

Research Article

Assessment of Beekeeping Practice and Its Constraints in Cheha Woreda of Gurage Zone

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Abstracts

The objective of this study was to assess the potential of beekeeping and its practice taking place, constraints affecting the beekeeping practice of the area. For this study, 20 households were selected randomly, with the total of 60 households. Both primary and secondary source of data was collected. The primary data were collected mainly from interviews and by observation, whereas secondary data were collected from Chaha Woreda Agricultural office. Further more, visits to the districts were taken to gather relevant information for the study prior to actual survey. The results of this study show that, out of the respondents, 51 were male headed households whereas the rest 9 households were female headed. Majority of household in the area was from 20-60 years old indicating that, active working force is dominant in the study area. In relation to educational level, 20% of the respondents were illiterate and the remaining had got at least basic education quantitatively, 18.33%, 28.33% and 13.33% of the respondents had attended elementary school, secondary and high school, respectively. Beekeeping is an ancient farming activity and practiced as a side line with other farm activities. Based on the type of hives and management practiced, three types of beekeeping are yet visible in the area. There was no significant variation in proportion of hives among the study kebeles. However, *Sisenamati*, which was lower in number of transitional hive, has shown relatively high potential with modern hive followed by warden. *Adoshe* was better in potential of transitional hive but has lower number of modern hive. Out of householders, 53.4%, 30.6%, 9.4% and 6.6% state that they have place traditional hive under the roof of the house, hanging on trees, inside the house and back yard respectively.

Keywords

Beekeeping, Hive, Honeybee, Gurage Zone

1. Introduction

Beekeeping is an important component of agriculture in Ethiopia. It helps to provide security in nutrition, economy and ecology. Ethiopia is known to be home for diverse fauna due to its varied ecological and climatic conditions [1]. The use of honey as food and medicine and that of wax for candle lighting in churches has a long history in Ethiopia [2]. Furthermore, smallholder farmers usually consider honey as cash

crop, rather than a subsistence commodity [3]. Beekeeping can also be easily integrated into on-going resources conservation and rehabilitation developments in different parts of Ethiopia.

The diversified agro climatic conditions of the country create environmental conditions conducive for the growth of over seven thousand species of flowering plants of which

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most are bee plants [4]. The favorable climate of the country allows for having about 10 million honeybee colonies of which 7 million are kept in different man made hives and the balance exists as wild [5]. This makes Ethiopia to be leading country in Africa and ninth in the world in honey production, respectively. Similarly, it stands first in Africa and third in the world in beeswax production [6].

Because of the diversity of plant habitat and environmental conditions and distributions, flowering season vary from place to place [7, 8]. Thus, identification and registration of honeybee flora in different agro-ecological zones, the value of different honey plants as sources of nectar and pollen or both, their life form, possible ways of propagation and their potential for honey production is a paramount an important issues [9]. Therefore, it is doubtless that, evaluating the current potential and identification of challenges that threatening this potential is mandatory in order to keep and exploit the potentiality that we have, and tackle the threatening problem for the sustainable development and improvement of the sub-sector. Therefore, this research was conducted with the objective of assessing the potential of beekeeping and its major constraints in the study area.

2. Material and Methods

2.1. Description of the Study Area

The study was conducted in two kebeles found in the Cheha woreda of Gurage zone of the Southern Nation Nationality and Peoples Regional state (SNNPRS). Gurage Zone is Located at 155 km south west of Addis Ababa between 7.8⁰ - 8.5⁰ North latitude and 37.5 °C - 38.7 °C East longitude of the equator. Agro ecologically, the Zone have dry mid-altitude, highland and frost with around 93% of the total area is mid-altitude to highland and moist dega climatic

condition, that makes it suitable for agricultural production [10].

2.2. Sampling Method

Three kebeles were selected purposively based on the potential for honey production and 20 households were selected randomly from each selected kebeles, making the total sample size of 60 household. For the study, both primary and secondary source of data were collected. Visits to the districts were taken prior to actual survey to gather relevant information from all possible sources. The primary data were collected mainly from interviews and by observation; whereas Secondary data were collected from the Woreda Agricultural office.

