

The Role of Working Animals toward Livelihoods and Food Security in Selected Districts of Fafan Zone, Somali Region, Ethiopia

Takele Geta Gina^{1*} Bosenu Abera Tadesse²

1. Department of Animal and Range Sciences, College of Agriculture, Wolaita Sodo University, PO box 138, Wolaita Sodo, Ethiopia

2. Department of Animal and Range Sciences, College of Dryland Agriculture, Jigjiga University, PO box 1020, Jigjiga, Ethiopia

*E-mail of Corresponding author: takeleg@gmail.com

Abstract

Working animals play a fundamental role in human livelihoods through their direct and indirect contributions to food, financial, human and social capital. They are producing profitable livestock products, and provides support to food security and poverty reduction by increasing agricultural productivity but their roles have received less attention. The objective of this study was to examine the role of working animals toward livelihoods and food security in three districts of Fafan zone, Ethiopian Somali Region. This study showed that, different kinds of working animals were kept for multipurpose role, including camels, cattle, goats and sheep, donkey and little amounts of poultry in Jigjiga district (Hadaw and Deghalee Kebeles). About, 10% were used for ploughing of land in Jigjiga than Awubare (19.5%) district. Their uses for carrying loads in Jigjiga was higher (42.5%) than Kebribiyah (35.5%) district when compared to other uses. All respondents agreed that, rearing working animals was easy, ecologically feasible and possible for poor stakeholders, and increase social acceptances. Accordingly, they were contribute to HHs income (22.5% by direct sale, 37.5% through their products and by products, 24% by packing, and 16% by renting). Particularly, they were assist in creation of rural and urban economic opportunities (from the practices in Jigjiga town "*Biyolle-Biyyo*" services to the urban inhabitant). About 45% of respondents were indicated that they were contribute to food security as a meat source, whereas, 55% were reflected that they were contribute as source of meat and milk (contains protein, minerals, vitamins, etc.) and had significant association between livelihood activities of HHs and their farming system ($\chi^2=35.14$, $p=0.000$), and commonly used working animals and their contribution toward food security ($\chi^2=37.11$, $p=0.000$). In conclusion, working animals can be used as an alternative resources for sustainable food production for human livelihoods and enhances food security for the study area and nation at large.

Keywords: Food security, Livelihoods, Working animals, Alternative resources

1. Introduction

Agriculture is the main source of livelihoods for 2.5 billion people and, with rural development, it is widely acknowledged as a pathway out of poverty and key contributor to food security. Roughly one billion people, including many of the world's poor, depend directly on animals for income, social status and security as well as food and clothing (FAO, 2011). Livestock play a central role in food security; both directly and indirectly (Sandford and Ashley, 2008; Sofia and Heelen, 2012), and central to underprivileged families livelihoods and culture (Rangnekar, 2006).

Among livestock, working animals play a fundamental role in human livelihoods; provide food, as well as employment, income, human and social capital, draft power and manure for arable crops (Sofia and Heelen, 2012). Generally, their work provides support to food security and poverty reduction efforts through their role in income generation activities. Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life. It encompasses four dimensions: food availability, access, utilization, and stability (FAO, 2011, Sofia and Heelen, 2012).

Working animals are multipurpose, producing profitable livestock products, including meat, milk and manure (FAO, 2011). They are also important in communities' and households' socio-cultural lives, as they are often used in celebrations and supporting households in need by being lent and shared between families (FAO, 2014). They provide draught and load-bearing power, as well as outputs including milk, meat, and hides and manure. Use of working animals contributes to increased farm productivity. For example, smallholders who use animals for soil tillage can cultivate larger areas more efficiently and quickly than with human labour, thus greatly increasing their yields.

The use of working animals for food production (which involves by far the largest number of animals used by humans) is changing rapidly. They assist men and women with crop production (ploughing, planting, weeding, fertilizing) and transport to complement motorized vehicles (on-farm, marketing, riding, pack

transport). They also create synergy in nutrient cycles, farming and marketing systems: animals allow farmers and traders to transport manure, harvests and market products. They increase people's transport capacity and range, and provide families and entrepreneurs access to supplies, services and livelihoods (FAO, 2011).

