

Study on Management Practice and Challenges on Beekeeping in Bagnaskali, Palpa, Nepal

Pit Bahadur Nepali, Apsara Saru, Keshab Chokhal and Hira Bahadur Rana

pitsnepal@gmail.com

Department of Zoology

Tribhuvan Multiple Campus, Tribhuvan University, Nepal

Article History: Received 20 August 2022; Reviewed 28 October 2022; Revised 27 December 2022;
Accepted 25 January 2023

Abstract

Beekeeping is the architectural design of hives to increase honey bee productivity. Research methods used between February to December 2021 in Bagnaskali Rural Municipality (Khanigaun and Barangdi), Palpa. This study's aims were to understand beekeeping management practice and investigate its challenges. Random sampling methods were employed by surveys, interviews, and field observations. Throughout the study period, semi-structured interviews with 30 household respondents were performed. They preferred modern hive than traditional hive which were placed backward side of house. Four times a year, respondents collect honey, producing high-quality honey products. The high demand for local honey, the distance to the market, the scarcity of bee colonies, disease outbreaks, etc. were the most frequent challenges in managing honey bee practices. In addition to these, biological pests and predators of honey bees in the current study area included wasps, spiders, ants, beetles, lizards, wax moths, and mites. This investigation adds to the body of traditional knowledge on beekeeping challenges and management. It is necessary to conduct more research on the local honeybee population or sample, diseases, pests, and predators.

Key words: Colony;Hive; Honey;Inspections; Productivity

Introduction

Honey bee management and hive modernization are the two primary aspects of beekeeping. This ability aids in enhancing the quality of bee products and removing financial problem (Nuru, 2000). In Nepal, native species of *Apis cerana*, *Apis florea*, *Apis dorsata*, and *Apis laboriosa* have been extensively cultivated for pollination and honey production despite the fact that there are 11 species of honeybees in the world (Allen, 1995; Brabear, 2009; Gurunget *et al.*, 2012; Kachhawaha, 2019). Nepal is a particular habitat for pollinating insects and beneficial to the region's agriculture, economy, beauty, and cultural elements (Gill *et al.*, 2016). Compared to many other products, such as cattle and crops,

honey products have a wide range of markets and are also healthy food options. Bee-derived products are high-value products, and the money made from the sale of honey and beeswax is crucial for low-income families to use to obtain food. From 70 to 4200 m in altitude, Nepal's production is effectively gained in a variety of regions and climates (Joshi, 2008). Thousands of tons of honey are produced per year, and the products are also a part of the agricultural economy that receives little funding and commercial firm input (Edessa, 2005). Nepalese honey has no market share in the international economy (FAOSTAT, 2014).

The main risks to honey bees in Nepal are chemical pesticides and predators, diseases, climate change, exotic species, and habitat loss (Thapa, 2001; Joshi *et al.*, 2004). *Vespa* species and bee-eating birds are the main predators contributing to the reduction in honey production (Thapa *et al.*, 2012). Inadequate knowledge on beekeeping, low number of trained manpower, poor availability of modern bee equipment, honey bee diseases and predators that limit the bee management practice (Bekuma, 2018). For beekeeping to expand in Nepal, it must be supported by strict regulations, a small domestic market, technology, unstable transportation, inadequate product storage, and lack of quality monitoring, inadequate laboratory facilities, and weak institutional mechanisms for maintaining quality (Hausmann, 2016). In order to develop and recommend intervention strategies to increase the productivity of the sector and its contribution to the development of the country, researchers, policymakers, and other stakeholders must have knowledge about the beekeeping production potential, hive preferences, and challenges. It contains a wide range of natural vegetation and cultivated crops, small and large water bodies, and a significant demand for honey and beeswax, among many other possibilities for apiculture development. However, there is little information available about the opportunities and challenges experienced by beekeepers in the research area. The study's aims were to comprehend beekeeping management practice and observe at its challenges in order to address this. It occurred in Bagnashkali rural municipality, Palpa. As a result, the purpose of this research was to broaden and suggest potential solutions to beekeeping challenges, as well as to capitalize on existing opportunities for beekeeping development in the study area.