2.3. Data Analysis

Field observations, interview with key informants and focus group discussions were used to collect the data. SPSS (Version 20.0) was used analyze data and the results were presented in the form of tables and figures.

3. Results and Discussion

3.1. Socio-Economic Characteristics of Households

3.1.1. Household Characteristics

The result of this study reveals that, out of 60 household in the study, 51 were male headed and the rest 9 were female headed (Table 1).

Table 1. Sex characteristics of households.

Sex of respondent	Sisenamati	Warden	Adoshe	Total	Average	%age
Male	18	16	17	51	17	85%
Female	2	4	3	9	3	15%
Total	20	20	20	60	20	100%

On the other hand, the results of this study showed that, the majority of beekeepers house hold head in the area was from young to adults (20-60 years old) (Figure 1). The majority of household were in the productive age categories.

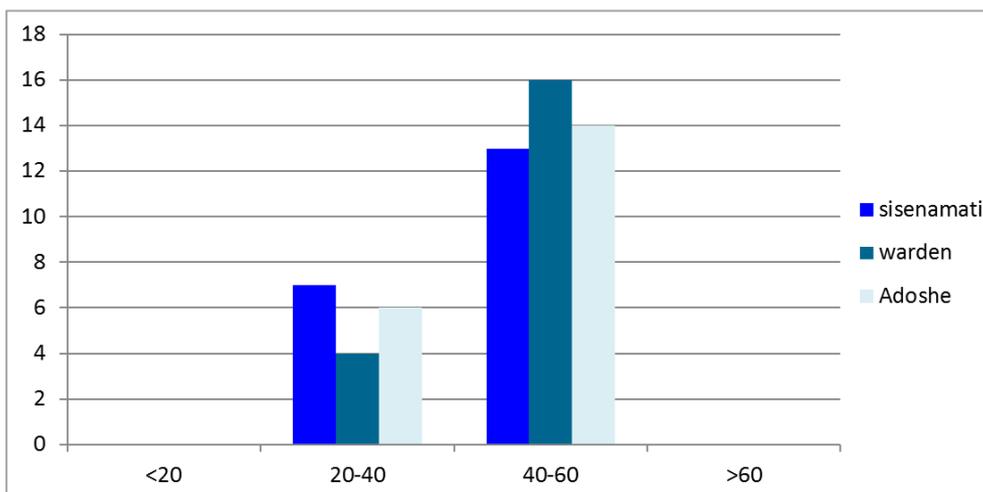


Figure 1. Age characteristics of households of the study kebele.

3.1.2. Educational Level (Status)

According to results of this study, only 20% of household member involved in interview were illiterate (Figure 2) and the remaining had got at least basic education. Accordingly, 18.33%, 28.33% and 13.33% of the respondents had attended

elementary, secondary and high school, respectively. This may have advantage in the ease dissemination of technology, as educated people can easily accept technologies than illiterate one. Simal results reported by [11, 12] in Damot Gale district.