Working animals contribute to households' livelihoods and benefit the community as a whole through providing draught power for agricultural tillage, including ploughing, harrowing and weeding, providing agricultural and livestock products, such as milk, vegetables and other farm produce, to the market and bringing market purchases back to the homestead in Ethiopia (Berhanu and Yosef, 2011; Tadegegne et al., 2012; FAO, 2014). Cereal production using oxen and camel drawn plough is typically the most important food and income source for populations practicing mixed farming system in Ethiopia and particular to the study areas (Berhanu and Yosef, 2011). By using ploughs, farmers are both able to increase the amount of land cultivated and also improve yields of certain crops which require more intensive soil preparation (Sandford and Ashley, 2008).

As, in the case of income, animal products only make a minor contribution to overall food intake of smallholders, and of the poor in particular. Although more significant, even for pastoral and agro-pastoral populations the contribution is small. However, as income, this small contribution often has a nutritional importance beyond its calories. Working animal products contain some of the most easily digestible forms of protein, Vitamin A, iron as well as other key components of a healthy diet. Particularly, the rural poor are less likely to purchase meat and animal products for consumption than the better off; what little they consume is usually from own production (and frequently linked to festivals) (Sandford and Ashley, 2008)

Even though, working animals provide a key source of power, both in terms of production and distribution (i.e. access to markets), and are therefore critical to the functioning of farming systems, they remain absent from food security and agriculture interventions. Moreover, their role of working animals to livelihood and food security have not been rightly perceived and less exploited in Fafan zone, Somali region. It is, therefore, imperative to address their roles in livelihood's and better understanding of their contribution to food production for poor smallholders for their current and future needs. Thus, the objective of this study was to examine the role of working animals toward livelihoods and food security in the study areas.

2. Materials and Methods

2.1 Description of study area

Jigjiga or at present called "Fafan zone" is one of nine zones of the Ethiopian Somali Region. Fafan zone is bordered on the south by Degehabur, on the southwest by Fiq, on the west by the Oromia Region, on the north by Shinile and on the east by Somalia. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this Zone has a total population of 967,652, of whom 526,398 are men and 441,254 women. While 203,588 or 21.04% are urban inhabitants, a further 112,153 or 11.59% were pastoralists. Two largest ethnic groups reported in Jigjiga were the Somalis (95.6%) and Amhara (1.83%); all other ethnic groups made up 2.57% of the population. Somali language is spoken as a first language by 95.51%, Amharic by 2.1%, and Oromo by 1.05%; the remaining 1.34% spoke all other primary languages reported. 96.86% of the population said they were Muslim, and 2.11% said they practiced Orthodox Christian.

