**INTERNATIONAL JOURNAL OF AGRICULTURE & BIOLOGY**

**ISSN Print: 1560–8530; ISSN Online: 1814–9596**

**DOI: \*\*\* - - - \*\*\* - - - \*\*\***

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Management Practices, Utilization and Challenges of Donkey in Godey Town of Shabele Zone, Somali Regional State, Ethiopia

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**ABSTRACT**

The study was conducted in Godey town of Shabele zone, Somali Regional State, Ethiopia. The objective was conducted to assess management practices, utilization, and challenges of donkey. A total of 200 households who own working donkeys were selected for this study. Data were collected using semi-structured questionnaire, key informants interview, focus group discussion with community who own donkeys and personal observations. The study revealed that 92% of working donkeys were involved in drought work, whereas 18% were used for pack work. The common feed resources for donkeys were feeds obtained from natural pasture, green maize leaves, hay, household wastes and grain supplements. Pipe water, river water, and pond water were the main water sources for working donkeys in the study area. About 91% of households kept their donkeys in an open backyard, while 9% of them kept in a separate shed built adjacent to or a short distance away from the family home. Donkeys provide cart services in the study area, transporting various items weighing more than 300 kg in order to obtain a high benefit in a short period of time and to be used more than six days per week. Working donkeys in the current study area had a life span of less than 6 years, 7-10 years, and more than 10 years, with 37%, 151%, and 12%, respectively. The most important constraints that affect donkey production and utilization in the study area were a lack of feed, health problems (sickness, wounds, etc.), overloading and overworking, poor road and harnessing problems, and poor attitude/lack of awareness. As a result, in order to enhance working donkey management concerns, area-based development interventions that can overcome current constraints should be employed.

**Keywords:** Working donkeys; Management Practices; Utilization; Constraints

**Introduction**

Donkey is important farm animals that have descended from African wild ass (*Equus asinus*) and early was domesticated equines that have been around long as mankind (Burden and Thiemann, 2015). For at least 5000 years, donkeys have been primarily utilized as working animals. Donkeys are adapted to dry and mountainous condition with scarcity of water and poor quality of vegetation (Rossel *et al.,* 2008). Ethiopia has an around 10 million donkeys (CSA, 2021) which is the second largest donkey population in the world after China and nearly 40% of Africa’s equine population.

The low cost of purchase and maintenance of donkeys, their relatively small size, ease of training and handling high effective digestive system and their ability to stand thirst has enabled them to small scale farmers and the poor living in peri-urban, remote and hostile environments with no infrastructure and road access (Herago *et al.,* 2015). In Ethiopia, 56% of households kept donkeys mainly for pack services (to generate income and homestead use), 26% for cart use (to generate income), and 14% for pack use but exclusively for homestead use and 4% exclusively for renting, breeding or petty trade (Admassu and Shiferaw, 2011).

The animal welfare is being compromised internationally due to several constraints such as poverty and lack of knowledge. In the rural and peri-urban areas the welfare of working donkeys in developing countries is therefore crucially important (Smith, 2005), not only for the health and survival of those animals, but also for the livelihoods of those people dependent on them (Mekuria et al., 2013). Often in the rural and urban areas, donkeys are not kept properly, because of misplaced love for animals and the belief that they are worthless. Donkeys are the most important, appropriate, and economical pack animals under the smallholder farming system because of the country's low level of road construction, network, and rugged terrain (Gebreab et al., 2000). A pair of well-conditioned donkeys could be used as an alternative draft power source for secondary and tertiary land in areas where draft power is a constraint for crop cultivation (Herago et al., 2015). Many activities that are performed by donkeys within the community are collecting firewood, transporting water in both rular and urban (Biyole), farm inputs and goods to markets and/or homes in the rural areas (Mohammed, 1991).

Donkeys used under difficult environmental conditions including intense heat, difficult topography dehydration, malnutrition, lesions on different body part, hoof problems, poor feeding and housing management practice. Donkeys are often engaged in work for long hours and when getting free, they are left to browse and feed on grass garbage, walking long distance and overloading, poor handling during loading, poor harness devices and unloading is common (Anonymous, 2007). These have the potential to affect negatively their welfare and quality of life. Donkeys are subjected to different welfare problems in rural and urban areas, even though they have a crucial role in day to- day activity. The most common difficulties with donkey welfare are overloading and insufficient access to feed or health care services (Biffa and Woldemeskel, 2006). Moreover, they are exposed to ling working hours with little rest, little poor husbandry, lameness, poorly designed harnesses, severely tethered moreover they ae exposed to long working hours with, severely tethered or hobbled, cruel training methods, lack of shade, lack of water, inhumane handling, heat stress, inhumane disposal when old or worn out (Mesfin, 2008).