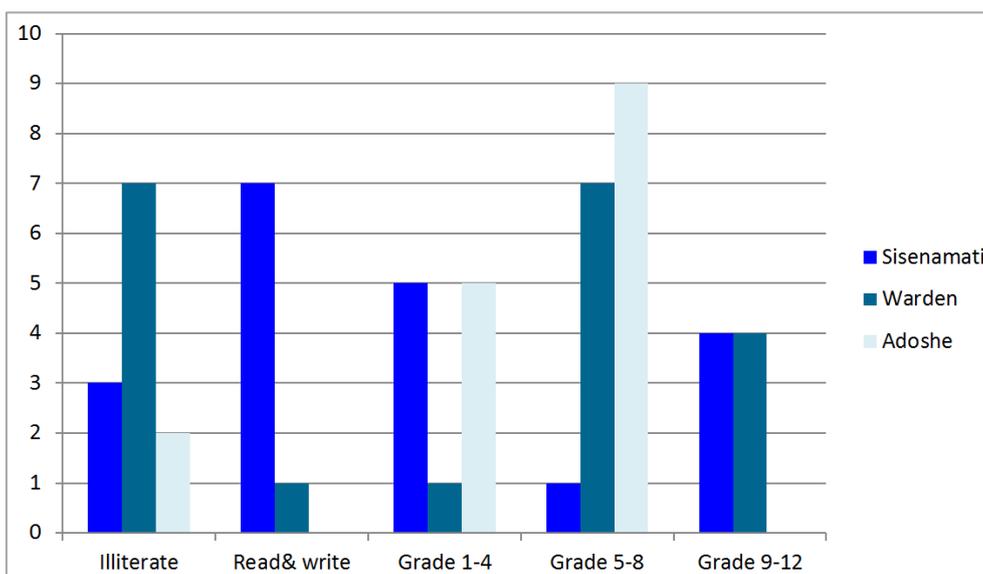


Figure 2. Educational level of households of the study area.

3.2. Land Holding in Relation with Family Size

The average family size per household was 12, 14 and 10 in sisenamati, Warden and Adoshe respectively. There was not significant different among the three kebeles in land holding by householders based on family size. This shows that there is no additional land as a result of increasing family members. The average farm land holding of the respondent was 1.5 ha,

which was in between the national average household land holding of 1.0-1.5 ha. There were no significant differences in farm land holding among the three kebeles (Table 2) and about 29 of respondent had less than 2ha., 29 had 2-3 ha., and 2 had more than 3 ha. Land holding size in this study was higher than the land size (0.80 ha) reported by [13] in Damot Gale district. But lower than the 3.23 ha reported by [14] in Adami Tullu, Oromia region and the 3.6 ha reported by [15] in

Burji District, Segen Zuria Zone of southern Ethiopia.

Table 2. Land holding and family size of the study area.

	Sisenamati	Warden	Adoshe	Total	Average	%age
Land size						
0.5-1	11	9	9	29	9.66	48.33
2-3	8	10	11	29	9.66	48.33
3-5	1	1		2	0.66	3.33
Total	20	20	20	60	20	100
Family size						
Under 14	4	5	4	13	4.33	36.11
15-30	6	6	3	15	5	41.67
31-60	2	3	3	8	2.67	22.22
Total	12	14	10	36	12	100

In General the results of this study indicated that most of the households with good potential of beekeeping have seen to possess less farming land and this is an indicator that, beekeeping can be practiced on fewer areas. In all study area, there was very low grazing land which resulted from in-

creasing human population that led to converting of grazing land to arable land. There was significant difference between sisenamati (35.9%) and warden (26.92%) and Adoshe (37.02%) in holding private forest land (Figure 3).

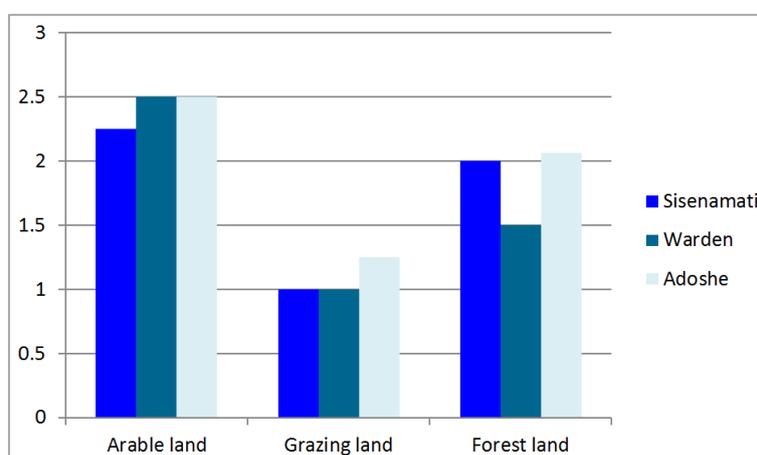


Figure 3. Arable/farm land, grazing land and forest land of the area.

