultivating between 2 – 3 hectares, using human labour and traditional tools such as matchets, cutlasses, hoes etc (Laurent, 1968). These tools are used in land preparation, for sowing of seeds, weeding and harvesting. In most places, little use is made of mechanized technology and other modern inputs such as improved seeds and fertilizer. Modern agricultural techniques and inputs are too expensive and too difficult to acquire. From the beginning of this century, the Federal Government of Nigeria and the Katsina State Government in particular, have made constant efforts to assist small holders in increasing their agricultural production by replacing traditional tools with ox-drawn ploughs and tractors.(Barwell.1980)

Animal traction (AT) was demonstrated in Katsina State in1920's and their uses have become widespread to various parts of the tse-tse fly free zones of Nigeria(Musa and Oni 1983).The rationale for using oxen-drawn tools for cultivation and transportation is that it increase agricultural work output, reduce drudgery and improve living standard of rural populace compared to other means of modern agricultural production. Animal traction is the one that a small holder can think of to passes eventually. The introduction was accomplished through mixed farming system and a remarkable measure of success was recorded.

The success was attributed to:

1. Extensive test evaluation and selection of imported draught animal implements,
2. Ecological capability of the area with the use of draught animals,
3. Efficient credit schemes,
4. Extensive research, training and extension, and
5. Efficient health and veterinary services.

Government provided impetus for adoption of the technology was by establishing farmer training and workbull training centres at Tambu (Daura Senatorial zone), Kafin Soli (Katsina Senatorial zone), Daudawa (Funtua Senatorial zone). These centres, provided training that improved the method of crop production using draught animals. After successful completion of the training were given a pair of work bull and posted to villages to serve as agricultural instructor or field staff (Akinsoye 1985). However, the vigour with which draught animal power adoption was promoted declined significantly in the

1970's when the campaign for increase food production favoured capital intensive tractor mechanization approach. This approach failed to bring about the much desired increase in food production partly because the small-scale farmer was neglected in the scheme and because tractor, implements and spare parts had to be imported with the scarce foreign exchange. The failure of the approach coupled with the down turn of the Nigerian economy and the compelling need to meet the rising local demand for food, led to strident calls for a look inwards for a cheaper labour saving, and locally sustainable technology for agricultural mechanization (Musa and Oni 1983). The small scale farmer remains the major producers of food and cash crops in Nigeria. To him, the use of draught animals represents a substantial improvement over the traditional hoe method. The use of draught animals saves labour per hectare allows for extension of areas farmed, improves the timeliness of planting (Barratt and Lassister 1982).

1.2 Development Strategies

The World Bank has been assisting the Nigerian government towards her developmental efforts to restore self-sufficiency in food production since 1975. Besides attracting farmers to the use of improved seeds, fertilizer and pesticides. attention has been focused on introduction of better animal-drawn implements and equipment according to the availability of land and climatic conditions and the fact that the vast majority of the agricultural land in Nigeria is owned by the small farmers using traditional manual technology(Musa and Oni 1983).

Governments are faced with the need to make decisions on two major mechanization issues:-

i) The total demand for farm power based on increased agricultural production requirements and goals and

ii) The appropriate combination of hand tools, draught animals and mechanical power technologies for each specific situation within the country, including technical suitability and the need to meet economic and social development objectives.

Use of animals to power machinery for agricultural purposes, i.e for lifting water, grain milling goes back to some of the earliest historical records, economic and social factors combine to make the need even more pressing for full utilization of animal-drawn multipurpose mechanical packages and for more land to be utilized(Akinsoye 1985). Animal powered machines have clearly exercised the minds of many over the centuries and a large number of solutions have emerged, each optimized the local and individual conditions.

The rising cost of farm tractors and the declining of the purchasing ability of farmers in the developing countries is making animal traction (AT) a worthwhile option (Etuk, 1977). Apart from being lower in initial and running costs, AT is technically less involving and culturally more compatible with the practices and educational status of a large number of farmers(Hussain and Hussain 1980). Furthermore, the droppings of the animals could be used as manure while the animals could be sold or slaughtered and use as meat when the farmer no longer feels the need for it. Thus, as long as the animal is alive it does not only maintains its initial cost, but its value could actually appreciate(Etuk 1977).

1.3 Present State of Draught Animal Adoption in Katsina State

The use of draught animal power has become a permanent feature of the farming systems of the northern parts of Nigeria and in Katsina state in particular inspite of the apathy towards its adoption in the 1970's. With the establishment of Katsina State Agricultural and Rural Development authority (KTARDA) in 1987 made use of AT for cultivation practice in large scale, due to the fact that during the colonial period farm centres were established, both the government and some international organizations have made significant efforts in promoting its adoption (Hussain and Hussain 1980). Some World Bank Assisted Agricultural Development Projects in the state which include (KTARDA) Gidauniyar Jihar Katsina, Katsina Trust Fund Foundation (KTFF)etc. have made significant investments in the training work bulls and their disbursement to farmers on interest free loans basis which is a revolving scheme(Idachaba 1985).