Donkeys provide invaluable support for the livelihoods of communities in Godey town. They are used in transportation of goods and are exposed to a various management and care practices. Little attention has been given to this animal and there is no information on donkey management, utilization and challenges that affect donkeys in the study area as such information will be useful for designing strategies that will improve donkey utilization and care. The herein presented study has been conducted in order to assess these practices and identify major constraints of donkey utilization.

**Materials and Methods**

**Description of the Study Area**

The study was conducted at Godey town of Shabele zone, Somali regional state, Ethiopia. Godey is bordered on the south by the Shebelle River which separates it from Adadle, on the northwest by Imay-bari, on the north by Danan, on the northeast by the Korahe zone, and on the southeast by Kelafo. It has an average elevation of 358 meters above sea level. The average annual maximum and minimum temperatures are 35°C and 22.9°C, respectively. The main rainy season termed locally as *Gu’*, extend from April to June and the short rainy seasons (*Deyr*) stretches from October to December. The average annual rainfall ranges from 150 to 344 mm. The soil type at the research site was sandy loam. The topography of the area is an extensive flat to gently sloping.

**Study Design and Sampling Procedure**

A cross-sectional study was conducted to assess donkey management practices, utilization and major production challenges in and around Godey. Prior to site and participant selection, discussions were made with key informants such as livestock experts in the Bureau of agriculture and rural development and different development agencies found in Godey for baseline information such as donkey production potential and their trends, donkeys’ and utilization practices. Four kebeles were selected based on their accessibility and donkey population. A total of 200 donkey owners were randomly selected for this study.

**Data Collection and Analysis**

Data were collected using semi-structured questionnaire interview, key informants interview, focus group discussion with community who own donkeys and personal observations. The data collected include demography and social characteristics of the households, purposes of donkey keeping, feeds and feeding systems of donkeys, water source and watering of donkeys, housing condition of donkey, breeding practices, health care of working donkeys, working practices of donkeys, and major constraints of working donkeys in the area.

Data were analyzed using SPSS (version 26.0). Descriptive statistics such as frequency and percentage were used to analyze the data and interpreted by tabular while qualitative data were narrated, and explained logically based on the existing condition and literature.

**Results and Discussion**

**Household Characteristics**

The general variables associated with donkey keeper respondents are distributed by sex, age, marital status, family size and educational status are presented in Table 1. The sex characteristics of respondents showed that the respondents in the study area were male-headed households that might be due to the fact that males are closely related to livestock handling and management. The male headed household characteristics of respondents was in agreement with Asmare *et al.* (2016) and Bainesagn (2016) for different parts of Ethiopia.

In terms of age category, the majority of respondents (34.5%) were between the ages of 31 and 40 years, and 28.5% was between 41 and 50. The age structure of household heads in the study area was similar to the reports of Altaye *et al.* (2014) and Asmare *et al.* (2016) who reported the average age of respondents of 43 years for Metekel Zone, north-western Ethiopia.

The educational statuses of the majority of respondents in the study area were found illiterate, which might be associated with poor education access in the area. The educational level of the donkey owners in the study area were almost comparable to the reports of earlier reports in Ethiopia (Asmare *et al.,* 2016; Bainesagn, 2016) for different districts of Ethiopia. This might be due to various factors such as access to education, awareness about the importance of education and other related factors. However, it is important to note that from technology adoption, this higher population of the illiterate class had a disadvantage on the acceptance of new technologies like trainings, improved agricultural technologies and adopting them for better live improvement. In other words, adoption of improved technologies should also consider the literacy condition of farmers. Study by Appleton and Balihuta (1996) indicated that education is the main issue in agricultural development.

The average family size of the sampled households was 5.65±1.9 which is lower than the report of Ma’alin *et al.* (2022) who reported an average family size of 7.01±1.1 for Godey district.

Working donkeys were acquired by sampled households in the study area through purchase (91%), exchange (6%), and inheritance (3%). Similarly, Nega and Demissie (2016) reported that purchase was source of donkey for urban areas of Assosa district; while purchase, inherit and exchange were source of donkey for 90, 2 and 8% of respondents in rural areas of Assosa district, respectively.

