

Full Length Research Paper

## Benefits of donkeys in rural and urban areas in northwest Nigeria

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The objective of this study is to explore the benefits of donkeys for rural and urban smallholder farmers in northwest Nigeria. We visited 112 smallholder donkey farmers located in rural and urban areas from four states in northwest Nigeria through four focus group meetings, interviews with individual farmers and in depth interview with 12 key informants. In addition, 80 citizens were interviewed about their perception on donkeys. Donkeys were used more intensively in urban than in rural areas. The number of donkeys was higher ( $p < 0.001$ ) in urban (4.1) than in rural areas (1.9). The number of days per week working with donkeys was also higher ( $p < 0.05$ ) in urban (6.4) than in rural (2.9) areas. However, farm sizes were lower ( $p < 0.001$ ) in urban (0.5 ha) than in rural (1.0 ha) areas. Farmers in urban areas received 16% higher annual income from their donkeys than those in rural areas. Donkeys were mainly appreciated by farmers for their low purchasing price, low-cost equipment, ease of management, and role in ceremonies. The main constraints facing the farmers were lack of information on donkey keeping, lack of access to clean water and proper feed, and lack of money to expand the business. About 50% of citizens associated donkeys with poverty. It was concluded that donkeys play important socio-economic roles in the farming systems and should therefore be included in future livestock policy planning in Nigeria.

**Key words:** Constraint, donkey, northwest Nigeria, perception, socio-economic role.

### INTRODUCTION

Donkeys are one of the ancient domesticated livestock. In developing countries donkeys are valued in particular for their ability to survive under harsh conditions (Blench et al., 1990; Swai and Bwanga, 2008), yet they are often regarded as animals of low social status and neglected by research and development organizations (Starkey, 1995). There are 41.5 million donkeys worldwide (Desalegne et al., 2011). Nigeria is one of the countries with a relatively large (800,000) donkey population (Mabayoje and Ademiluyu, 2004). Cross-border movements by the pastoral Fulani from Niger, Chad, Burkina Faso, Mali and Cameroon, have increased the

number of donkeys in Nigeria (Blench, 2004). Yet, most donkey breeding is practiced in the neighbouring countries. In Nigeria, donkeys are concentrated mainly in the northern states because of the savannah type of vegetation and fewer disease vectors such as tsetse flies (RIM, 1992). In southeastern Nigeria, donkeys are used as meat animals and about 16,000 donkeys are transported annually from the northern states for this purpose (ATNESA, 1997; Blench, 2004).

Donkey development in Nigeria was started with the introduction of different donkey breeds through trans-Saharan caravan trade across the Nile via the Sudan and

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Chad (Fielding and Starkey, 2004). However, in 1970s donkey population was drastically reduced due to oil exploration and trade (Blench et al., 1990). At that time, it was relatively cheaper to use other means of transport such as trucks and motorbikes due to excellent road networks. In the late 1980s, there was economic hardship due to changes in government policy which led to rising costs in transport fares as a result of unstable fuel prices and degraded road networks (Blench, 2004). Presently, donkeys have started gaining popularity again among the smallholder farmers for employment opportunities and as reliable option for poverty reduction (Fielding and Starkey, 2004).

In recent years, studies about donkeys have been of considerable interest among researchers. For example, donkeys are being used for income generation activities through local transportation of goods (Pearson et al., 2000). Donkeys can survive in new environments under poor management (Jones, 2009) and help to facilitate marketing of goods in some African countries through the use of cart drawn implements (Pritchard, 2010). In Europe, donkey milk is, based on its composition in lipids and proteins, considered as a valid alternative for human milk (Vincenzetti et al., 2008). Recently, emphasis on education and training of donkey owners in management strategies have been reported (Stringer et al., 2011). In Nigeria, donkeys help to transport people, carry water from deep wells and rivers, and serve Fulani herdsmen during seasonal migration throughout Nigeria. In urban areas, donkeys provide small-scale services, such as transportation of building materials and grains, particularly in the northern part of the country. However, donkeys are not promoted by any governmental agency. Consequently, donkeys are perceived by policy makers in particular and society in general as less valuable than other livestock. There is no reliable information on their roles and benefits for rural and urban households. The northwest Nigerian states vary greatly in terms of economic development, population density and infrastructural facilities. It is hypothesized that the use of donkeys varies between the states and between rural and urban areas depending on their economies. The main objective of this study was to explore the benefits of donkeys to sustainable livelihoods among rural and urban smallholder farmers and to identify citizens' perceptions on donkeys as well as constraints and opportunities in donkey keeping in four states of northwest Nigeria.