3.3. Livestock Holding and Herd Composition

The results of current study show that, there was significant difference in the average number of livestock and species composition per household with higher number (17) for cattle followed by poultry (16.4) and sheep (10.67) and with lower number (1.4) of goats. Equine were not recorded for house-

holders involved in the survey at all. This variation might be due to the differences in the role of livestock based on the agro ecologies of the area and the available resources for livestock production (mainly types of feeds). The observed lower number of goat from sheep in the area, as indicated in the Figure 4, for was the best evidence for this condition. That means as the study area (Cheha woreda) is relatively close to highland and the feed resources for goat, which is browse

species, is relatively scarce compared to lowlands. Lower values for cattle (15.6), sheep (4.4) and poultry (11.8), with higher number of goats (7.6) were reported by [15] in Burji District, Segen Zuria Zone of southern Ethiopia. Similarly [16]

also reported lower livestock holdings of 13.99, 6.14, and 8.45 heads of cattle, sheep and chicken, respectively, but higher number of goats (11.37) per household in Metekel zone of Benishangul Gumuz Regional State of Ethiopia.

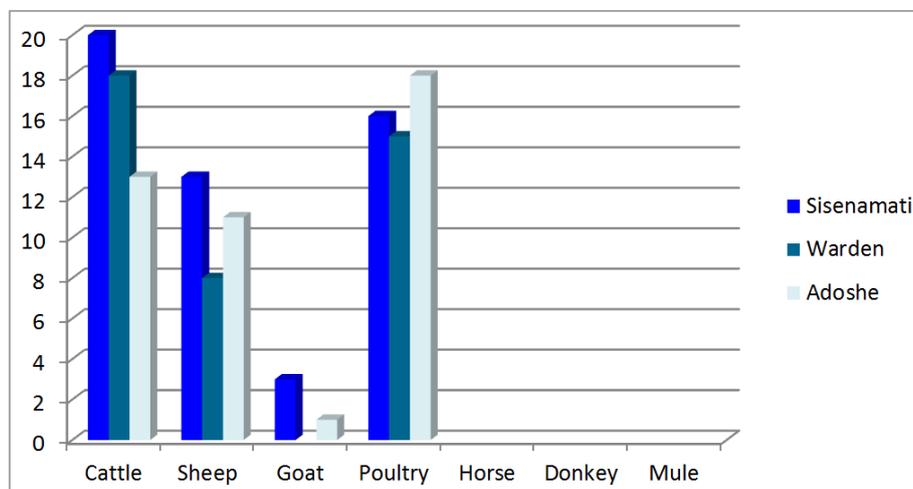


Figure 4. Major Livestock species in study area.

Livestock is used for the urgent financial need, dietary requirement, and fertilizer and as a safe guard in the case of crop failure. However, negative association between number of livestock holding and bee colony were observed in the study area. Consequently, beekeepers with large number of bee colony have small livestock population and vice-versa. This might be due to conflicts between livestock and honey bee or the attack of bees on livestock.

3.4. Beekeeping Practice in Study Area

Beekeeping was observed as an ancient farming activity in the study area, which is practiced as a sideline business with other farm activities. Out of the total 60 household practiced

beekeeping, 80.12% were male and the rest 19.87% were female (Table 3). This might be resulted from traditional believe that not encouraging women to involve in beekeeping practice [17] reported similar results in Erer zone of somali regional state, in which majority of the respondents (96.8%) were men, with the remaining (3.2%) being women. The majority of beekeepers reported that they cannot transfer the colony from local to frame hive. However, few householders Warden and adoshe responded as they use colonies from traditional hive to establish modern hive. However, [18] reported that majority (72%) of the respondents in Sude Woreda of Arsi Zone Oromia obtained bee colonies by catching swarms whereas 21 and 7% obtained their colony by buying them and from parents as gift, respectively.

Table 3. Farmers who practice in beekeeping in the study area.

Farmers	Sisenamati	Warden	Adoshe	Total	Average	%age
Male	17	18	13	48	16	80
Female	3	2	7	12	4	20
Total	20	20	20	60	20	100

As observed from this study, the three types of beekeeping means, Local (traditional), intermediation (transitional) and movable frame (modern hive) was practiced in study area in deferent proportion.