Statement of The Problem:

The evaluation of Animal traction shall be conducted to identify impact of animal usage on crop production, It is intended to find limiting factors and prefer solutions to identified problems to assist the community to live a better life than it is obtain presently.

1.4 Aim and Objectives.

The following are the aim and objectives of this research work.

a. To evaluate the impact of animal traction in Katsina State.

b. To highlight the benefits of animal traction on crop production.

c. To identify the limiting factors of animal tractions in the study area.

1.6 Scope and Limitation.

The survey covers some selected areas from the three senatorial zones, of Katsina State. While the draft animal considered is oxen. The project commenced in September 2009. Efforts also are geared to discuss the problem within the context of available data.

a. The area to be covered is Katsina State

b. Draft animals considered here are ox

c. The survey covers some selected areas from the three senatoriat zones, of Katsina and the draft on ox

1.7 Justification.

The significance of the study is to provide information of greater importance and for benefits to the researchers related case study.i.e Katsina State Agricultural Development Project, Ministry of Agriculture and Natural Resources and Institutions etc that might be interested on the findings and recommendations for references in future. However, all the solutions were made based on findings which have positive impact to the based rural communities.

CHAPTER TWO

2.0 LITERATURE REVIEW

Animal traction dates back to 1920's in the northern part of Nigeria and Katsina province in particular with the rationale for cultivation and transportation to increase agricultural production and reduce human drudgery which improve life in the rural areas (Akinsoye 1985).

Draught-animal technology refers to a wide range of implements. machines and equipment used in agriculture which are powered by animals; usually buffalo, oxen, horses, mules, donkeys or camels. Farm power is one of the most important input which will be required to meet the agricultural production goals of the future, whether in human, animal or mechanical form, power is an essential component of all production, harvesting, transportation and processing operations, today human power provides most of the power for agriculture in the developing countries (Hussain and Hussaini 1980).

Akinsoye (1985) define animal traction as the cheapest way of carrying out farming activities by the use of bulls, donkeys, mules and came is rather than the use of modern machine which are very expensive and complicated to be used. Also Idachaba (1990) define animal traction as a way through which rural people can simplify their day-to-day activities by the use of animals such as camels, donkeys and bulls.

Governments of Nigeria have fully recognized the importance of technological changes as a source of rapid growth in the agricultural sector. It is believed that the introduction of simple technologies is one of the quickest way of improving agricultural production and the raising of the productivity of the agricultural sector (Etuk 1977). The rationale for this belief is probably based on the outstanding performance obtained. The potential of the new technology has been fully expressed on the small scale farmers that produce the bulk of the country's agricultural products because labour is very important input in small holder agriculture in northern Nigeria with more than fifty percent of the labour used on small farms comes form family source.

More recently some attempts have been made to use more modern gearing materials i.e Monopump Company has commissioned a box to drive its vertical shaft borehole pumps (Lauret 1968). Also American Farmers Research Centre (AFRC) Silsoe UK produced two designs some years ago based on commercially available concrete-mixer gears, and more interestingly in the second prototype on fabricated gears(Laurent 1968).

Generally, oxen are used as a sources of farm power in the northern states of Nigeria, however, it is becoming predominantly common in parts of Sokoto, Katsina, Kano,. Zamfara, Jigawa states. Donkeys are used generally for haulage of farm produce and manure. Most available data on AT utilization in Nigeria indicates that farmers have not taken full advantages of using work animals for the various possible farm operations. The use has been mainly for ploughing and ridging and on a limited scale for transportation (Laurent, 1968; Musa and Oni,

1983). The available literature highlights the technical advantages of animal traction over the hoe method which provides a sound promise for promoting its adoption among small scale farmers. AT allows the small farmer to expand the area of land put under cultivation and reduces the labour time faster than hoe weeding (Barret and Lassister 1982). The use of AT can reduce substantially the tedious and drudgery often associated with hand cultivation. Also some economic studies of the utilization of AT indicate that cultivation with AT is cheaper than using the hoe or the tractor (Lauret 1968; Ogungbile et al 1983).

Research and development essentially involves investigating problems by adopting scientific methodology to find solutions. But however, research and development must take account of the social and economic of the environment to be successful, when considering the African farmer, his very self and his immediate environment must be thoroughly studied and understood before seeking to find solutions to his agricultural production problems.