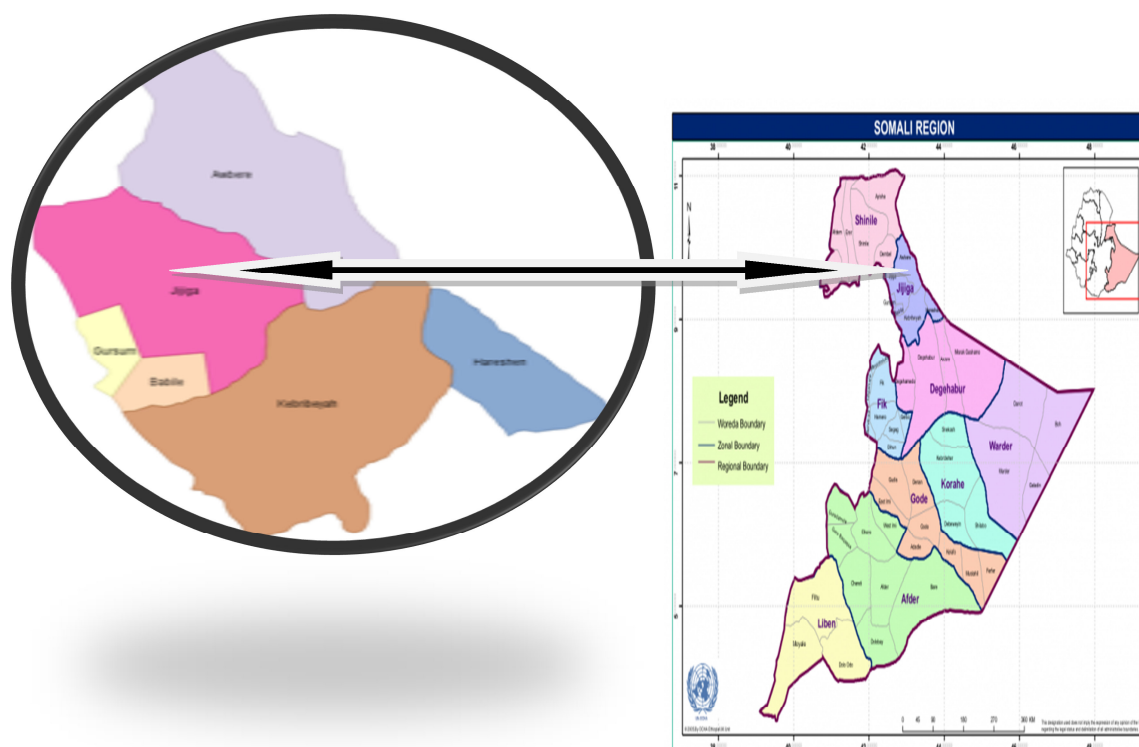


Fig. 1. Map of study area

2.2 Sampling Technique

Selection of the study districts and households were done by using purposive sampling technique in consultation with zonal and district bureau of agriculture experts. The selection criteria used were road accessibility, potential for working animal population, and importance of working animal production to the livelihood and food security in the agro-pastoralist economy. Six Kebeles (two from each districts), and a total of 120 households (HHs) from the three districts were selected purposively based on the availability of working animal.

2.3 Methods of data collection

A semi-structured interview schedule was drawn up and administered to owners of working animal power in the three districts of Fafan zone: The interview was designed to collect two sets of data. The first set was covered about general information on household characteristics and working animal holdings. The second set of interview was included data on the working animals' draught capability, their roles to livelihoods of poor stake holders, their contributions to food production and food security for agro pastoralists. A total of 120 households (20 households from each kebele, 40 households from each *Woreda*) were selected and interviewed by trained enumerators. The subsequent participatory focused group discussions was designed to involve stakeholders in identifying the common working animals. They were also describe their roles that can be attributed for livelihoods and food security. The selected stakeholders that were participated on focused group discussions were categorized by gender and different age groups. The discussions was also aimed at coming to consensus regarding the roles of working animals for different purposes.

2.4 Statistical analysis

The survey data was subjected to simple descriptive statistics at 95% confidence interval using the Chi-square test of the FREQ procedure by the SPSS software (SPSS, 2003). The percentage of respondents were also reported for each parameter.

3. Results and Discussion

3.1 General Household Characteristics of the Three Districts

Based on participatory focused group discussion, all the study households were possessed the working animals. Specifically, the respondents confirmed that, with the age groups of 7 up to 35 years were mainly owning or rearing and using working animals for different livelihood activities. The interviewed respondents were from both sex without considering ethnic aspects. The number of male who owned working animal was very large as compared to female respondents in the three study districts (Table 1). The study districts were mostly agro-pastoralist and their livelihood was mainly based on agricultural products through farming.

Table (1): Respondents category by age groups, gender and percentage of herders

Districts	Age Groups by years		No. of respondents by gender		%age of total herders of DAP
	7 - 35	35 - 60	Male	Female	
Jigjiga (N=40)	28 (70%)	12 (30%)	35 (87.5%)	5 (12.5%)	34 (85%)
Awubare (N=40)	22 (55%)	18 (45%)	33 (82.5%)	7 (17.5%)	31 (77.5%)
Kebrebiyah (N=40)	24 (60%)	16 (40%)	31 (77.5%)	9 (22.5%)	32 (80%)

Source: Own survey result, 2014, DAP=Draft animal power, %age= percentage

About 85 % of interviewed households were herds different kinds of livestock, including camels, cattle, goats and sheep, donkey and little amounts of poultry in Jigjiga districts particularly in Hadaw and Fafen (Deghalee) *Kebeles* (Table 1). The farming activity and working in government offices were contribute the major livelihood activities of the households which was on average 55 % and 23 %, respectively. The Chi-square test also indicated that there was systematic relationship ($\chi^2=35.14$, $p=0.000$) between livelihood activities of households and their farming system. In addition, the households conducts other livelihood activities which shares about 2.2 % of their living, and employment in the non-government institution was also contributes about 5%. Local non-farm income include; income earned by household members from merchandizing different goods which shares 11.8 % on average; across the three districts.