Table 1. Demography and social characteristics of the respondents

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Category** | **Frequency (n)** | **Percent (%)** |
| Sex | Male | 144 | 72 |
| Female | 56 | 28 |
| Age (years) | 18-30 | 47 | 23.5 |
| 31-40 | 69 | 34.5 |
| 41-50 | 57 | 28.5 |
| 51-60 | 24 | 12 |
| >60 years | 3 | 1.5 |
| Educational level | Illiterate | 174 | 87 |
| Read and write | 16 | 8 |
| Primary school (1-6) | 10 | 5 |
| Family size (Mean±SD) | 5.65±1.9 |  |  |
| Source of donkeys | Purchase | 182 | 91 |
| Inherit | 6 | 3 |
| Exchange  | 12 | 6 |

**Purpose of Keeping Donkeys**

Donkeys can be kept for different purposes including draught, packing, sloughing, breeding for commercial sells, and prestige/riding. However, according to the current study, working donkeys were mainly used for draught (92%), whereas the rest (8%) were used for packing. This finding is in line with the report of Samatar *et al.* (2022) who reported that most donkeys (64%) in Jigjiga city were used for draught, whereas the rest of the others were engaged in packing. Furthermore, information obtained from key informants interview and focus group discussions showed that donkeys were used for transporting of water, construction materials and grains/food items. Fred and Pascal (2006) noted that equids are kept for transportation purpose in different agro-ecological zones of Ethiopia. Pritchard et al. (2005) reported that in some regions of North West Kenya, animals were categorized as draught, pack, riding and other type of working equid.

A study by Tamador *et al.* (2011) has shown that draught donkeys are used for transport of building materials, farm products, consumer goods, public transport. Pack donkeys, on the other hand, were used for distributing milk and transport of light goods and plastic containers. A study by Mohammed (1991) revealed that farmers use alternative means like draught animals specially donkeys and mules to transport crops, fuel wood, water, building materials and people by carts or on their back from farms and markets to home. According to Mekonnen (1986) and Svendsen (1998), donkeys are considered as beasts of burden in many developing countries.

Figure 1: Reasons of keeping working donkeys in the study area

**Management Practices of Working Donkeys**

**Feeds and feeding of donkeys**

The major feeds and feeding frequency of working donkeys are given in Table 2. The major feed resources of donkeys were green maize leaves, natural pasture, grain supplements, hay and household wastes irrespective of the work type and load. This study is in contrary with the report of Molla *et al.* (2017) who reported that most of the donkey owners in and around Hawassa town used concentrate feeds such as wheat bran, chopped sugarcanes, barely and green grass. The type and amount of feed requirement varies according to the work load of the donkey (Harris, 2010). Furthermore, Dennis and Anderson (1992) suggested that animals, which are being used year round for transport, need more feeds than animals that are only worked for short periods seasonally.

The study further revealed that majority (93.5%) of the respondents offered feed to donkeys two times (morning and evening) and the remaining provided three times (morning, afternoon & evening). This is in agreement with the report of Molla *et al.* (2017) who reported that 36.72% and 63.28% of respondents in and around Hawassa town provided feed twice and three times, respectively. Similarly, Dinka *et al.* (2006) reported that the majority of the respondents (98.6%) in the Mid rift valley of Ethiopia provided feed to donkeys at different frequencies in a day.

Table 2. Major feed resources and feeding frequency of donkeys in the study area

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameters** | **Category** | **Frequency (n)** | **Percent (%)** |
| Feed resource | Feed obtained from natural pasture | 48 | 24 |
| Green maize leaves | 87 | 43.5 |
| Hay | 18 | 9 |
| Household wastes | 12 | 6 |
| Grain supplements | 35 | 17.5 |
| Feeding frequency | Morning and evening | 187 | 93.5 |
| Morning, afternoon and evening | 13 | 6.5 |

**Water Source and Watering of Donkeys**

Table 3 presented for the source of water, frequency of watering, and amount of water offered to working donkeys in the study area. Majority of respondents (70.5%) used river water for their donkeys, while 19.5%, 10% respondents used pipe water, and pond water, respectively. Majority of the respondents provide water their animals once a day (51%) and twice a day (46%) and the remaining (3%) respondents are three times per day. This finding is in line with the study of Nega and Demissie (2016) reported that the majority (40%) of donkey owners/users in urban area of Assosa district provided water three times per day but the rest (35% and 25%) provide water twice and once per day, respectively. Nega and Demissie (2016) further noted that in all respondents of rural areas in Assosa district provided water to working donkeys once per day. On the other hand, amount of water offered to working donkeys varied by household: 45% offered15 liters, 34% offered 10 liters, and the rest offered 20 liters. Nega and Demissie (2016) further reported that the average amount of water per supply per donkey was 9.75 ± 2.7 L in urban areas of Assosa district and not measured in rural study locations.