## **MATERIALS AND METHODS**

### **Area of the study**

### **Geographical description**

The field research was conducted between January and March 2008 in the semi-arid zone in northwest Nigeria. The mean annual temperature in this area is about 27°C. There is a single rainy season from May to October with mean annual rainfall of 508-1016

mm. The length of growing period is 100 to 150 days. The vegetation pattern ranges from open woodland and scattered trees to dense vegetation. Human population is over 35 million people (NPC, 2006).

### **Livelihoods**

The major inhabitants of northwest Nigeria are mixed crop-livestock farmers and livestock herders. More than 80% of Nigerian livestock population (cattle, sheep, goats, poultry, rabbits, guinea pigs, pigs, horses, donkeys and camels) is concentrated in this region because it is free from tsetse flies and the rainfall pattern is unimodal (RIM, 1992). The research was carried in the states of Jigawa, Kaduna, Kano, and Katsina. Katsina and Jigawa border Niger Republic; Kaduna is the most southern state among these four states. Characteristics of the study area are given in Table 1. In all four states agriculture is important. The economic activities and labour demands are higher in Kano and Kaduna compared to Katsina and Jigawa. In Kano, the distance to the state capital is the smallest compared to the other three states.

### **Smallholder donkey owners and their farming system in northern Nigeria**

We identified smallholder donkey owners as owners that owned five or less donkeys in their herds. We recorded information on their farming system such as types of crops grown, types of livestock kept, number of donkeys owned and farm size. We collected data about how household incomes were obtained. Cash received by the family is used to purchase farm inputs such as new donkeys, materials such as ropes, rakes, spade, saddle, sacks, vaccines, fertilizers, hired labour and firewood.

### **Research approach and methodology**

A rapid rural appraisal (RRA) was carried out in the four states during three months. RRA is a research methodology which enables researchers to meet, associate and collect information from stakeholders affected by a particular problem in the most cost effective way (Chambers, 1981; Mohammed et al., 2012). Aspects about farm size, education level of farmers, time spent in off-farm economic activities, prices of inputs used in donkey management and utilization, and the income generation potential from the use of donkeys were investigated. Data collected included: age of respondent, family size, years of working experience with donkeys, and working days per week with donkeys. The research was carried out in five stages which included: familiarization visit to the study area, direct participatory observation, individual interviews, focus group discussions with farmers and in depth interviews with key informants for confirmation and additional information concerning the socio-economic roles of donkeys.

After selection of the four states namely; Jigawa, Kaduna, Kano and Katsina, a two stage sampling technique was used using the method described by Berhanu et al. (2012). In the first stage, two Local Government Areas and locations (rural and urban) were selected based primarily on distribution and population of donkeys. In the second stage, respondent households were randomly selected from the locations using systematic sampling procedures. Donkey's contribution to farmers' livelihoods was measured using livelihood indicators such as contribution of donkeys to household income, number of children attending school, number of livestock owned, purchase of luxury items (motorcycle, mobile phones, radio, television etc) and type of roofing materials in the house (iron sheet, thatched, mud etc) following the method of Smith (2004).

In total, 112 households representing the smallholder rural and

**Table 1.** Details of selected characteristic features of four states in northwest Nigeria.

Items	Jigawa	Kaduna	Kano	Katsina
Population density	Low	High	High	Medium
Commercial activities	Low	Medium	High	Low
Informal sector (e.g. industries)	Low	Medium	High	Low
Infrastructure (e.g. roads)	Medium	High	Low	Low
Ethnic diversity	Low	High	Low	Low
Formal sector (e.g. schools)	Medium	High	Medium	Medium
Agricultural activities	High	High	High	High

urban donkey farmers were interviewed using a structured questionnaire, with open- and closed-ended questions; 14 in rural areas and 14 in urban areas in each of the four states surveyed. Sample selection during the study was based on the number of donkey owning households, road accessibility, gender and geographical position within the states, particularly considering the scale of north-south axis for better representation of the information. Only male farmers were interviewed during the study due to cultural barriers between males and females in these states. Donkey households were identified with the help of key informants: farmers' leaders, local community leaders, agricultural extension agents, university researchers, marketing agents, government authorities, veterinary doctors, school teachers, youth and the community elders.