3.2 Common Working Animals and their Draught Capability

Based on the analysis, the respondents were indicated that, 45% were uses donkeys (from equines family), 35% were uses cattle, and 22.5% were uses camels as draft power in the three study districts. The draught capabilities of working animals were also ranked accordingly in the Table (2). Mostly rural stakeholders prefers cheap labour for land tillage (ploughing) as well as transport of water and other commodities. The stakeholders also require cheap energy sources for other activities like pulling or carrying loads on back and hauling carts. The Chi-square analysis also revealed that there was significant relationship between commonly and mostly used working animals by the household and their farming system and livelihood activities ($\chi^2=40.89$, $p=0.000$), local transportation ($\chi^2=6.42$, $p=0.04$) and, uses as carting and hauling ($\chi^2=11.22$, $p=0.024$), but had non-significant association with the perception household towards their welfare in the three study areas.

Table (2): Most commonly used working animal across three districts

Commonly used working animals	%age of respondents	Ranking	Mean \pm SE
Camels	22.5	3	2.12 \pm 0.12
Cattles	35.0	2	
Donkey	42.5	1	

Source: Own survey result, 2014

This study indicated that donkeys were prepared due to their ability adapt well in dry areas, provides more power for agriculture and transport at the low cost and used for different purposes in the study districts (Jigjiga, Awubare and Kebribiyah). Cattles and camels were the second and third choice of the area (Table 2).

In addition, donkeys had a comparative advantages to survive and perform during drought under poor feed recourses (Table 2). They eat less than cattle and do better than cattle under drought conditions and in heavily stocked areas, and were also lighter and smaller than cattle. They were also live a long life and can be worked up to 25 years of age and these evidences were supported by Starkey, (1997); Simalenga and Joubert, (1997); and with the review report of Tadegegne et al., (2012). Generally, working animals chosen in the study areas, were in accordance to the type of work to be performed, the local environment, socio-economic conditions and the availability of local animals.

3.3 Purposes for Keeping Working Animals in the Distincts

Across the three districts, cattle and camels were kept mainly for food services, but among cattle, male (oxen) were kept for ploughing in addition to meat and breeding purposes. Camels were occasionally used for ploughing in rural areas of Kebribiyah, whereas; donkeys were kept for transportation, packing and hauling loads, carts, and renting in rural stakeholders in the three districts (Table 3). Across the three districts, purposes of keeping working animals was vary.

Table (3): Purposes for keeping working animals in the study districts

Working animals	Purposes for Keeping by stakeholders
Cattles	Meat, Milk, Ploughing, Breeding
Camels	Milk, Meat, ploughing, Prides, Pack loads, Breeding
Donkeys	Transportation, Packng and hauling load, carts, Gharry services

Source: Own survey result, 2014

The variability was may be due to their variation in location and people life standards. The transport role of working animals is important for carrying farm inputs (seeds, fertilizers, and crop protection requisites)

and outputs like harvested crops and animal products by the FAO (2010) report; which is similar to the finding of this study.

3.4 Contribution of Working Animals to Livelihoods

In figure (2), the mean of respondents were showed that; the contribution of working animals to livelihoods significantly vary. About 10% of working animals were used as food sources, 30% were used as an income source, 52.5% were used as working or draft power and 7.5% were used as other purposes (like blood compensation and social prestige, especially camels) among working animals across the study districts. The Chi-square test indicated the absence of systematic relationship ($\chi^2=1.14$, $p=0.767$) between farming system of households and their contribution to the owners.

Our result is in agreement with the works carried out in Southern region in Ethiopia (Berhanu and Yosef, 2011), Southern Africa (Simalenga and Joubert, 1997) and IGAD region (Sandford and Ashley, 2008) who reported that working animals draught is labour saving technology because they allow a large area to be cultivated per households or per unit of labour and save household (women and children) time and effort by carrying water (used for water-lifting) and fuel wood, milling, logging and land excavation and road construction.