Table 3. Source of water and watering frequency of working donkeys in the study area

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameters**  | **Category** | **Frequency (n)** | **Percent (%)** |
| Source of water | Pipe water | 39 | 19.5 |
| River  | 141 | 70.5 |
| Pond | 20 | 10 |
| Watering frequency | Once a day | 102 | 51 |
| Twice a day | 93 | 46.5 |
| Three times | 5 | 2.5 |
| Estimated amount of water offered/day | 10 liters | 68 | 34 |
| 15 liters | 90 | 45 |
| 20 liters | 42 | 21 |

**Housing of Donkeys**

Majority (91%) of the interviewed households reported that accommodation of working donkey in an open area by tethering around the household compound. While about 9% of respondents reported that a separate shed built either adjacent or few distance far from the family house (Table 4). This finding is similar with the study of Tuaruka and Agbolosu (2019) who reported that 44% of the respondents in Bunkpurugu/Yunyoo District in the northern region of Ghana allowed their donkey to freely roam without providing housing. This study further added that some farmers indicated that donkeys have good immune response and can survive both in cold and dry environments hence there was no need to provide housing. However, some reported resource constrains caused their inability to provide housing for their animals. During wet season these farmers tether their donkeys in front of their houses.

On the other hand, this finding is in contrary with the report of Nega and Demissie (2016) who reported that 90% of the households from urban and 40% from rural areas in Assosa district of Benishangul gumuze region reported accommodation of working donkey in a separate shed built either adjacent or few distance far from the family house. The difference might be due to the agro-ecology, educational background and attitude of the households towards donkey management practices.

The majority of respondents, cleaned their houses once a week, while the rest (39.5 %) cleaned twice a week. This indicates a lack of awareness and knowledge among households in the study area, implying the need to promote awareness and train donkey owners to enhance management techniques.

Table 4. Housing practice of donkeys in the study area

|  |  |  |  |
| --- | --- | --- | --- |
| **Housing of donkeys** | **Category** | **Frequency (n)** | **Percent (%)** |
| Type of house | Open backyard | 182 | 91 |
| Separate shed /enclosure | 18 | 9 |
| Frequency of cleaning house | Once a week | 121 | 60.5 |
| Twice a week | 79 | 39.5 |

**Breeding Management of Donkeys**

Breeding management of donkeys like other animals has very much economic benefit. However, all respondents in the study area indicated that un control breeding practice, random by the donkeys themselves without any human intervention. All of the respondents noted that donkeys breed early in rainy season, which might be associated with availability of feed resources during the rainy season. Like other livestock species (Bayou *et al.,* 2014; Zewdie and Welday, 2015) in most production systems of Ethiopia, no planning of breeding and human-assisted breeding of equines in most cases.

**Health Care of Working Donkeys**

According to the result of the current study, donkeys face a range of health problems, not all of which have been clearly identified in this survey. As indicated by the respondents, the main health problems identified included back sores, respiratory problems (with common symptoms such as coughing and nasal discharge), lameness, bite wound, eye problem, and hoof overgrowth (Table 5). This finding is in line with the report of Feleke *et al.* (2015) who noted respiratory problems (coughing and nasal discharge), back sores and parasitic load with their descending degree of severity as the main health problems reported by donkey owners in Gena Bossa Woreda, Southern Ethiopia.

Furthermore, information obtained from focus group discussion and key informants interview showed that the health care for donkeys with proper vet service in the study area was very poor. Traditional healing like burning, branding and use of donkey dungs smoke were practiced. Similarly, Feleke *et al.* (2015) reported that traditional healing like branding and use of certain herbs were widely applicable in Gena Bossa Woreda of Southern Ethiopia.