3.4.1. Traditional Beehive

The results of this study reveal that traditional beehive was categorized into three different categories based on material

from which the hive constructed. This includes: Bidiru (log), mud and basket hive type. Furthermore, the results of this study also showed that, the percentage of bee colony for traditional hive in sisenamati (49.0%) was significantly higher than that of warden (27.5%) and Adoshe (23.4%). This may be due to variation in potential of the area for resources and awareness of the farmers.

On the other hand, traditional beekeeping practice taking place in the study area was observed to be in the 2 forms based on the level of management. These were traditional forest beekeeping, which is practiced in forest by hanging bee hives on long tress (Figure 5), with little/no sound management taken for bees and bee products.



Figure 5. Forest traditional hive placed on the bark of long tree in adoshe.

The second one is traditional backyard beekeeping, which is practiced around homestead with relatively better management provided to bee colonies as compared to that of forest beekeeping (Figure 6). However, the relatively better management that the farmers give for these types of traditional beekeeping practice was varies from kebele to kebele.



Figure 6. Backyard traditional hive kept under the roof in sisenamati.

Accordingly, households from sisenamati kebele were showed relatively pronounced management for their hive. For instance, from the total of respondents in this area, around 28% used independent ware house as shade (Figure 7) for their hives and around 11% of the households try to plant trees and different horticultural crops intentionally as sources of bee flora around their beehive.



Figure 7. Traditional basket hive kept in small apiary site in sisenamati.

However, such types of better management were less in the rest two kebeles with the exception of warden in which several householder kept smaller number of modern hive under roofed shade and almost all households in the Adoshe were responded that they have no housed hive at all but they keep their hive under roof of their house to protect from environmental impacts.

3.4.2. Top Bar (Transitional Beehive)

Although, almost all householders respond to have knowhow about these types of hive from information deducted to them from government through developmental agents working in the area, still there was no significant distribution of these types of hive. The number of top bar hive owned by household is limited and this was supposed to be due to poor beekeeping extension service in the study area.

3.4.3. Movable Frame Hive Beekeeping Practice

It is known that; the quantity and quality of hive products primarily depends on the type of beehive used. However, the results of this study show that the distribution of movable-frame hive, which is an indicator of improvements in beekeeping, was very low as compared to traditional beehive. This is probably because of poor beekeeping extension services and weak intervention on beekeeping by Government and non-government organizations in the study area.

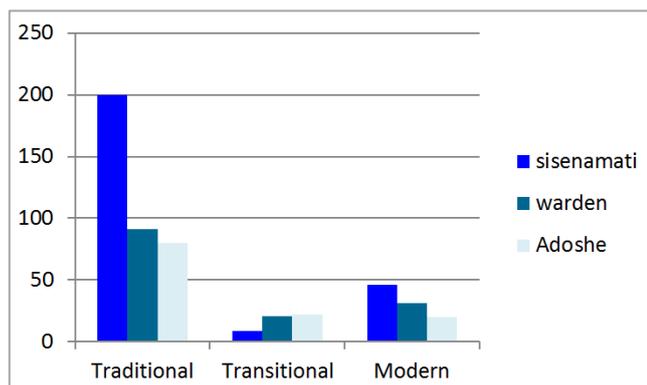


Figure 8. Distribution and composition of bee hive.

There was no significant variation among the study kebeles in proportion of types of bee hive. However, adoshe which was lower in number of transitional hive has shown relatively a few number of movable frame hive with better management. In adoshe kebele, there was a number of frame hive managed under small apiary site (Figure 9).



Figure 9. Modern hive placed under the shade in small apiary in adoshe kebele.

3.4.4. Feeding of Honey Bee

Of many factors that influencing the beekeeping, the condition of flowering plants and availability of sufficient feeds for bees, are observed as the two major factors affecting the sustainability of the study area for beekeeping. As a result, provision of additional feed for bees like shiro, suger and honey, has been reported in the study area (Figures 10 and 11).



Figure 10. Supplementing of bees with sugar shrup during deth period.