Materials and methods

Study area

The study area were the Khanigaun (27.5502^o to 83.3213^o) and Barangdi (27.5517^o to 83.3302^o) of Palpa district. The annual maximum temperature ranges is 12^oC to 27^oC with an elevation ranges 900m to 1700m. The region includes the Mahabharat range which has subtropical climatic zone. There are many different types of natural forests, cultivated crops, small and huge water resources, and different agro-ecologies covered.

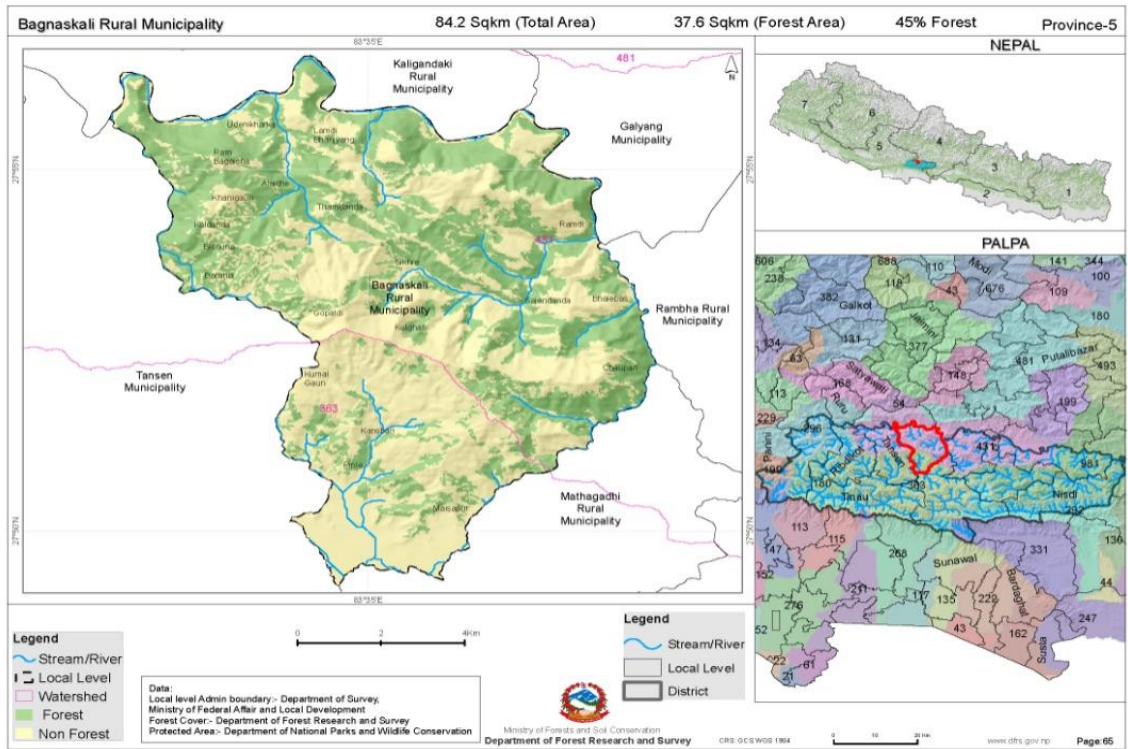


Figure 1: Study area (Sources Department of survey ministry of local development)

Data Collection and analysis

The study was carried out in Khanigaun and Barangdi, which were randomly selected from this district. Within a sample size of 30, samples were taken by direct observation, interviews, and questionnaires. On household characteristics, education levels, beekeeping experience, honeybee colony, holding size, colony placement, types of hives, and significant challenges such as honeybee pests and predators, as well as training and extension service, primary information was collected. All data were entered and analyzed using Microsoft Excel 2007 along with descriptive statistics like percentage and frequency. Table and chart were used to present the results.