Table 5. Housing practice of donkeys in the study area

|  |  |  |  |
| --- | --- | --- | --- |
| **Health problems** | **Local name (*Somali*)** | **Frequency (n)** | **Percent (%)** |
| Back sore | Dhabar xanuun | 54 | 27 |
| Respiratory problem | Dhibaatada neefsashada | 43 | 21.5 |
| Lameness | Curyaanimo | 25 | 12.5 |
| Bite wound | Nabar qaniinyo | 33 | 16.5 |
| Eye problem/ ocular discharge | Indho ilmayn | 7 | 3.5 |
| Hoof overgrowth | Ciddiyo dhaadheeri | 15 | 7.5 |
| Digestive problem | Dhibaatada dheef-shiidka | 23 | 11.5 |

**Working Practice of Donkeys**

Working practices of donkeys in the study area are summarized in Table 6. Most (53.5%) of the donkeys worked for more than 5 days per week followed by (31.5%) range 3-5 days/ week and the rest (15%) worked <3dats/week. Majority (49%) of the respondents replied that numbers of hours of work per day were ranged 4-8 hours followed by (33.5%) >8 hours. This is in line with the findings of Biffa and Woldemeskel (2006) who noted that donkey work from 4 to 12 hours/day in Ethiopia, depending on the season and type of work. With regard to loading practices, most (46.5%) of the donkey carried more than 300kg load at a time. Majority of the respondents (91.5) indicated that they were packing heavy load in order to get high benefit in short time. The result obtained in this study was higher than the result reported by Biffa and Woldemeskel (2006) who indicated carrying an average weight load of 150 kg in Hawassa town. Similarly, this observation was in agreement with the findings of Morka *et al.* (2014) who noted described overloading and over working was the main constraint on working equine in and around Nekemtetown, East Wollega Zone, Ethiopia. While interviewing, owners also expressed that life span of working donkey varied between 6-10 years (Table 6). The current finding contradicted Fred and Pascal's (2006) findings, which claimed a life expectancy of up to 30 years.

Table 6. Distribution of respondent’s respect to amount of load/week, reason of loading and life span of working donkeys

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Category** | **Frequency (n)** | **Percent (%)** |
| Frequent use of donkey/week | <3 days | 30 | 15 |
| 3-5 days | 63 | 31.5 |
| >5 days | 107 | 53.5 |
| No of hours worked/day | <4 hr | 35 | 17.5 |
| 4-8 hr | 98 | 49 |
| >8 hr | 67 | 33.5 |
| Estimated amount of load | <80 kg | 28 | 14 |
| 80-300 kg | 79 | 39.5 |
| >300 kg | 93 | 46.5 |
| Reasons of carting heavy load | Lack of awareness | 17 | 8.5 |
| To get high benefit within short time | 183 | 91.5 |
| Life span of working donkeys | < 6 years | 37 | 18.5 |
| 7-10 years | 151 | 75.5 |
| >10 years | 12 | 6 |

**Major Constraints of Working Donkeys**

There are various problems or constraints faced by the respondent farmers in the utilization and production of donkeys. According to the responses of the households, donkey production and utilization bear different constraints as summarized in Table 7. It was found that shortage of feed (0.28), health problems (0.26), overloading (0.19), overworking, poor road and harnessing problem (0.15) and lack of awareness were (0.11) the most commonly known constraints of working donkeys kept in the study area. Feed shortage was ranked as the first most important constraint which affects management of working donkeys, followed by health problems. The current result is in agreement with the findings of Feleke *et al.* (2015) who noted feed problem, poor road and harnessing problem, overloading and lack of awareness as the major constraints of donkey production and utilization in Gena Bossa Woreda, Dawuro Zone, Southern Ethiopia. A similar information was also reported by Nega and Demissie (2016). In addition, Haftu and Adane (2018) reported harnessing problems, over loading, disease, lack of veterinary service and injury as the major constraints of donkey in Hossana city of Ethiopia.

Experts in study location during group discussion underlined that working donkey management system in general was backward *i.e*., donkey owners do not give more attention for donkey, especially in supplementary feeding, health care, housing management, reducing the load, providing adequate rest times, providing day time shelters and using appropriate harnesses.