Four focus group discussions with farmers and key informants were organized at community-level in which Strengths, Weaknesses, Opportunities and Threats (SWOT) issues raised by farmers were thoroughly discussed. The SWOT issues raised by the farmers were further discussed during the farmers' group discussions, involving 28 farmers in each state. The SWOT group discussions were led by the researcher and lasted for two hours and the discussions were fairly informal. In order to create a conducive atmosphere for the discussion of particular issues of concern among the farmers, eight separate focus group interviews were conducted using preference ranking and scoring procedures (Watson and Cullis, 1994; Starkey, 2000). Also, 20 citizens (non-donkey keepers) were randomly selected from each state and interviewed about their perceptions on donkeys in the society. Citizens were selected based on their willingness to participate in the research because many of them were sceptical about the purpose of the survey on donkeys.

#### Data analyses

Total annual income from donkeys was estimated as the gross outputs minus the variable costs. Total family income was estimated from annual income from donkeys, sales of manure and offspring, and off-farm income. Univariate General Linear Model procedure (nested ANOVA) was used in SPSS 15.0 (2003) to analyze total family income and annual income from donkeys as dependent variables and state and location (rural or urban) as fixed factors, including interactions between state and location. Means with significant F-values were separated by least significant difference (LSD) test.

Chi-square test for a two-way contingency table was used to test the hypothesis that there was no difference between the states in perception of citizens about donkeys. The outcome was considered significant when fewer than 20% of the cells in the table have an expected cell count of less than 5 and none of them has an expected cell count of less than 1.

## RESULTS

### Farming systems with donkeys

Cattle, sheep, goats, donkeys, and poultry were the most commonly found livestock in these states. However, in some parts of Kaduna, local pigs were reared in the backyard. Camels were mainly restricted to Jigawa and Katsina. The most common crops grown included: sorghum, maize, groundnut, cowpea (beans), rice, vegetables, and sesame. In Kaduna, the farmers cultivated sugar cane, onions and tuber crops because of differences in the amount of rainfall and soil conditions. Millet and cotton were mainly cultivated in Jigawa and Katsina, respectively, while paddy rice was becoming popular in Kano both under irrigation and rain-fed conditions. Crops were grown in mixtures. In the four states, crops were cultivated by hand using traditional hoes. The household obtains income from farm outputs such as manure, draught, offspring, farm produce, hiring out of donkeys, donkey sales, gifts, exchange and off-farm labour.

The focus group discussions indicated that donkeys were the primary pillars in the farming system of smallholder donkey farmers. They provided manure to crops in both rural and urban areas. Manure serves as an alternative to chemical fertilizers, thereby lowering the cost of crop production. Also, donkeys helped to carry out hard labour, such as conveying farm produce from farms to homes or markets, to fetch water from deep wells, and they were also used intensively for commercial pack transport. Donkeys could be hired out for some hours or days. Further, donkeys served as the major source of income to the farmers in cash and in kind from the sale of manure, offspring and herd replacement. The cash received (from donkey services/sales) was used to purchase farm inputs such as new donkeys, materials such as ropes, rakes, spade, saddle, sacks, vaccines, and fertilizers, hired labour and firewood.

Farmers said that the reasons for preferring donkeys rather than cattle were that donkeys cost less to purchase and maintain compared to cattle and were more easily managed even by women and children in rural areas. The minimum price of a donkey was 6,000-7,000

**Table 2.** Least squares means and standard deviations (SD) of household (hh) and farm characteristics for smallholder rural and urban donkey farmers from four states in northwest Nigeria.