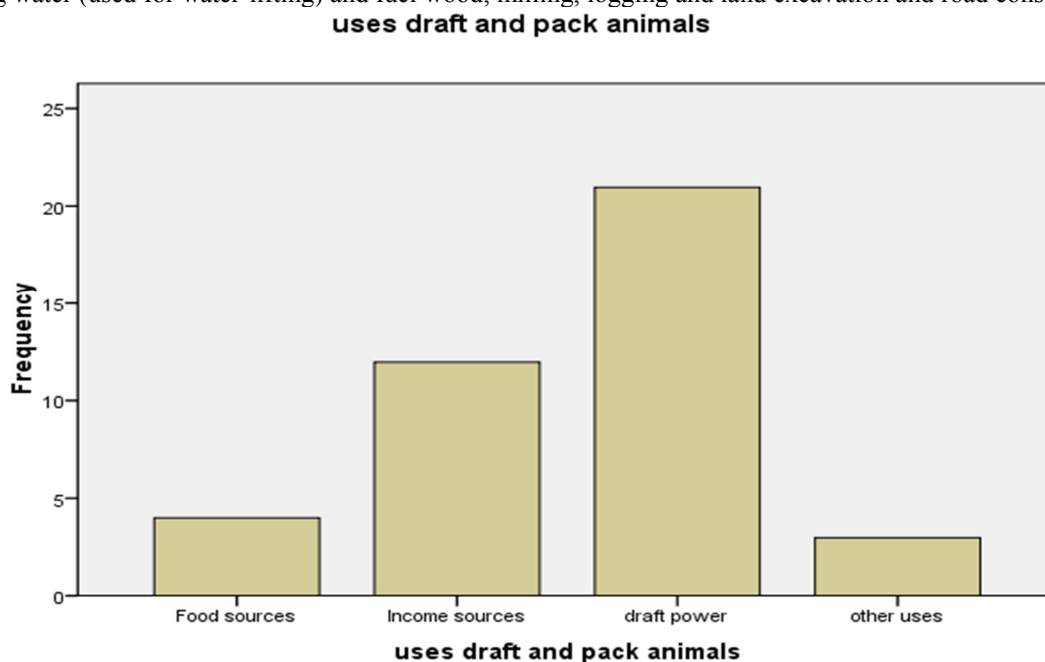


Fig. 2. Contributions of working animals in the study area

3.4.1 Socio-ecological values of working animals

The respondents were showed that, working animals increase social acceptances as compared with those stakeholders did not possess. For example owning camel is an indication of wealthy, i.e. having camel is all about the money in the banks. The respondents were also indicated that camels are used as marriage dowry for women family in the Somali tradition and as prestigious animals. All respondents agreed that rearing or herding working animals is easy, ecologically feasible and possible for poor stakeholders. They were evidently reflected that, camels and donkeys were well adapt and perform better under drought condition and in heavily shocked agro-ecology among working animals across the three districts.

Generally, working animals had a prominent socio-ecological importance and preferred by poor stakeholders for rearing in the three districts. Furthermore, working animals can easily adapt harsh agro ecological environment and requires less cost and labor for raising, enhances ecologically sustainable means of increasing agricultural production for rural livelihoods which is similar to the finding of Tadegegne et al., 2012; Berhanu and Yosef, (2011) and FAO, (2010).

3.4.2 Economic values of working animals

Respondents mentioned that milk production from cattle and camels for family consumption and selling, and cash income from direct animal sales are the two major economic reasons of keeping livestock species. Accordingly, 22.5% of working animals were contribute by direct sale, 37.5% of working animals were contribute through giving their products like meat, milk, hide or skin, by products and eggs, 24% were contribute by packing whereas, 16% were contribute the economy of stakeholders through by renting of working animals (Table 4).

Table (4): Forms of economic contribution by working animals in the study districts

Form of contribution	Economic value (by percentage)	Mean \pm SE
Direct sale of draft and pack animals	22.5	1.97 \pm 0.10
Products and by-products	37.5	
Pack and Gharry services	24	
By renting draft animals	16	

Source: Own survey result, 2014. SE= Standard Error

The Chi-square analysis also revealed that there were significant relationship between economic value from working animals for the owners and their purposes of keeping ($\chi^2=15.688$, $p=0.003$), types of feed resources ($\chi^2=20.45$, $p=0.002$), and types of management practiced ($\chi^2=11.65$, $p=0.038$) across three districts, respectively. In this case, working animals assist in creation of rural economic opportunities and urban employment (from the practices in Jiggiga town "Biyolle-Biyyo" services to the community of urban inhabitant) which is in lined with the report of FAO (2010) and Berhanu and Yosef, (2011).