In Nigeria, the Institute of Agricultural Research, Samaru Zaria has been developing ox-cart since 1967 which can be adapted by using different yokes to hand push, ox-drawn or tractor-trailer. Also an indigenous established manufacturer, John Holt Agricultural Engineers Zaria, has been manufacturing and marketing these ox-carts with yoke, along with other animal-drawn equipments (Research for Development of Animal Traction in West Africa 1990). Also, the intermediate technology development group (ITDG), UK, under its transport programme has made tremendous contributions recently in the development of low cost transport technologies (Barwell, etal 1980). Despite the

potentials of animal power, i.e varies with breed, size, care (feeding, environment) and animal type of harness and period during which animals are used in all cases, the available power is much greater than that which can be generated by human beings (up to 0.1kw) (Hussain ,and Hussain1980).

2.1 Animal-Drawn Agricultural Implements

Presently, farmers use work bulls mostly for land preparation. Their use can be increased and made more economical by using them for other farm operations such as harrowing, paddling, inter-cultivation, threshing, transportation, and water lifting (Hussain and Hussain 1980).

2.1.1 Animal-Drawn Ridger

An average-small farmer in northern Nigeria uses hoe, axe, cutlasses, a slatted spade and some other local tools to prepare and cultivate the land where available ox-drawn ridgers are used.

The ridger commonly in use was introduced and designed taken into cognizance of the soil, climatic conditions, cropping patterns, prevailing farming practices etc. It is pulled through a chain by a pair of work-ox to produce rounded top ridges and the furrow width can be adjusted by a simple mechanisms, the depth adjustment wheel of 20cm diameter is adjusted by sliding stalk mechanism, which is fixed by a hook pin at desired position. It has a robust share and a reversible doubled-edge share point made up of high carbon steel, hardened and tempered to last long Hussain and Hussain 1980).

2.1.2 Animal-Drawn Plough

This implement is used in clay loam and clay soils with more than 45% clay content. It has a single bottom mould board plough and in most working conditions the depth of ploughing is 15cm while the hitching point can be adjusted height wise and sideways to control the working depth and stabilizes the plough while its in operation (Hussain and Hussain 1980).

2.1.3 Disc Harrow

The disc harrow is extremely useful in pulverizing clay soil, chopping weeds and trash beside land paddling. These are useful for wheat and rice growing and have scope for use in Nigeria's fadama areas especially for growing rice and crops following rice (Hussain and Hussain 1980).

2.1.4 Tropicultor

It is a multipurpose animal-drawn wheeled tool carrier in the market since 1978. It is capable of performing many types of farm operations under different soil conditions like ploughing, forming of ridges, furrows, seed bed preparations, sowing, fertilizer application and inter row weeding (Hussain and Hussain 1980).

2.1.5 Ox-Cart

This means of transportation was developed long ago to meet the needs of small scale farmers for simple and cheap transport. Ox-cart are pulled by a pair of draught animals. They are available in the pneumatic wheel type and with all metal flat wheels in 1000kg and 1500kg models. There are many uses to which

an ox-cart can be put. A farmer spends a great proportion of his time in transport activities on his farm, an ox-cart revolutionizes his farming system and also opens the potentials for additional income earned from off-farm transport activities, thus raising his social and economic status in the rural setting (Hussain and Hussain 1980).

2.2 Livestock Production System

Livestock production is an integral part of farming system in Katsina state as both animal and crops are sources of cash and food for farmers. There is hardly a house in rural areas without livestock. Livestock population comprises 1.2 million Cattle, 2.6 million Sheep, 4.1 million Goats, 41,400 Camels, 182,160 Donkeys, 43,470 Horses and 4.2 million poultry Birds (KTARDA, 1995). A part from crops, the state has a number of livestock and a few water bodies which in 2005 it has and estimated number of livestock which include 1.3 million cattle, 787,000 sheep, 1.5 million goats, 47,000 horses and 4800 camels. While annual fish production is rising at alarming rate (KTARDA 2005).

2.3 Selection of Draught Animals

Farmers selects their breeds from the local available cattle breeds. In Sokoto, Gusau, Birnin Kebbi, Kauran Namoda areas they use Sokoto Gudali and some white Fulani breeds while Funtua, Katsina, Zaria, Kano make use of White Fulani (Bunaji) in Gombe, Potiskum, Maiduguri, Mubi areas make use of Bororo (zebu)(Barrett,1982).

2.4 Feeding

Ox are taken to graze during the day and brought to sheds near dwelling houses in the evening. Still feeding using crops by product are abundant during the rainy season while additional concentrates, supplements and roughages are given (Musa and Oni 1983).