Factors	Farm size (ha)		Time spent off-farm (h)		Age of head (y)		Family size (n)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Overall	0.7	0.5	7.4	1.5	43.5	7.7	12.4	4.5
State								
Jigawa	0.8 <sup>a</sup>	0.5	6.5 <sup>b</sup>	0.9	43.9	8.5	12.9	3.9
Kaduna	0.8 <sup>a</sup>	0.3	8.4 <sup>a</sup>	1.9	43.1	7.9	12.5	6.1
Kano	0.4 <sup>b</sup>	0.5	8.0 <sup>a</sup>	1.2	41.6	7.8	11.9	4.3
Katsina	0.9 <sup>a</sup>	0.5	6.7 <sup>b</sup>	0.8	45.6	6.0	12.3	3.3
Location								
Rural	1.0 <sup>a</sup>	0.4	7.3	1.1	44.7	7.6	12.6	3.9
Urban	0.5 <sup>b</sup>	0.3	7.5	1.2	42.4	7.2	12.2	4.7
Interaction p-value	ns <sup>1</sup>		ns		Ns		ns	
	Livestock number (TLU)		Livestock density (TLU/ha)					
	Mean	SD	Mean	SD				
Overall	14.5	15.0	21.8	30.7				
State								
Jigawa								
Rural	9.6 <sup>c</sup>	8.7	9.7 <sup>b</sup>	6.2				
Urban	7.7 <sup>c</sup>	4.2	15.8 <sup>b</sup>	10.7				
Kaduna								
Rural	27.8 <sup>b</sup>	12.9	29.5 <sup>b</sup>	12.4				
Urban	21.5 <sup>b</sup>	17.7	38.8 <sup>a</sup>	26.0				
Kano								
Rural	28.6 <sup>a</sup>	24.7	56.0 <sup>a</sup>	66.0				
Urban	4.0 <sup>a</sup>	2.6	0.0 <sup>c</sup>	0.0				
Katsina								
Rural	7.4 <sup>c</sup>	2.6	7.3 <sup>b</sup>	4.6				
Urban	9.7 <sup>c</sup>	2.4	17.3 <sup>b</sup>	9.1				
Interaction p-value	0.000		0.000					

<sup>a, b, c</sup> Different superscripts denote significant differences between means within columns ( $p < 0.001$ ), <sup>1</sup> ns: non significant ( $p > 0.05$ ).

Naira (1 US\$= 117 Naira (2008) while the minimum price of a young bull was about 40,000 Naira. Also, donkeys could be trained easily, especially at their young age, whereas cattle could only be trained by the first owner when they reached the age of maturity. Another reason was that before using cattle, the farmer must purchase a cart, which was more expensive than the saddle or pannier used for donkeys. Also, the use of cattle for activities in urban areas would be dangerous because of the horns and the hostile nature of cattle, especially when they were frightened. The theft of donkeys was much less common than cattle, because donkeys were able to recognize their owner even at night. Another reason the farmers presented was that they wanted to preserve the culture of their forefathers rather than using cattle, which were practically unaffordable. However, farmers said that they could not afford to purchase inputs for their donkeys such as donkey carts, drugs and medications, manufactured feeds and supplements.

### Farming characteristics of the respondents

All farmers interviewed were from the Hausa and Fulani tribes which are the dominant tribes of the area studied. Table 2 presents the farming characteristics of rural and urban donkey farmers in the four states. In the rural areas, average farm size was twice compared to the urban areas ( $p < 0.001$ ): 1.0 to 0.5 ha. The time spent in off-farm activities per week was significantly different between the states with Kano and Kaduna having spent about one and a half hour per person more ( $p < 0.001$ ) compared to Jigawa and Katsina. Interactions in the livestock number and density between the state and location were statistically significant ( $p < 0.001$ ), indicating that the differences in livestock number and density between the rural and urban locations were different in the different states. Overall, Kaduna and Kano had a higher ( $p < 0.001$ ) livestock density (28-38 TLU/ha) compared to the other two states (12.5 TLU/ha). Especially, farms in Kano (0.4 ha) were

**Table 3.** Least squares mean and standard deviation (SD) of use of donkeys by smallholder rural and urban donkey farmers from four states in northwest Nigeria.