Results and discussions

Bee keeping Management

In general, three varieties of honey bees have been raised in Nepal's mid-mountains. The common species *Apis cerana* is primarily raised in the study area. The conclusions are further supported by Pokhrel (2009). It was chosen in hilly places because of the favorable environment and higher productivity. To illustrate the significance of the productivities, both modern and traditional log hives were placed. However, in Barandi and Khanigaun, it

was observed that there were 98.89% modern, 1.11% traditional log hives and 98.59% modern, 1.4% traditional log hives respectively (Figure 3). It suggested that modern hives were preferable than traditional hives. According to Bhusalet *al.*(2011)a similar finding has been observed. Although Amssaluet *al.* (2004), Thapaet *al.* (2000), Workneh (2011), and Pudasini (2018) reported contradictory findings, traditional log hives have been employed mostly in developing countries like Nepal because they may be more effective and simple to maintain.To make a modern hive suitable for a modern hive, it was easy to control the bees, honey, food, and predators.

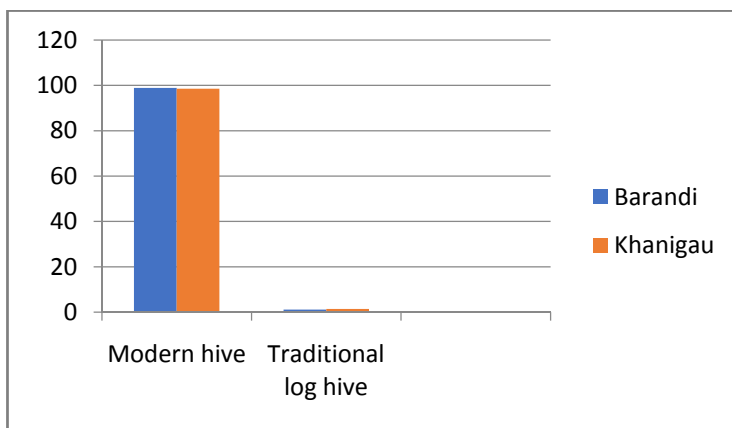


Fig 2: Preferred hives by beekeepers in different study area

Table 1 showed that the hive placement kept the hive frame at the backyard sides (50%) of the house for protect the honey bees from predators and diseases. But according to Gideyet *al.* (2012), Nebiyuad, and Messele (2013), the results were likewise different from the current finding. More than half of respondents (66.67%) stated that they monitor their hive once every month, while 33.33 % said they check it every 15 days, which is also supported by (Tessage, 2009). Autumn and summer are the two seasons in which honey is typically harvested twice year (83.33%) and four times (16.67% of the total), respectively, because the frequency and quantity of honey harvesting are influenced by seasonal colony management techniques and flowering factors (Kajobeet *al.*, 2009). Harvesting was more appropriate to the flowering season than to other times of the year. A variety of flower crops were cultivated as a food source, and sugar syrup was also given as supplemental feeding in the evening.

Table 1: Placement, inspection of hive and honey harvesting

Variables	Position/ Frequency	Percentage
Hive Placement	Terrace	33.33%
	Backyard	50%
	Courtyard	16.67%

Inspection of hive	15 days	33.33%
	Once in a month	66.67%
Honey harvesting	Twice	83.33%
	Fourth times	16.67%

Honey marketing and its products

Among, the thirty sample of respondents almost know about the use of honey product whereas very low knowledge on propolis, brood, wax, and pollen products in both sample areas. Similar results has been also find out by (KC *et al.*, 2021) all people has been used honey products probably they have no proper knowledge to the importance and value of other products of honey bee (Figure 3)