2.5 Training Of Ox

The training period normally last 3 – 4 weeks, which largely depend on the experience of the oxen handler, the age, character and condition of the animal. The training procedure adopted includes:-

i) Familiarization: Getting the animals used to the trainer.

ii) Yoking and reining: These should be fitted after 4 – 5 days of familiarization.

iii) Training to walk: Once the animal is yoked, a chain is attached to the middle of the yoke which is then hooked to large log. The reins from the nose or horns are used for the control of the animal movement.

iv) Command: Consistent commands in a local language are used from the very beginning. Words are clearly distinguished form each other.

v) Training to plough: After 14 days of training, the log is replaced by a plough.

2.5 Health Care

Disease treatment and prevention have grasp many concepts which are recognized by western veterinarians as essential for disease control – prophylactic.

Maintaining a high level of hygiene in the herd is the best disease control method. Such animals should be isolated or destroyed. The dead body preferably being burned, injuries may be prevented by using adequate care and handling, while proper management plays an important part in preventing or lessing the effects of parasitic animals on the host. Such management practices include: -

a. **Good nutrition**: - Involve providing food at the righttime also not only in the right quantity but also quality with respect to carbohydrates, fats and oils, proleins, mineral especially vitamins. Animal suffering from malnutrition easily succumb to attack by disease organisms while well fed animals will resist attack more successfully.

b. **Deworning**: Deworning livestock with drugs such as piperazine wormer which will keep the endoparasite in check.

c. Disinfecting premises by regularly changing bedding materials. sweeping stock houses and spraying of insecticides and acaricides. These measure will destroy some parasitic arthropods arachmids and their life stages.

d. Dipping and spraying stock with appropriate insecticide at regular intervals. This will destroy the ectoparasites such as ticks, fleas and lice.

Endemic diseases such as trypanosomiasis and tick-borne diseases are transmitted in a cyclic manner, that is there is a parasitie vector/host relationship which has

reached equilibrium. Immunity (resistance) to parasitic organisms plays an important part in preventing their effects on the host.

CHAPTER THREE

3.0 METHODOLOGY

3.1 The Survey Area

The research was conducted in nineteen (19) locations in Katsina State of Nigeria which include: Daura, Baure, Mai'adua, Zangon-Daura, Mani, Mashi, Kusada, Katsina, Kurfi, Dutsinma, Batsari, Safana, Danmusa, Funtua, Faskari, Bakori, Malumfashi, Sabuwa and Kankara towns.

Katsina State is located within three agro-ecological zones, i.e, the Sahel in the extreme north, the Sudan Savannah in the centre, and the northern Guinea Savannah in the south. Annual rainfall ranges between 350mm – 500mm in the Sahel, 600-800 mm in the Sudan Savannah, and between 900 -1000 mm in the northern Guinea Savannah.

In the Sahel and Sudan Savvanh, Millet is predominantly mixed with local Sorghum selections, Cowpea and Groundnut. Other include Yams, Cocoayams, Sugar Cane and assorted vegetables.

Apart from crops, the State has a number of livestock and a few water bodies.it is estimated that there are 1.3 million cattle, 787,000 sheep, 1.5 million goats; 47,000 horses and 4,800 camels. Annual fish production is rising at alarming rate.

Katsina State is currently having 34 Local Government Areas with 80% of the people engage in farming as their main economic mainstay.

It has an estimated population of about 5,801,584 people with 2,948,279 (51%) male and 2,853,305 (49%) female and a population density of about 224 person's per km^2

3.2 The Survey

The survey was carried out by administering structured questionnaires and randomly interviewing a total of 260 Ox users/owners to obtain first hand information on the use of draught animals on crop production in the selected areas.

Aspect covered were respondents bio data, utilization, management. From a random sample of nineteen (19) towns scattered all over the three senatorial zones (Daura, Katsina, Funtua).

3.3 Tools of Analysis:

The data collected was subjected to analysis using the relation (Robert, 1974)

Percentage Response = x/y

Where x = The sum of response on question

Y = Expected number of response

The analysis provides responses on percentage basis from each local government area.