Factors	Donkeys (n)		Working days (days/week)	
	Mean	SD	Mean	SD
Overall	3.0	1.9	4.7	2.0
State				
Jigawa	3.3	2.1	4.9 <sup>a</sup>	2.1
Kaduna	2.4	1.8	4.1 <sup>b</sup>	2.0
Kano	3.1	2.1	5.4 <sup>a</sup>	2.3
Katsina	3.1	1.6	4.2 <sup>b</sup>	2.4
Location				
Rural	1.9 <sup>b</sup>	0.7	2.9 <sup>b</sup>	1.7
Urban	4.1 <sup>a</sup>	2.1	6.4 <sup>a</sup>	0.2
Interaction p-value	ns <sup>1</sup>		ns	
	Working with donkeys (h/day)		Experience with donkeys (y)	
	Mean	SD	Mean	SD
Overall	5.2	2.0	11.0	3.6
State				
Jigawa				
Rural	3.6 <sup>b</sup>	1.0	10.1	3.8
Urban	5.9 <sup>a</sup>	0.5	12.1	3.3
Kaduna				
Rural	3.1 <sup>b</sup>	0.6	11.9	3.8
Urban	7.7 <sup>a</sup>	0.7	9.1	3.8
Kano				
Rural	4.9 <sup>b</sup>	2.1	10.6	3.7
Urban	7.4 <sup>a</sup>	1.0	10.4	3.4
Katsina				
Rural	3.2 <sup>b</sup>	1.5	12.9	2.5
Urban	6.3 <sup>a</sup>	0.5	10.5	3.3
Interaction p-value	0.001		0.046	

<sup>a, b, c</sup> Different superscripts denote significant differences between means within columns ( $p < 0.001$ ),<sup>1</sup> non significant ( $p > 0.05$ ).

significantly ( $p < 0.05$ ) smaller than in the other states (0.8 ha).

Table 3 shows that rural farmers (1.9 donkeys) had significantly ( $p < 0.001$ ) fewer donkeys than urban farmers (4.1 donkeys). The mean working days with donkeys per week was higher ( $p < 0.001$ ) in Kano and Jigawa (5.2 days) than in Kaduna and Katsina (4.2 days). Respondents from urban areas worked more days per week (6.4 days) with donkeys than those from rural areas (2.9 days) ( $p < 0.001$ ). In particular, the difference in working hours with donkeys between the rural and urban respondents in Kaduna was higher than in the other states ( $p < 0.001$ ). This may be related to the number of hours spent on transit in conveying firewood and other materials to urban areas.

#### Economic impact of donkeys for smallholder donkey keepers in Nigeria

Mean annual income from donkeys (Table 4) was six

times higher for urban donkey farmers than for rural donkey farmers, with highest income in Kano (558,000 Naira). The working hours with donkeys and the number of donkeys had a positive effect ( $p < 0.001$ ) on income from donkeys. The regression coefficient for the number of donkeys indicated that increasing the number of donkeys by one donkey increased annual income from utilizing donkeys by 90% in rural areas and 21% in urban areas. Farm size had a significant ( $p < 0.01$ ) negative effect on income from donkeys in both rural and urban areas. This implies that farmers with larger farms use fewer donkeys for economic activities. On average, total family income was 32,903 Naira in rural areas and 211,771 Naira in urban areas. After donkeys, main income sources were cropping in rural areas, and off-farm income in urban areas. The type of off-farm activities depended on the location. In Jigawa and Kaduna, many rural farmers were engaged in small scale food processing industries, while in the urban areas of Kaduna and Kano, farmers worked mainly in large scale commercial farms around cities.



**Table 5.** The perception of citizens (n = 80) about donkeys (D) in four states in northwest Nigeria (n).

Statements	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	p-value <sup>2</sup>
D <sup>1</sup> have socio-econ. value	21	40	6	1	12	0.000
D are associated with poverty	18	18	8	14	22	0.136
D look ugly	26	18	11	12	13	0.047
D look bad to tourists	14	17	11	15	23	0.287
D are friendly	20	31	12	12	5	0.000
D are hard working	41	32	4	2	1	0.000
D are wicked animals	12	19	14	15	20	0.579
D are stubborn	15	37	17	5	6	0.000
Nigerian D are unproductive	16	15	8	17	24	0.087
D provide cheap transport	40	26	2	7	5	0.000
D cause overgrazing	11	15	10	16	28	0.012
D cause road accidents	19	27	12	13	9	0.013
Use of D is necessary	23	22	10	15	10	0.043
D should be promoted	17	13	16	18	16	0.928
D population should increase	21	29	13	11	6	0.000
D should be fully utilized	15	35	15	9	6	0.000
D are difficult to control	11	41	10	11	7	0.000
D cope with distractions	15	33	9	11	12	0.000
D cost less than cattle and easy to manage	25	31	12	8	4	0.000

<sup>1</sup>D: Donkeys, <sup>2</sup>p-values: Level of significance across the contingency table, p-values are chi square probabilities.

areas were tethering their donkeys near the main roads, thereby causing road accidents. Also, in both rural and urban areas, farmers did not bury their dead donkeys in a pit; they disposed them outside the town, thereby causing air pollution to citizens.