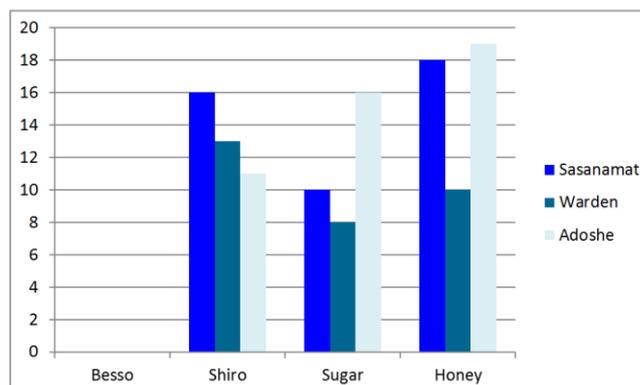


Figure 11. Types of the feed offer for honey bee.

3.5. The Major Constraints for Beekeeping

Technical and institutional was reported as the most constraints hindering beekeeping in the study area. The other problem comes from honeybee characteristics, or environmental factors that are beyond the beekeepers for controlling. Infrastructure, beekeeping facilities, absconding of colonies are some the factors affecting beekeeping activities in the area.

Table 4. Major constraints for beekeeping in the study area.

Major beekeeping constraints	Sasanamati	Worden	Adoshe	Total	Ave	%age	Rank
Pest and predators	4	9	10	23	7.66	38.33	1 st
Lack of beekeeping equipment	1	2	2	5	1.66	8.33	4 th

Major beekeeping constraints	Sasanamati	Worden	Adoshe	Total	Ave	%age	Rank
Shortage of bee forage		1		1	0.33	1.66	6 th
Lack of improved bee hive	6		3	9	3	15	3 rd
Absconding	2	4	3	9	3	15	3 rd
Lack of knowledge	10	4		14	4.66	23.33	2 nd
Drought			2	2	1.33	3.33	5 th
Total	20	20	20	60	20	100	

As indicated in the table pests and predators are number one problem in the area followed by frequent absconding of bee colonies, where as shortage of bee forage and droughts are recorded as minor problem for beekeeping in the area. This result agree with [19] that reports great loss of total honey production per annum which can be caused by honey bee enemies (38.3%) mainly by pest. According to this study, honey badger attack was a serious problem/ number one honey bee enemy of the area. As a result honey badger attack a considerable amount of honey and other hive products was lost and bees absconded. However, [17] reports beekeeping equipments and pests and predators as first and second problem respectively, with absconding as 5th ranked problem in Erer zone of Somali regional state.

4. Conclusion

Beekeeping is deeply rooted practice within the Ethiopian farming community. It plays a significant role in conserving the natural resources and contributes to the globe through environmental protection. The use of honey as food and medicine and that of wax for candle lighting in churches has a long history in Ethiopia. At present, beekeeping is largely an income generating activity that fits well into the concept of smallholder agricultural development. Beekeeping was observed as an ancient farming activity in the study area, which is practiced as a sideline business with other farm activities. Technical and institutional constraints were reported as the most factors affecting the realization of sustainable beekeeping in the study area. Pests and predators were observed as number one constraints affecting this sector in the study area. Farmers were reported to use different traditional and indigenous techniques to control /prevent pests in the area.

Abbreviations

CSA	Central statistical Authority
GZADD	Gurage Zone Agricultural Development Department
SNNPRS	Southern Nations and Nationalities Peoples Reginal State

Author Contributions

Kedir Adem is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of Interest.