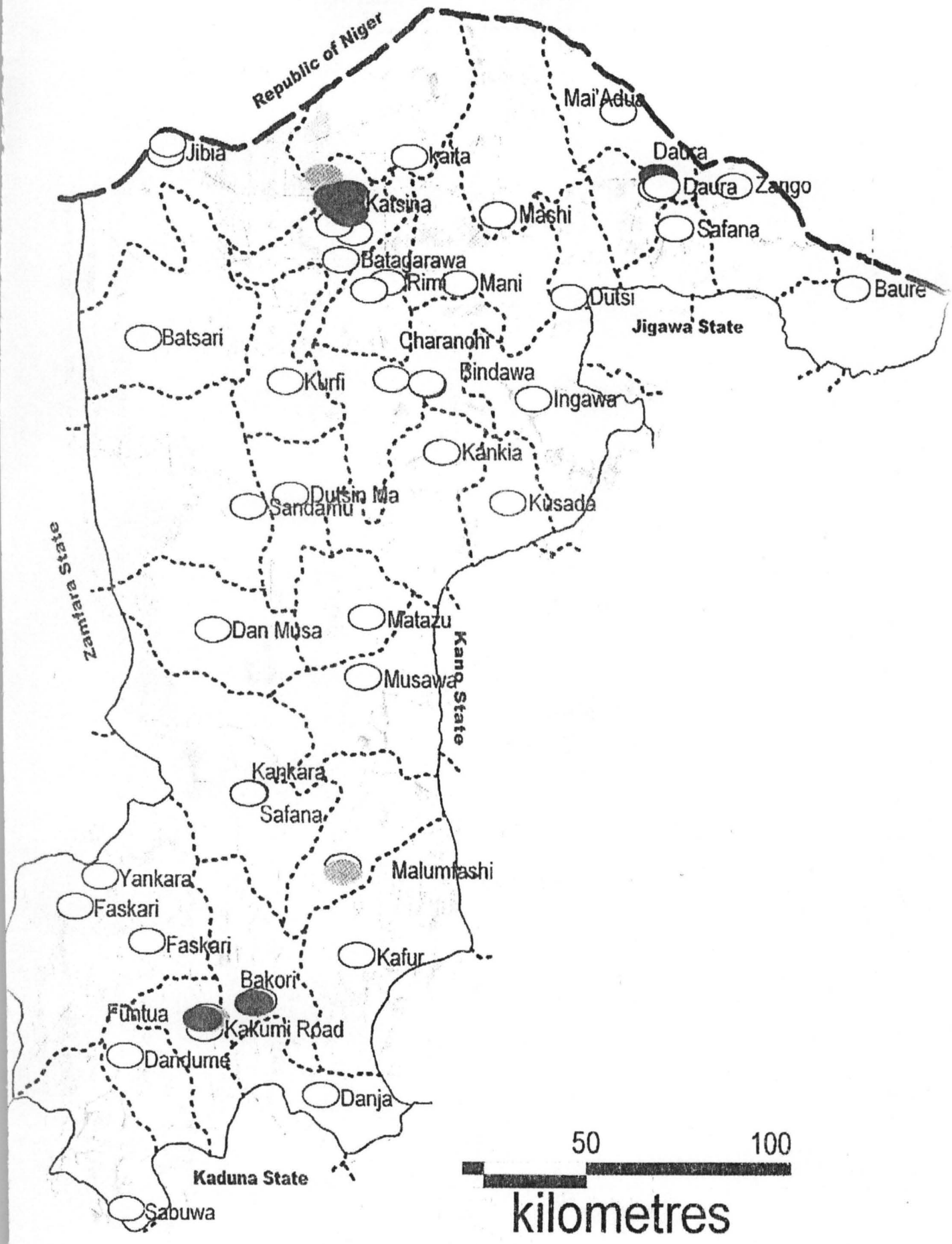

Fig 1. Map of katsina state showing local Govt. Areas

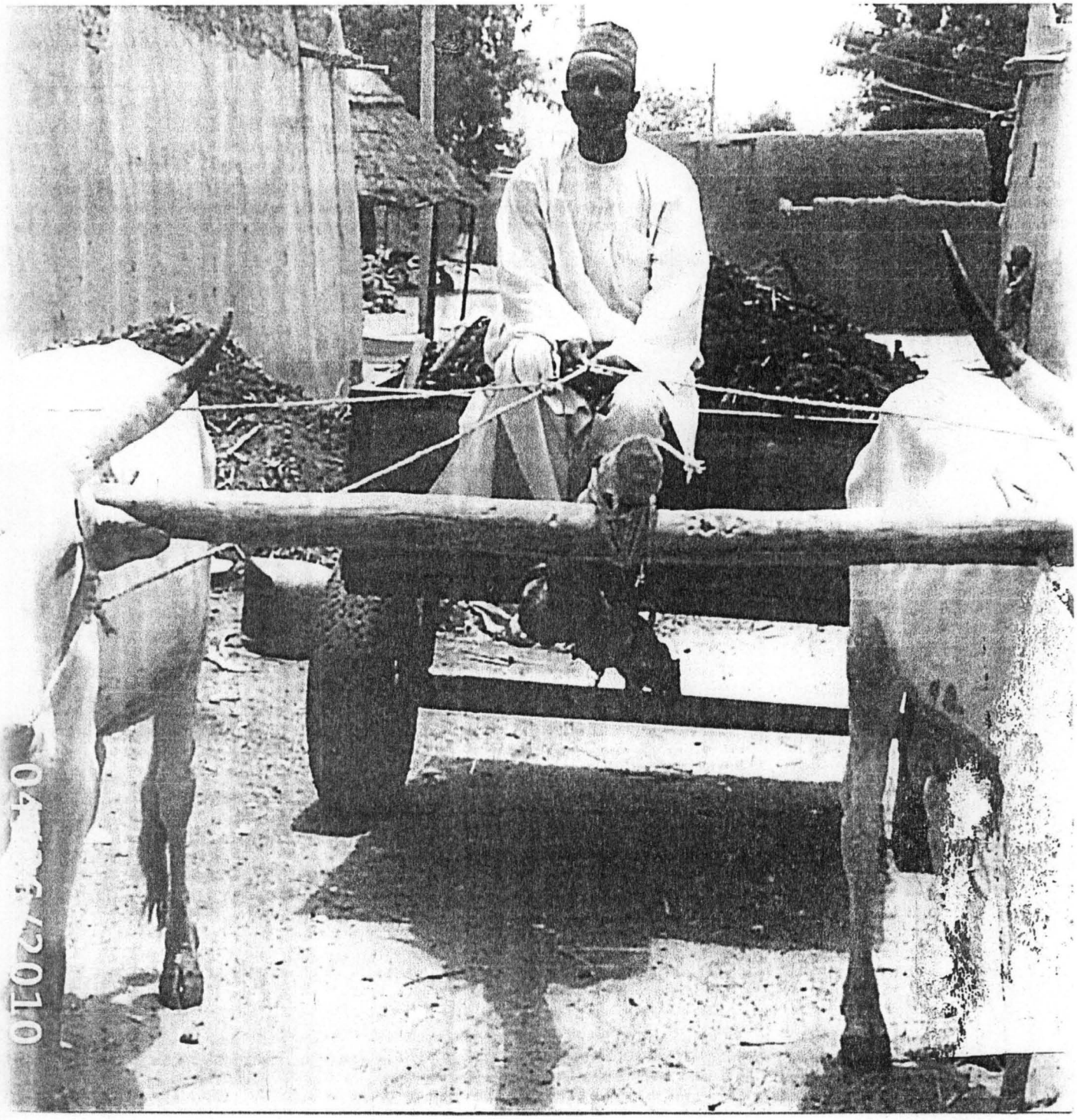

Plate 1. A farmer transporting farm yard manure to farm.

Plate 2. Ploughing a virgin land with a pair of Work bulls.

CHAPTER FOUR

4.0 PRESENTATION OF RESULTS

The particulars of Respondents (Mean values) are shown in Table 4.1

Table 4.1. The Particulars of Respondents (Mean Values) is shown in table 1

S/No		Location	Age(Years)	Experience (Years)	Annual Income (₦)
Zone 1	1	Baure	32.1	5.7	22000
	2	Daura	36.1	4.4	25450
	3	Kusada	35.1	3.4	12500
	4	Mani	37.2	4.6	12000
	5	Mashi	33.3	4.3	12300
	6	Mai'Adua	30.2	6.4	24500
	7	Zangon-Daura	32.5	4.3	25400
Zone 2	1	Funtua	38.6	3.4	21500
	2	Faskari	37.0	6.7	20500
	3	Kankara	35.2	4.2	23500
	4	MalumFashi	38.3	4.9	26000
	5	Bakori	34.4	4.5	23000
	6	Sabuwa	33.2	6.2	23500