Table 7 – Major constraints of working donkeys in the study area

|  |  |  |  |
| --- | --- | --- | --- |
| Constraints  | Priority choices | Index | Rank |
| 1st  | 2nd  | 3rd  | 4th  | 5th |
| Shortage of feed  | 104 | 52 | 26 | 15 | 3 | 0.28 | 1 |
| Health problems (disease, wound etc) | 82 | 46 | 34 | 14 | 9 | 0.26 | 2 |
| Overloading and overworking | 78 | 12 | 25 | 12 | 8 | 0.19 | 3 |
| Poor road and harnessing problem | 43 | 29 | 23 | 9 | 4 | 0.15 | 4 |
| Poor attitude/lack of awareness | 23 | 21 | 17 | 5 | 12 | 0.11 | 5 |

**Conclusion and Recommendations**

It was found that donkeys were primarily used for draught work in the study area. Natural pasture, green maize leaves, hay, household wastes, and grain supplements were all common feed sources for donkeys. Donkeys were typically fed twice or three times per day. Donkeys were mostly watered twice a day from the river, which was their main source of water. According to the respondents, donkey housing has received less attention, and they are kept in an open backyard. Donkeys are used more than six days a week in the study area, transporting various items weighing more than 300kg in order to obtain a high benefit in a short period of time. The most common known constraints of working donkeys kept in the study area that need immediate improvement were found to be feed shortages, health problems, overloading and overworking, poor road and harnessing problems, and lack of awareness. Therefore, based on the above conclusions, the following recommendations are forwarded:

* Proper veterinary health care and diseases prevention strategies should be designed.
* Awareness creation and training of both professionals and donkey owners as to donkey related technologies, basic management, health care and welfare problems of donkeys should be made.
* Improvement of the management practice like housing, health care and use of proper harnessing materials need to be implemented.
* Donkey owners should be encouraged to use different feed resources that can supplement the available donkey feeds.

**Acknowledgements**

We are grateful to Jigjiga University for financial support.

**Author Contributions**

Guled Hassen: conceptualization, investigation, writing review and editing, visualization, data curation, formal analysis, and project administration. Kawnin Abdimahad: Conceptualization, methodology, investigation, writing original draft, visualization, data curation & analysis. Kiflay Welday: Conceptualization, supervision, data curation and analysis, writing-review & editing. Abdihakim Ma’alin, Abdulahi Mahamed, and Aden Omer: Investigation, data curation, writing review and editing

**Conflict of Interest**

The authors declare that they have no conflict of interest

**Data Availability**

Data presented in this study will be available on a fair request to the corresponding author.

**Ethics Approval**

Not applicable in this paper.

**Funding Source**

This work was supported and funded by Jigjiga University.

**References**

Admassu B and Shiferaw Y, 2011. Donkeys, horses and mules - their contribution to people’s livelihoods in Ethiopia. <https://www.thebrooke.org/sites/default/files/Ethiopialivelihoods-2020-01.pdf>

Altaye, SZ, Kassa B, Agza B, Alemu F, and Muleta G. 2014. Smallholder cattle production systems in Metekel zone, northwest Ethiopia. Research Journal of Agriculture and Environmental Management, 3(2): 151-157. <https://www.academia.edu/download/56916859/Cattle_survey.pdf>

Anonymous 2007. Arthropoda Species File Online. Version 1.1/3.1. <http://taxonomicon.taxonomy.nl/Reference.aspx?id=5420>

Appleton S, Balihuta A. 1996. Education and agricultural productivity: evidence from Uganda. *J Int Dev*. **8**: 415–44. <https://ideas.repec.org/p/csa/wpaper/1996-05.html>.

Asmare B, Demeke S, Tolemariam T, Tegegne F, Wamatu J, and Rischkowsky B. 2016. Determinants of the utilization of desho grass (Pennisetum pedicellatum) by farmers in Ethiopia. *Tropical Grasslands-Forrajes Tropicales*, *4*(2), 112-121. DOI: 10.17138/TGFT(4)112-121

Bainesagn WW 2016. Smallholder cattle production systems and husbandry management in West Shewa zone of Oromia Regional State, central Ethiopia. *World Scientific News*, *53*(3), 178-188. <http://psjd.icm.edu.pl/psjd/element/bwmeta1.element.psjd-6497a39b-5808-4ab8-af04-902e4d46b19c>

Bayou, E., Haile, A., Gizaw, S. and Mekasha, Y., 2014. Characterizing husbandry practices and breeding objectives of Sheko cattle owners for designing conservation and improvement strategies in Ethiopia. *Livestock Research for Rural Development*, *26*(12). <http://www.lrrd.cipav.org.co/lrrd26/12/bayo26235.html>