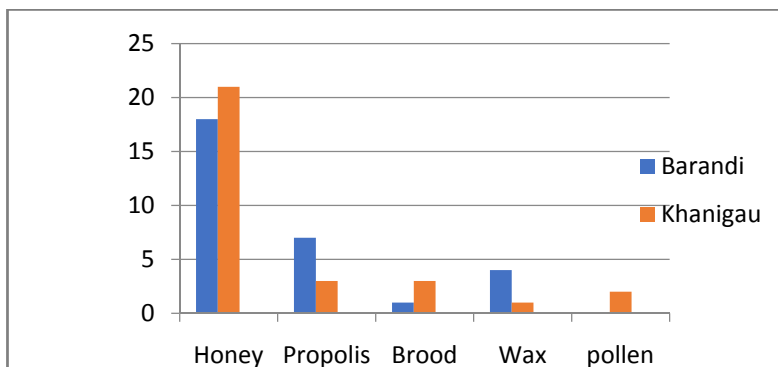


Fig 3: Different products of Honey

In comparison to Barandi, Khanigaun produced more honey. In the Bagnaskali Rural Municipality, an average of 8 kg of honey was produced each hive by *Apis cerana*. Throughout the flowering season, products are released with higher quality than during the winter. Only 40% (12) of bee keepers had participated in skill-based training, according to the findings, and 60% (18) had not. This might potentially be a contributing element to the low bee productivity. Because most beekeepers in the research area live in rural areas as opposed to consumers or markets, honey and beeswax marketing is still in its infancy. As a result, honey was sold randomly to villagers, retailers, and unauthorized salespeople. As a consequence, in Khanigaun and Barandi, respectively, they mostly sell their honey to whole-sale shops (63.64% and 53.33%) as opposed to farm gate consumers (17.65% and 38.46%). The main honey product marketplaces were located in Tansen, Butwal, Pokhara, Kthamandu, etc. However, Tansen was the primary market close to the research region, thus handling and shipping the honey product wasn't a problem (Table 3). The difficulties of producing honey were revealed by NamwataBaltazaret *al.* (2013), who showed that there was no reliable access to markets or transportation. The market's distance was the cause. Because farmers don't store or process their own honey, KC *et al.* (2021) report that a contrary result has been farm-to-consumer sales at a price that is generally higher than those of whole-sale retailers (Table 2). Due to the distance from the wholesale market, some of their products are consumed by the company itself.

Table 2: Honey marketing in Bagnaskali, Palpa

Agent	Barangdi	Percentage	Khanigaun	Percentage
Farm gate consumer	3	14.64%	5	33.34%
Whole seller	14	63.64%	8	53.33%
Self-use	5	22.72%	2	13.34%

Table:3 Management practice challenges of beekeeping

Components	Barangdi (n=12)	Khanigau (n=18)
Trainings	5(41.67%)	7 (38.89%)
Honey processing	4(33.33%)	6 (33.34%)
Market accessibility	10 (83.34%)	13 (72.23%)
Beekeeper	12 male	2(Female), 16 (male)
Transportation	Easy accesses	Easy accesses

Lack of bee colony was the major challenges identified in study sites. Similarly, pesticide and diseases were other threats of beekeeping management practices in these sample area. Results have been similar with the findings of (Tokuda, 1924; Yirga and Teferi, 2010; Tesfaet *al.*, 2013) shows the poisoning, diseases, loss of honey bee colony, Absconding, parasites and diseases main constraints for bee keeping management in different country. Pests and predators were one of the challenges to the honeybees and beekeepers in the study area. Wasp, spider, ant, beetle, Ashy Drongo, Green bee-eater, lizard, wax moth and Varroa mites reported as the major pest and predator of honey bee in present study area (Figure 4)