Zone 3	1	Batsari	30.2	4.2	20000
	2	Dutsin-ma	38.2	4.7	21200
	3	Dan-Musa	34.1	3.5	28000
	4	Kurfi	36.0	4.3	10500
	5	Safana	33.0	3.7	12450
Katsina			37.9	7.3	19000
Overall Mean.			34.9	4.8	21740

THE Pattern of ownership of ox is presented in Table 4.2

Table 4.2. The Pattern of Ownership

S/No		Location	Self Sponsor	Cooperative Society	Government Aid	Non-Government
			Self Sponsor	Cooperative Society	Government Aid	
Zone 1	1	Baure	7	3	3	2
	2	Daura	8	3	3	0
	3	Kusada	7	2	3	2
	4	Mani	9	0	0	4
	5	Mashi	8	1	2	3
	6	Mai'Adua	13	1	0	0
	7	Zangon-Daura	3	10	1	0
Zone 2	1	Funtua	5	2	3	4
	2	Faskari	8	3	2	1
	3	Kankara	5	5	0	4
	4	MalumFashi	10	3	0	1
	5	Bakori	6	6	2	1
	6	Sabuwa	9	3	2	0
Zone 3	1	Batsari	9	2	2	1
	2	Dutsin-ma	14	0	0	0
	3	Dan-Musa	6	5	3	0
	4	Kurfi	6	4	3	1
	5	Safana	11	1	2	0
Katsina			4	6	2	2
Overall Mean.			7.79	3.16	1.68	1.37