Biffa D, Woldemeskel M., 2006. Causes and Factors Associated with Occurrence of External Injuries in Working Equines in Ethiopia. *Inter J App Res Vet Med* **4(1)**: 1-7. <http://www.jarvm.com/articles/Vol4Iss1/Vol4Iss1BiffaV4N1pp1-7.pdf>

Burden F, and Thiemann A. 2015. Donkeys are different. Journal of Equine Veterinary Science, 35: 376-382. <http://dx.doi.org/10.1016/j.jevs.2015.03.005>

CSA (Central Statistics Agency) 2021. Federal Democratic Republic of Ethiopia, Agricultural sample survey on livestock and livestock production (Private peasant holdings), Statistical Bulletin No. 589, Addis Ababa, Ethiopia. 2: 40-41. <https://www.statsethiopia.gov.et/wp-content/uploads/2021/05/REVISED_2013.LIVESTOCK-REPORT.FINAL-1.pdf>

Dennis R, and Anderson M. 1992. Improving animal-based transport: technical aspects of cart design. In *Improving Animal Traction Technology. Proceedings of the first workshop of the Animal Traction Network for Eastern and Southern Africa (ATNESA) held* (Vol. 18, p. 23).

Dinka H, Shelima B, Abalti A, Geleta T, Mume T and Chala R. 2006. Socioeconomic importance and management of carthorses in the mid rift valley of Ethiopia. In: Pearson R A, Muir C J and Farrow M, Editors. The Future for Working Equines. The 5th International Colloquium on Working Equines. Proceeding of an International Colloquium held at the Addis Ababa University, Ethiopia, 2006 Oct 30 - Nov 2. The Donkey Sanctuary, Sidmouth, Devon: EX10 ONU. 2007. p.181-88. <https://www.cabdirect.org/cabdirect/abstract/20083249310>

Feleke A., Getachew K., Tamrat G. 2015. Assessment of the Production Status, Utilization and Management of Donkeys in Gena Bossa Woreda, Dawuro Zone, Southern Ethiopia. *Food Science and Quality Management* Vol. 45, 2015. <https://www.semanticscholar.org/paper/Assessment-of-the-Production-Status%2C-Utilization-of-Assefa/35963d723add908efd441ccba29f2d53080ac048?sort=relevance>

Fred O, and K. Pascal, 2006. Extension Approaches to improving the welfare of working equines. Kenya Network for Dissemination of Agricultural Technologies (KENDAT). Nairobi, Kenya, pp: 1-28. <https://www.academia.edu/12755893/equine_welfere>

Gebreab, F., Shiferaw, Y. and Worsene, A., 2000. Survey on helmintnosis of equines inWenchi, West Shewa Administrative Region, Ethiopia in: Smith, D., Tesfaye, A.and More, L. (eds), Alleviating poverty in peri-urban Ethiopia by improving the health, (welfare and management of donkeys proceedings of a workshop held at Debre Zeit, Ethiopia), pp. 128- 138.

Haftu K, and Adane H. 2018. Assessment of Donkey Utilization Practices and Challenges in Hossana City of Ethiopia. *Agricultural Research and Technology Open Access Journal*,16(3) -<https://juniperpublishers.com/artoaj/pdf/ARTOAJ.MS.ID.555990.pdf>

Harris PA. 2010. Review of equine feeding and stable management practices in the UK concentrating on the last decade of the 20th century. *Equine Veterinary Journal*, 28:46-54. <https://doi.org/10.1111/j.2042-3306.1999.tb05156.x>

Herago T., Megersa M., Niguse A., and Fayera T, 2015. Assessment on Working Donkey Welfare Issuein Wolaita Soddo Zuria District, Southern Ethiopia. *Global Veterinaria* **14 (6)**: 867-875 [https://www.idosi.org/gv/gv14(6)15/12.pdf](https://www.idosi.org/gv/gv14%286%2915/12.pdf)

Ma’alin, A., Abdimahad, K., Hassen, G., Mahamed, A. and Hassen, M. 2022. Management Practices and Production Constraints of Indigenous Somali Cattle Breed in Shabelle Zone, Somali Regional State, Ethiopia. Open Journal of Animal Sciences, **12**, 103-117. <https://doi.org/10.4236/ojas.2022.121008>

Mekonnen T, 1986. Rural transport systems in Ethiopia. Proceedings of a National Workshop on Food Strategies for Ethiopia held at Alemaya University of Agriculture, Ethiopia. <https://assets.publishing.service.gov.uk/media/57a08ccee5274a27b200143b/R7350c.pdf>