Farmers mentioned the main threats facing them at the time of the survey (Table 6b). The first threat in rural areas was competition between the donkey owners and commercial motorcyclist and wheelbarrow pushers in conveying goods to various destinations. Another threat was increasing market prices for donkeys and their equipment. The farmers said the market price of donkeys washigh due to the slaughtering of donkeys for meat in the southeastern part of the country. The farmers also complained aboutthe new policies and programmes of the state ministries of environment and agriculture and natural resources. In these programmes, the farmers were prevented from undertaking their normal business with donkeys due to the imposed environmental sanitation in the last Saturday of every month and/or due to heavy tax paid to the government as part of revenue generation.

## DISCUSSION

### Socio-cultural and economic benefits of donkeys in northwest Nigeria

In the past, donkeys were owned by farmers for personal

uses such as transportation, drawing water from deep wells, conveying manure to the farmsand transporting farm produce to home or local markets. This study indicates that donkeys still play significant roles in the life of smallholder farmers in northwest Nigeria. They are used to generate income, as gifts and as entertainment during ceremonies. However, farmers differed in their opportunity to own and utilize donkeys due to differences in resources, wealth, economic activities, and labour demands between the rural and urban locations. For example, respondents from rural areas had larger farm size (Table 2) because they are less affected by urbanization, compared to those in urban areas where there is virtually less land (ECA, 2004). However, competition for family labour between farm activities and working with donkeys could potentially reduce annual income from utilizing donkeys. Huang et al. (2009) observed a negative relationship between total household income and working off farm in China.

During the group discussions, farmers emphasized the use of donkeysfor income generation rather than other draught animals, like the popular White Fulani bulls (Bawa and Bolorundoru, 2008). The rising demand for services of donkey transport in urban areas is the main driving force for the large number of donkeys in urban areas (Table 3). The income generating activities using donkeys was impressive in both rural and urban areas of northwest Nigeria. The time spent in working with donkeys, 25 h per week, shows the intensity to which

**Table 6.** Strengths and weaknesses of Nigerian agricultural system with donkeys, (b) Opportunities and threats of Nigerian agricultural system with donkeys.

Internal	Strengths(+)	Weaknesses(-)	
<b>(a)</b>			
Internal	(i) Donkeys are used during annual celebrations e.g. Durbar*	(i) Donkeys have low status in the society	
	(ii) Donkey owners work in groups	(ii) Poor management of female donkeys	
	(iii) Farmers form cooperative societies	(iii) High abortion rate	
	(iv) Theft of donkeys is minimized.	(iv) Loss of foal for replacement	
	(v) Citizens prefer to use donkeys to convey certain goods and farm produce because they are safer and cheaper	(v) Decrease in donkey population	
	(vi) Donkeys are given as gifts to friends, families and less privileged individuals in the society (e.g. lepers).	(vi) Over-utilization of donkeys	
	(vii) Donkeys serve as starting capital to farmers which shift to other professions later in life.	(vii) Lack of improvement in the management of donkeys	
	(viii) Donkeys are source of off-farm income to farmers	(viii) Bad welfare condition and mal-treatment of donkeys	
	(ix) All materials required by donkey users are locally produced and therefore cheap	(ix) Lack of proper information about their activities and possible constraints	
Socio-cultural	(i) Donkeys with good body condition cost more than the emaciated ones	(x) Inability to organize themselves into successful farmers organizations especially in rural areas	
	(ii) Donkey trading offers employment to some people e.g. donkey traders	(xi) Perception that donkey owners are associated with poverty especially in rural areas	
	(iii) Donkeys are source of food (meat) for some people	(xii) Farmers have to replace their donkeys occasionally	
	(iv) Farmers enjoy monopoly of market using donkeys especially in urban areas	(xii) High rate of disease incidence e.g. colic diseases.	
	(v) Utilization of donkey manure helps to recycle products in mixed crop-livestock system	(i) Use of extensive management system	
	(i) Donkeys cause less environmental degradation compared to other livestock	(ii) Farmers use donkeys for long distance journeys	
	(ii) Farmers have better option to use their manure due to lack of artificial fertilizers	(iii) Donkeys have no access to clean drinking water and good quality feed.	
	(iii) Donkeys are adapted to their environments	(iv) Farmers lack motivation to use donkeys as draught animals	
		(v) High costs of medical care	
Economic		(vi) Low investment in donkeys especially in rural areas	
		(i) Land sizes are fragmented and small	
		(ii) High rate of deforestation due to firewood business	
		(iii) Donkeys cause so many road accidents	
Ecological		(iv) Dead donkeys cause environmental pollution	
	<b>(b)</b>		
	Socio-cultural	(i) Considerable interest in donkey utilization among youths in north-west Nigeria	(i) High taxes paid to the government for revenue generation
		(ii) Increased opportunities in donkey utilization in urban centers due to rapid urbanization	(ii) Citizens do not yet realize the advantages of donkeys
(iii) State ADPs in northern states are considering the use of donkeys as sources of farm power		(iii) Extension work is done mainly on other livestock. Donkeys are neglected.	