The distribution of breeds and Number of Draft Animal kept is given in Table 4.3

Table 4.3 The Distribution of breeds and Number of Draft Animal Kept

S/No		Location	Breeds			Number Kept
			White Fulani	Red Bororo	Ndama	
Zone 1	1	Baure	1	8	5	7.5
	2	Daura	7	2	5	6.4
	3	Kusada	3	9	2	6.2
	4	Mani	1	13	0	2.0
	5	Mashi	4	8	2	4.1
	6	Mai'Adua	2	7	5	4.7
	7	Zangon-Daura	2	8	4	7.2
Zone 2	1	Funtua	6	7	1	5.2
	2	Faskari	4	4	6	4.0
	3	Kankara	9	5	0	8.3
	4	MalumFashi	5	8	1	2.0
	5	Bakori	5	4	5	4.3
	6	Sabuwa	6	7	1	4.9
Zone 3	1	Batsari	4	9	1	2.7
	2	Dutsin-ma	13	1	0	7.2
	3	Dan-Musa	14	0	0	4.9
	4	Kurfi	13	1	0	7.5
	5	Safana	9	2	3	6.2
Katsina			6	2	6	6.0
Overall Mean.			6	5.5	2.5	5.3

The mean Age of commencement of training and duration of Usage is presented in Table 4.4

Table 4.4 Mean Age at Commencement of Training and Duration of Usage

S/No		Location	Age (Years)	Duration (Years)
Zone I	1	Baure	5.0	3.0
	2	Daura	5.5	8.5
	3	Kusada	3.5	8.0
	4	Mani	3.0	6.5
	5	Mashi	5.5	7.0
	6	Mai'Adua	4.0	5.5
	7	Zangon-Daura	3.5	7.5
Zone 2	1	Funtua	4.0	10.0
	2	Faskari	4.5	10.0
	3	Kankara	5.0	6.0
	4	MalumFashi	3.5	6.5
	5	Bakori	4.5	7.5
	6	Sabuwa	4.0	8.0
Zone 3	1	Batsari	3.5	7.0
	2	Dutsin-ma	4.5	7.0
	3	Dan-Musa	3.5	8.5
	4	Kurfi	4.5	7.5
	5	Safana	4.5	7.5
Katsina			4.5	7.5
Overall Mean			4.2	7.3

The System of Management and Health Status is given in Table 4.5

Table 4.5 The System of Management and Health Status

S/No		Location	System of Management			Health Status		
			Free Range	Semi Intensive	Intensive	Rinder Pest	New Castle	Foot and mouth disease.
Zone I	1	Baure	12	2	0	1	1	12
	2	Daura	13	1	0	0	0	14
	3	Kusada	10	4	0	0	0	14
	4	Mani	13	1	0	0	0	14
	5	Mashi	12	1	1	0	0	14
	6	Mai'Adua	11	3	0	0	0	14
	7	Z/Daura	13	1	0	1	1	12
Zone 2	1	Funtua	11	3	0	1	1	12
	2	Faskari	10	3	1	0	1	13
	3	Kankara	12	1	1	0	1	13
	4	MalumFashi	13	1	0	0	0	14
	5	Bakori	13	1	0	0	0	13
	6	Sabuwa	10	4	0	0	1	14
			14	0	0	0	0	14
Zone 3	1	Batsari	14	0	0	0	0	14
	2	Dutsin-ma	12	1	1	0	0	14
	3	Dan-Musa	14	0	0	0	0	14
	4	Kurfi	13	1	0	0	0	14
	5	Safana	12	2	0	0	0	14
Katsina			9	3	2	0	0	13
Overall Mean			12.0	1.68	0.32	0.21	0.43	13

The Draught Animal utilization in farming operation is presented in Table 4.6

Table 4.6 The Draught Animal Utilization in Farming Operations

S/No		Location	Farming	Transportation	Farming and Trabsport
Zone I	1	Baure	0	0	14
	2	Daura	2	4	8
	3	Kusada	1	4	9
	4	Mani	3	0	11
	5	Mashi	2	0	12
	6	Mai'Adua	3	1	10
	7	Zangon-Daura	0	1	13
	1	Funtua	1	1	12
	2	Faskari	2	1	11
	3	Kankara	1	2	11
	4	MalumFashi	1	2	12
	5	Bakori	1	2	11
	6	Sabuwa	0	0	14
Zone 3	1	Batsari	2	1	11
	2	Dutsin-ma	1	0	13
	3	Dan-Musa	2	1	11
	4	Kurfi	0	1	13
	5	Safana	2	1	11
Katsina			0	1	13
Overall Mean			1.26	1.16	11.6

CHAPTER FIVE

5.0 DISCUSSION OF RESULTS

Table I shows the Bio-data of the owners/users of Bulls in the survey area. The 260 (Two hundred and Sixty) respondents were mostly young men of mean age 34.9 with about 5 years of experience. Estimated overall mean income (annual) from the use of animals for the purpose under consideration was N21740:00.