Mekuria S, Mulachew M and Abebe1 R, 2013. Management practices and welfare problems encountered on working equids in Hawassa town, Southern Ethiopia, Journal of Veterinary Medicine and Animal Health, **5(9):** 243-250. <https://academicjournals.org/article/article1379688055_Mekuria%20et%20al.pdf>

Mesfin F., 2008. Investigation in to health, management and welfare problems of working donkeys in Wonchi district, South West Shoa zone, Ethiopia [dissertation]. Debre Zeit, Ethiopia: College of Veterinary Medicine and Agriculture Addis Ababa University.

Mohammed, A., 1991. Management and Breeding aspects of Donkey around Hawassa, Ethiopia. In: fielding and R.A. Pearson, (Editors). Donkeys, Mules and horses in tropical agricultural development. CTVM, Edinburgh UK, pp: 185-188. <https://agris.fao.org/agris-search/search.do?recordID=US201301760684>

Molla B, Dembela S, Megersa B, Mekuria W., 2017. The Welfare, Watering, Housing, Feeding and Working Management of Working Donkeys in and Around Hawassa City, Southern Ethiopia. Journal of Veterinary and Animal Husbandry **2(1)**: 106.

Morka A, Adisalem H, Bojia E, Eyob H, Bedasso M., 2014. Health and Welfare Assessment of Working Equine in and Around Nekemte Town, East Wollega Zone, Ethiopia. *American-Eurasian Journal of Scientific Research* **9 (6)**: 163-174. [https://www.idosi.org/aejsr/9(6)14/3.pdf](https://www.idosi.org/aejsr/9%286%2914/3.pdf)

Nega M. and C. Demissie, 2016. Management Practices of Working Donkeys in Urban and Rural Areas of Assosa District, Benishangul Gumuz Region, Ethiopia. World Journal of Agricultural Sciences, **12(5)**: 346-356. <https://dx.doi.org/10.5829/idosi.wjas.2016.12.5.23776>

Pritchard, J. C., Lindberg, A. C., Main, D. C. J. & Whay, H. R. (2005). Assessment of the welfare of working horses, mules and donkeys, using health and behavior parameters. Preventive Veterinary Medicine, **69**: 265–283. <https://pubmed.ncbi.nlm.nih.gov/15907574/>

Rossel S, Marshall F, Peters J, Pilgram T, Adams MD, and O'Connor D, 2008. Domestication of the donkey: Timing, processes, and indicators. Proceedings of the National Academy of Sciences, 105(10): 3715-3720. <https://doi.org/10.1073/pnas.0709692105>

Samatar AM, Abdifetah M, and Nesra Y., 2022. Assessment on Working Donkey Welfare Problem in Jigjiga City, Somali Region, Eastern Ethiopia. International Journal of Current Research Vol. 14, Issue, 01, pp.20535-20541, DOI: <https://doi.org/10.24941/ijcr.42904.01.2022>

Smith DG. 2005. Use and management of donkeys by poor societies in peri-urban areas of Ethiopia. Final Technical Report. Centre for Tropical Veterinary Medicine (CTVM), UK, 34 pp. <https://agris.fao.org/agris-search/search.do?recordID=GB2012111370>

Svendsen E., 1998. The Professional Handbook of the Donkey, 3rd edn. Whittet Books LTD, W14OBY, London, pp: 166-182. <https://www.amazon.com/Professional-Handbook-Donkey-Donkeys/dp/1873580371>

Tamador, Main DS. and Deneka, 2011. The management and husbandry of working animals reference of welfare. In proceeding of Khartoum international meeting on working animals. April 14-16, Khartoum, Sudan.

Tuaruka, L. and Agbolosu, A.A., 2019. Assessing Donkey Production and Management in Bunkpurugu/Yunyoo District in the Northern Region of Ghana. *Journal of Animal Husbandry and Dairy Science,* 3(2): 1-5. <https://www.sryahwapublications.com/journal-of-animal-husbandry-and-dairy-science/pdf/v3-i2/1.pdf>

Zewdie B, and K. Welda, 2015. Reproductive performance and breeding strategies for genetic improvement of goat in Ethiopia: a review. *Greener Journal of Agricultural Sci*ences, **5**: 023–33. DOI: <http://doi.org/10.15580/GJAS.2015.1.080614317>