Table 6. Contd.

	(iv) Image of donkey farmers is improving gradually in the society	(iv) Donkey population is decreasing due to slaughtering for meat in the south-eastern states (v) Escalating prices for donkeys and their equipment in the market (vi) Unpredictable returns to investments in donkeys especially in rural areas
Economic	(i) Farmers form cooperative organizations (ii) Less conflicts between donkey owners and other people (e.g. traffickers) (iii) Socio-economic role of donkeys is becoming recognized again in the society (iv) There could be high demands for donkey milk in the future due to its nutritious and medicinal values (v) The desire of some local governments to give priority to donkey farmers may give opportunities	(i) High costs of replacement of donkeys (ii) High competition between donkey owners and commercial motor cyclists and wheelbarrow owners (iii) High costs of some implements such as shovel digger saddle and axe (iv) High incidence of court trial cases in urban centers due to conflicts between farmers and citizens
Ecological	(i) Increased demand of donkey manure in rural areas (ii) Improvement of farming systems research for better integration of mixed crop-livestock system	(i) New policies and programmes of Ministry of environment at federal, state and local government levels (e.g. control of livestock movements in urban centers).

Durbar\* = Colourful event with horses to celebrate certain occasion or welcome an important visitor.

donkeys are utilized (Table 3). In a rural area in Ethiopia, Crossley (1991) found that donkeys were used for only 8 h per week. This result suggests that donkeys in Nigeria have the potential to provide their owners with a steady income, provided they are well managed (Berhanu and Yoseph, 2011). In Kano, farmers worked on average 36 h/w, because of high demands for services of donkey farmers, resulting also in attractive prices. Kano is the most densely populated state and has the smallest distance to the state capital compared to the other three states. The latter makes movement of people and goods easier, thereby boosting commercial activities.

### Constraints to donkey utilization in northwest Nigeria

Despite the significant role of donkeys in income generating activities in northwest Nigeria, the productivity of donkeys in terms of income generated by the farmers per annum still remains low due to some technical constraints. Farmers mentioned the problem of feed shortage which is linked to other problems such as general management, diseases and high costs for veterinary care and materials. Therefore farmers, animal scientists, health providers and policy makers need to work together to address the problem of feed scarcity and low veterinary care (Pritchard, 2010). Another problem outlined was shortage of funds and lack of credit facilities. Hence collaborated efforts are needed from both

the government and non-governmental organizations (NGOs) to assist farmers with credit facilities so as to raise the efficiency of the system and improve farmers' livelihoods (Shomo et al., 2010). In Ethiopia, Pearson et al. (2000) reported that about 20% of the respondents perceived lack of finance and feed shortage as two most important constraints for donkey management. Another major limitation mentioned by the farmers was the issue of low status in the society. Donkeys are not being used as meat animals in northwest Nigeria and therefore some citizens consider them as animals with very low social values. A similar observation was made in Zambia (Mofya, 2004). The situation could be improved by the donkey farmers' associations through activities that promote the image of donkeys in the society (Starkey, 2001). Despite the contribution of donkeys towards food security, improved livelihoods and nation's building, there are no government policies directed toward protecting, promoting and utilizing donkeys in Nigeria. Therefore policy makers in Nigeria need to appreciate the contribution of donkeys to the nation's building by formulating policy instruments in line with farmers' needs which could bring about the required social change (Berhanu and Yoseph, 2011).