Table 2 Indicates that majority of the farmers in the survey (56%) are self sponsored while cooperative society, government aid and non-government accounts for 23%, 12% and 9% respectively, indicating little assistance from government and non-governmental organizations.

Based on coat coloration pattern three distinct types of draft animals were found in the survey area. The white Fulani constituted the largest proportion of (43%) Red Bororo (39%) and Ndama (18%). While the number kept having an overall mean value of (5) in each locality.

The Mean ages at commencement of training and duration of training are 4.2 and 7.3 years respectively. The percentage of draught animal utilization is estimated to be 71 percentage.

The selected animals are trained by carrying children and small loads. Stock replacement take place when they are sold for reasons like bad temperament or poor health.

Very little attention was paid to the housing of the animals, which were kept in open yards at nights, hence the lack of relevant data on costs of housing and holding facilities. Also the animals were fed using mainly crop residues (rice,

wheat, Stover, cereals stalks etc) supplemented with cereal grains and salts. They are normally led to water sources such as ponds, rivers or streams for drinking water. Disease conditions frequently noticed in herds were foot and mouth disease which is treated locally by herbal extracts and vaccines.

Majority of the farmers 83% interviewed in the study area are familiar and conversant with utilization of draught animals for their farming operations while 8% and 9% used draught animals for transportation and farming operation respectively.

5.1 CONCLUSION

Draught animal use has and will continue to play a vital role in agricultural production at small scale holder levels in Katsina State and in the northern parts of the country in general. If agricultural production is to grow in the country, a more efficient and productive method of animal traction should be developed and extended to the farming community at large. Modern research on the different aspect of animal traction has been carried out but little has extended to taking the farming community into account. The rejection of new research development might be because researchers have not had adequate time to address these issues or because the technology through the established chain has been inadequate.

The use of animals as a source of power rather than people is one of these strategies which with adequate research is vital to the economic recovery, long term progress and future prosperity of farmers.

Appropriate animal draught technology should be acceptable to the farmers, affordable, sustainable using local skills and should raise farmers incomes.

5.2 RECOMMENDATIONS

1. Local artisans should be encouraged to make simple low-cost animal powered technologies appropriate to the needs of the rural farmers.
2. Encouragement of more outlets for credit facilities in the rural areas through government policies.

3. Establishment of more animal traction training centres in the various local government areas of the northern states.
4. Introduction and popularization of animal powered devices that will cut-down on effort, improve timeliness of operations of labour intensive task like lifting and carrying water, oil- extraction, grinding, planting, weeding, carrying of fire wood etc.
5. Government and Non-Governmental Agencies should pursue a coherent policy to support animal traction programmes to ensure a sustained adoption. Policies that will ensure equilibrium of costs and benefits should be vigorously pursued.

QUESTIONNAIRE

BIO DATA

1. Name:.....
2. Local Government Area:.....
3. Marital Status:.....
4. Number of children:.....(5). Age.....

HERD SIZE, COMPOSITION AND MANAGEMENT

6. What is your average annual income from the use of draught animals?

   .....

7. What is your source of draught animals?

   Self sponsor ☐ Government aid ☐

   Cooperative society ☐ Non-governmental organization ☐

8. Number of draught animals kept.

   2 – 4 ☐ 6 – 8 ☐ 10 – 12 ☐

9. Breed of draught animal

   White Fulani ☐ Red Bororo ☐ Ndama ☐

10. System of management.

    Free range ☐ Semi-intensive ☐ Intensive ☐

11. Type of animal feed used:.....

    .....

12. Major disease outbreak.

    Rinderpest ☐ Newcastle ☐ Foot and mouth disease ☐

13. Control measure of diseases outbreak.

    Veterinary service ☐ Local medicine ☐ Veterinary/local ☐

14. Age of animal training:.....

15. Types of farm operations perform by the draught animal.

    Farming operation ☐ Transportation ☐

    Both farming and transportation ☐

16. Availability of grazing reserve in the area.

Sufficient ☐ Non sufficient ☐ None at all ☐

17. For how long have you been using draught animals for crop production?

1-5 years ☐ 6 – 8 years ☐ over 10 years ☐

18. State other benefits derivable from draught animals.....

.....

19. What problems do you encountered in draught animal farming.

.....

.....

20. Give possible suggestion(s) to improve the standard of draught animal utilization in the state:.....

.....

21. What means of transport are you using in conveying our farm inputs and outputs?.....

Foot ☐ Draught animals ☐ Tractor ☐

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