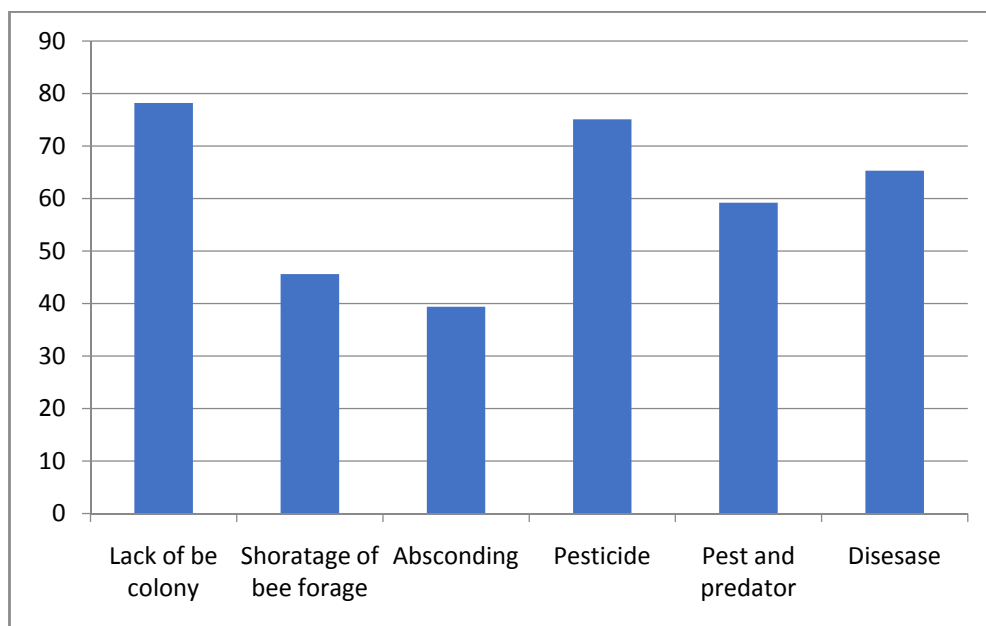


Figure 4: Major challenges identified by respondent beekeepers in study area

Conclusions

Apisserena was rearing in the sample sites in modern hives. These hives was kept in backyard sites of the house for protection. Honey harvesting has been regularly occurring in twice a month alternatively inspection were also done at once time in a month. Honey was the mostly used commercial product which also traded by the whole sell retailorin surrounding market of study area. Lack of bee colony, diseases, lack of training and predator were the major challenges of bee farming that was limited by the increment of skill and policy enforcement.

Acknowledgements

We would like to acknowledge and thank Tribhuvan Multiple Campus in Palpa for providing the laboratory facilities needed to conduct research. Our sincere gratitude is expressed to Mr. MuktaBahadur Nepali and Neelam Nepal of Tribhuvan Multiple Campus, Palpa, who edited the language. To Mr. Krishna Prasad Bashyal, Amrita Saru, Hem BahadurSaru, HomBahadurRana, Narayan Bararl, and ShantaBashyal, we would like to convey our appreciation and respect for their assistance on this assignment.

Conflicts of interest

Authors declare no conflict of interest.

References

- Allen, M.F. (1995). Bees and Beekeeping in Nepal. *Journal of Bee World*, 76(4): 185-194.
- Amssalu, A., Nuru, B., Radloff, S.E. & Hepburn, H.R. (2004). Multivariate morphometric analysis of *Apis mellifera* in the Ethiopian region. *Journal of Apidologie*, 35 (1): 71-81.
- Bekuma, A. (2018). *Study on Challenges and Opportunities of Beekeeping in Gimbi District, West Wollega Zone, Ethiopia*. 9(6), 6.
- Bhusal, S.J., Kafle, L., Thapa, R.B. & Shih, C.J. (2011). Effect of colony strength on the performance of Honeybees (*Apis mellifera*) in Nepal. *Journal of Sociobiology*, 58 (2): 1-13.
- Brabear, N. (2009). Bees and their role in forest livelihoods. Food and Agriculture Organization, Rome. *Official Journal of the European Communities*, 1-7.
- Edessa, N. (2005). Survey on honey bee production system in West Shoa zone. Report submitted to proceeding of the 4th Ethiopian beekeeper association.
- Food & Agriculture Organization Corporate Statistical Database. (2014). Statistical Yearbook. Food and Agriculture Organization of the United Nations.
- Gidey, Y., Bethelhem, K., Dawit, K., & Alem, M. (2012). Assessment of Beekeeping Practices in Asgedetsimbla district, Northern Ethiopia: Absconding, Bee Forage, and Bee Pests. *African Journal of Agricultural Research*, 7(1): 1-5