3.4.3 Roles of working animals toward food security

Almost all of the respondents agreed that, camels and cattle were the main source of food as compared with donkeys..

Table (5): Forms and their contribution toward food security in the study districts

Forms as a sources of food	Contribution toward food security (by %)	Mean \pm SE
Milk	28	2.55 \pm 0.79
Meat	20	
Both meat and milk	52	

Source: Own survey result, 2014, SE= Standard Error

About 20% of respondents were indicated (Table 5) that; working animals contribute to food security as a meat source, whereas; 52% were reflected that working animals contribute to food security in the form of meat and milk as protein sources. For example, camel milk and meat is rich in minerals, proteins and vitamins. Contrarily, donkeys were not used as food source in the study districts due to the cultural and religious principles or dogma.

Table (6): Parameters and their associations toward food security in the study districts

Association	df	χ^2 -value	Asymp. Signif ($p<0.005$)
Roles toward food security*Purposes of keeping	2	5.984 ^a	0.050
Roles toward food security*Types of feed resources	3	10.62 ^a	0.014
Roles toward food security*Commonly used WA	2	37.11 ^a	0.000
Roles toward food security*Types of Mgt practices	1	5.78 ^a	0.016
Roles toward food security*Types of health problems	3	5.28 ^a	0.152

Source: Own survey result, 2014, df=degree of freedom, χ^2 =Chi-square test, WA= working animals, Mgt= management, a= number of cells

The Chi-square tests also revealed that there were significant relationship between roles toward food security and commonly used working animals but non-significantly associated the health risks observed and indicated in the Table (6). The study showed that, children's (1-10years) average daily consumption was only 2.5 liter of milk for nourishment, whereas, age group above 11 years of HHs was consumes 4 liter on daily basis (Table 7). The consumption of working animals' meat was most of the time blended with their normal diets (Rice, Pasta, and Macaroni) by 11 years and above age groups in the study districts.

Table (7): Forms and average household consumption of working animal products in the districts

Age group of consumers	Product type	Forms of consumption	Average monthly consumption per HHs	% of respondent
1-10 years	Only Milk	Pure whole milk	75 L	100
>11 years and above	Milk	Pure milk	120L	31.5
		Mixed wth 1/2 cup of tea		48.0
		Oat grain powder +Milk		20.5
>11 years and above	Meat	Rice + meat(2kg)	60kg	30.0
		Pasta+ meat(1.5kg)		31.7
		Macaroni+ meat(2kg)		26.7
		Only Meat (roasted, cooked)		11.7
SE+Mean				1.005 \pm 2.2

Source: Own survey data, 2014, SE= Standard Error. L= liter, HH= Household, %= percent

Generally, working animals was contributed to food production through milk and meat, and fulfill food requirements directly or indirectly (from manure and offspring) for poor stakeholders and shares its parts in alleviating food insecurity across the study districts which is similar to the report of FAO (2010 and 2014).

4. Conclusion

Working animals play a fundamental role in human livelihoods through their direct and indirect contributions to financial, human and social capital in particular. They were also increase social acceptances and had a prominent socio-ecological importance and preferred by poor stakeholders for rearing in the three districts. About 22.5% of working animals were contribute by direct sale, 37.5% of working animals were contribute through giving their products like meat, milk, hide or skin, by products and eggs, 24% were contribute by packing whereas, 16% were contribute the economy of stakeholders through by renting of working animals. This study showed that the working animals generally contribute to food production through milk, meat, manure and offspring, and generally fulfill food requirements directly or indirectly for poor stakeholders and shares its parts in alleviating food insecurity across the study districts. Particularly, their products were consumed as pure whole milk by children's, whereas milk only (31.5%), mixed with 1/2 of cup of tea (48%), and boiled with oat grain powder and milk (20.5%) by consumers 11 years and above.

In conclusion, working animals can be used as an alternative resources for sustainable food source for human livelihoods and enhances food security in the study area. Engaging policy-makers and development partners is vital to make these animals to be included in national development plans and as part of a holistic approach to food security and poverty reduction. Although some working animals adapt harsh agro-ecological environment and requires less cost and labor for herding, good management and conducive working environment should be created for the working animals by the owner's and users'.

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