References

- [1] Beyene, T & David P (2007). Ensuring small scale producers in Ethiopia to achieve sustainable and fair access to honey markets. Paper prepared for international development enterprises (IDE) and Ethiopian society for appropriate technology.
- [2] Ayalew, A., Bekele, T., & Demissew, S. (2006). The Undifferentiated Afromontane Forest of Denkoro in the Central Highland of Ethiopia: A Floristic and Structural Analysis. *Ethiopian Journal of Science*, 29, 45-56.
- [3] Mengistu A (2010) Improving market access and income of small scale beekeepers through value chain analysis; a case study from Gera district in south west of Ethiopia. MSC these is presented at Cope hagen University, faculty of life sciences.
- [4] Mohammed, N. A. (2002). Geographical Races of the Honeybees (*Apis Mellifera* L.) of the Northern Regions of Ethiopia. (n.p.): Rhodes University.
- [5] CSA (Central Statistical Agency). 2021. Agricultural Sample Survey. Report on Livestock and Livestock Characteristics. Volume II. Statistical Pulletin 589. Addis Ababa, Ethiopia, pp. 22-29. https://www.statsethiopia.gov.et/wp-content/uploads/2021/05/REVISED_2013.LIVESTOCK-REPORT.FINAL1.pdf
- [6] Workinesh A (2007). Determinants of adoption improved box hive in AtsbiWemberta district of eastern zone, Tigray region MSC. Thesis, Haromaya University Ethiopia.
- [7] Admasu A (2004). Botanical inventory and phenology of beaplants in riftvally regions of east showa zone 13th conference of Ethiopia society of animal production. Aug 25-27 Ad-dis Ababa Ethiopia, from <http://www.eior.gov.et>

- [8] Gabissa L and Admasu A (2007). Identification and evaluation of bee plants in arid and semi-arid agro ecological zones of south east zones of Oromia. 17th annual conference of Ethiopia society or animal production, September 24-26, 2009 Addis Ababa Ethiopia.
- [9] Yirga G, Koru B, Kidane D, Mebrahatu A (2012). Assessment of beekeeping practices in Asgede Tsimbla district, Northern Ethiopia: Absconding, bee forage and bee pests. African Journal of Agricultural Research, 7(1), 1-5.
<https://academicjournals.org/journal/AJAR/article-abstract/E0D605732836>
- [10] Gurage Zone Agricultural Development Department). 2011. Documented report on socio-economic study of the zone.
- [11] Njarui MG, Mwangi Gatheru, Gichangi M, Nyambati M, Ondiko N and Kziah W 2017. Determinants of forage adoption and production niches among smallholder farmers in Kenya. African Journal of Range & Forage Science. 34(3).
www.tandfonline.com (Accessed on May 06 2018).
- [12] Shimelis M, Ajebu N, Adugna T, Melkamu B, Abera A, Endalkachew W, and Mesfin Z 2021. Livestock Production Challenges and Improved Forage Production Efforts in the Damot Gale District.
- [13] Ayza A, Yilma Z, Nurfeta N 2013 Characterization of milk production systems in and around Boditti, South Ethiopia. Livestock Research for Rural Development. Volume 25, Article #183. Retrieved from:
<http://www.lrrd.org/lrrd25/10/ayza25183.htm> (ESAT), Addis Ababa, Ethiopia.
- [14] Assefa D, Nurfeta A and Banerjee S 2013 Assessment of feed resource availability and livestock production constraints in selected Kebeles of Adami Tullu Jiddo Kombolcha District, Ethiopia. African Journal of Agricultural Research, 8(29): 4067-4073.
- [15] Guyo S and Tamir B 2014 Assessment of Cattle Husbandry Practices in Burji Woreda, Segen Zuria Zone Of SNNPRS, Ethiopia. International Journal of Technology Enhancements and Emerging Engineering Research, 2 (4): 11-26.
- [16] 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.
- [17] Mahamed A, Abdimahad K, Abdilahi A, Hassen G, Hassen M, Omer A. (2022). Traditional Management Practices and Production Potential of Beekeeping in Erer Zone of Somali Regional State, Ethiopia. Online J. Anim. Feed Res., 12(3): 165-175. <https://dx.doi.org/10.51227/ojaf.2022.2>
- [18] Weldearegay A, and Anja A (2017). Assessment of beekeeping production system and constraints in Sude Woreda, Arsi Zone Oromia Ethiopia. Journal of Horticulture and Forestry, 9(12), 109-114. <https://dx.doi.org/10.5897/JHF2017.0503>
- [19] Shenkute AG, Getachew Y, Assefa D, Adgaba N, Gebeyehu G, Abebe W (2012). Honey production systems (*Apis mellifera*L.) in Kaffa, Sheka and Benchi-Maji zones of Ethiopia. Journal of Agricultural Extension and Rural Development, 4(19): 528-541. <https://mp.ra.uni-muenchen.de/id/eprint/56580>