- Gill, R.J., Baldock, K.C.R., Brown, M.J.F., Cresswell, J.E., Dicks, L.V., & Fountain, *et al.* 2016. Approaches to understanding and mitigating threats to wild insect pollinators in Ecosystem services. *Advances in Ecological Research*, **2(14)**: 135-206.
- Gurung, M.B., Partap, U., Shrestha, N.C.T., Sharma, H.K., Islam, N. & Tamang, N.B. (2012). *Beekeeping Training for farmers in the Himalayas* 1st edition. Himanchal Pradesh Kathmandu.
- Hausmann, S.L., Petermann, J. S. & Rolff, J. (2016). Wild bees as pollinators of city trees. *Insect Conservation and Diversity*, **9**: 97-107.
- Joshi, S.R., Ahmad, F., & Gurung, M.B. (2004). Status of *Apis laboriosa* population in Kaski. *Journal of Apiculture research*, **43(4)**: 176-180.
- Kachhawaha, N. (2019). *Research Trends in Multidisciplinary Research and Development in Apiculture* 3rd edition Zittau, Germany.
- Kajobe, R., Agea J.G., Kugonza, D.R., Alioni, V., Otim, A.S., Rureba, T. & Marris, G. (2009). National beekeeping calendar, honeybee pest, and disease control methods for improved production of honey and other hive products in Uganda. A research report submitted to Natural Agricultural Research Organization Entebbe, Uganda.
- KC, G., Bhusal, P. & Kafle, K. (2021). Production & management of honey bee in dang district of Nepal. *Food and Agri Economics Review*, **1 (2)**: 83-88.
- Manandhar, H.K., Timila, R.D., Sharma, S., Joshi, S., Manandhar, S. & Gurung, *et al.* (2017). A field guide for identification and scoring methods of diseases in the mountain crops of Nepal 1st edition. Bioversity International, pp 186.
- Ministry of Agriculture and Development. (2017). Statistical Information on Nepalese Agriculture. Ministry of Agriculture Development, Government of Nepal, Kathmandu.
- Namwata Baltazar M.L., Mdundo Kianga J., & Malila Mwambless N. (2013). Potentials and Challenges of Beekeeping Industry in Balang' dalalu Ward, Hanang' District in Manyara, Tanzania *Kivukoni Journal*, **1 (2)**, 75 -93.
- Nebiyu Y. & Messele T. (2013). Honeybee production in the three Agro-ecological districts of Gamo Gofa zone of southern Ethiopia with emphasis on constraints and opportunities. *Agriculture and biology journal of North America*, doi:10.5251/abjna.2013.4.5.560.567
- Nuru, A. (2000). Physical and chemical properties of Ethiopian beeswax and detection its adulteration. *Ethiopian Journal of Animal Production*, **7**: 39-48.
- Pudasaini, R. (2018). Indigenous Knowledge and Practices of Beekeeping with *Apis cerana* in Nepal. *Journal of Apiculture*, **33(2)**: 71-76.
- Teferi, K. (2018). Status of Beekeeping in Ethiopia. A Review. *Journal of Dairy and Veterinary Sciences*, **8 (4)**: 573-585

- Tesfa, A., Ejigu, K., & Kebede, A. (2013). Assessment of Current Beekeeping Management Practice and Honey Bee Floras of Western Amhara, Ethiopia. *International Journal of Agriculture and Biosciences*, 2(5): 196-201.
- Tessega, B. (2009). Honeybee Production and Marketing Systems, Constraints and opportunities in Burie District of Amhara Region, Ethiopia. A Thesis Submitted to the Department of Animal Science and Technology, School of Graduate Studies Bahirdar University.
- Thapa, R., Wongsiri, S., & Manandhar D. N. (2000). Current status of predators and diseases of honeybees in Nepal. Report submitted to Proceeding 7th conferences Chiang Mai, Thailand, 221-226.
- Thapa, R. (2001). The Himalayan giant honeybee and its role in ecotourism development in Nepal. *Journal of Bee World*, 82 (3):139-141.
- Tokuda, Y. (1924). Studies on the honeybee, with special reference to the Japanese honeybee. *Transaction of the Sapporo Natural History Society*, 9; 1-6.
- Workneh, A. (2011). Identification and documentation of indigenous knowledge of beekeeping practices in selected districts of Ethiopia. *Journal of Agricultural Extension and Rural Development*, 3(5): 82-87.
- Yirga, G., & Teferi, M. (2010). Participatory technology and constraints assessment to improve the livelihood of beekeepers in Tigray region, northern Ethiopia, *Momona Ethiopian Journal of Science*, 2 (1): 76-92.