### Status of donkeys in northwest Nigeria

Citizens' perception about donkeys may have

considerable effects on the smallholder farming system with donkeys, and should be addressed to achieve sustainable promotion of donkeys in Nigeria. The perception of citizens showed that donkeys still had low status. This might be connected to the local traditional beliefs of the people in both urban and rural areas. There are a lot of misperceptions about donkeys in northwest Nigeria which are passed down from generation to generation. For example, citizens believed that donkeys are generally dull animals that possessed little or no talent at all. One misperception about donkeys is that donkeys are owned by the poor compared to horses which are owned by the rich, elites and traditional rulers. In the past, donkeys were not used during festive occasions such as traditional durbar (a colourful event with horses to celebrate certain occasions or welcome an important visitor), but now they are being used.

The current change in perception about donkeys by some citizens might be related to the present economic circumstances in Nigeria as a result of new economic policies (Bryceson, 1999, 2000), which led the citizens, especially the youths, to invest in the use of donkeys for different activities in both rural and urban areas. This was shown in the diverse response of citizens about the relationship of donkeys with poverty (Table 5). However, some citizens still had negative perceptions about donkeys and their socio-economic roles in the study areas. For example, 25% of the citizens perceived the use of donkeys in the Nigerian farming system as needless. This result was expected because most citizens give little or no attention to donkeys, and donkeys are not promoted. In general, citizens had divergent opinion about the use of donkeys. In future, the welfare of donkeys in northwest Nigeria may become better as 65% of the citizens in this study recognized the social status of donkeys. These types of negative perceptions have also been reported in South Africa (Fielding and Starkey, 2004).

The image of smallholder donkey farmers is being gradually improved in the study area as a result of changes in peoples' lifestyle through education, wealth, travelling and political activities. This is similar to the situation reported in Ethiopia where the citizens realized the advantage of donkeys and their owners in carrying out daily activities in the society, although government officials and planners had different perceptions about donkeys (Sisay and Tilahun, 1997). Since farmers had associations in both rural and urban areas, it would be good if they could be advertising their activities to the citizens in both government and commercial radio and television stations in all the states. Previous studies have shown that local farmers associations succeeded in promoting donkey marketing without the intervention of the government (Starkey, 2001). Proper market information about donkeys should be provided to the farmers through local radio extension programmes and mobile phones in the future.

## Prospects for utilizing donkeys in northwest Nigeria

Donkeys helped to provide employment opportunities to unemployed youths in northwest Nigeria. The level and intensity of utilizing donkeys for income generating activities serve as a means of employment opportunities for the unemployed youths. Income generated from utilizing donkeys is spent on other aspects of household needs. The daily income generated from donkeys in rural areas was only 250 Naira, but this was above the poverty line of US\$1 for Nigeria. In the urban areas, the daily income was three times higher than in rural areas. A prospect for the smallholder donkey farmers was the increase in urbanization in all parts of northwest Nigeria, which requires the use of donkeys in transporting building materials. Donkeys are likely to remain as the main source for transporting building materials in all parts of northwest Nigeria in the years to come because of the recent increase in fuel prices. Therefore, since the use of vehicles is limited by high fuel prices, donkeys will fill the gap. The lack of proper management, technological backwardness, financial constraints and unfavourable government policies may impose some limitations to this prospect.

## Conclusion

It can be concluded from this study that donkeys play significant socio-economic roles in terms of income generation, employment opportunities and improvement of livelihoods of many smallholder farmers and their families in northwest Nigeria. However, farmers find it difficult to effectively utilize their donkeys in both rural and urban areas. Both the government and private individuals should help to invest resources on donkeys in support of their income generating opportunities and poverty reduction among the youths. Productivity of Nigerian donkeys may not be improved without credit facilities, more knowledge on proper management and promotion of services. Also, welfare of Nigerian donkeys needs attention.

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