

ECONOMIC PERFORMANCE AND CONSTRAINTS OF BEEKEEPING (*Apis mellifera* L.) IN CHITWAN DISTRICT, NEPAL

Sujan Amgai^{1,*}, Kedar Devkota², Kamal Nayan Pant³

ABSTRACT

Beekeeping has become an important component of Nepalese agriculture, contributing to household livelihood, employment generation, and enhancing agricultural productivity through pollination services. This study aims to assess the contribution of beekeeping sector to household income, evaluate its profitability, and identify the major production and marketing constraints faced by beekeepers in Chitwan district. A total of 60 commercial beekeepers were randomly selected from three municipalities, namely Kalika, Khairahani and Ratnanagar. Profitability was assessed using the benefit-cost ratio (BCR) and problems was ranked using the index ranking technique. The result revealed that beekeeping is the dominant livelihood enterprise, contributing 78% of total household income. The majority of beekeepers had more than a decade of beekeeping experience, managed 50-100 beehive colonies, and harvested honey at least three times per year. The average productivity of honey was found to be 28.2 kg/hive/year with a gross return of NPR 12644 per hive and a benefit cost ratio of 2.17. Among the costs, variable costs accounted for 66.72%, while fixed costs comprised 33.28%. Although honey was the major product, beekeepers also extracted beeswax, averaging 1.24 kg/hive/year. Disease and pest infestations emerged as the most severe production constraints, followed by pesticide exposure and forage shortages. Similarly, insufficient certification and laboratory testing, untrustworthy traders, and competition with imported honey were identified as major marketing challenges. Overall, beekeeping enterprises seem to be economically viable and can play significant role in improving the livelihood of beekeeping households in Nepal. The performance can be further improved through the better management of forage and addressing the production and marketing challenges.

Key words: Beekeeping, honey, BCR, household income and production constraints

1. INTRODUCTION

Beekeeping is a significant livelihood option in Nepal's rural economy, which involves the scientific management of honeybees and production of honey, beeswax, propolis, pollen, royal jelly, etc. (Khun & Serey, 2024; Samanta et al., 2024). The country produces approximately 4200-5000 metric tons of honey annually, with potential to increase this volume substantially through improved hive management, market development, and modern beekeeping practices

¹ Senior Plant Protection Officer, Beekeeping Development Center, Bhandara, Chitwan

² Department of Agribotany and Conservation Ecology, Agriculture and Forestry University, Rampur, Chitwan

³ Plant Protection Officer, Commercial Industrial Development Farm, Bhandara, Chitwan

* Corresponding author, Email: sujanamgai@gmail.com

(MoALD, 2025). Beekeeping is a low-cost investment enterprise that requires minimal capital, does not require land ownership, and involves only limited expenditure on beekeeping tools and equipment, while demanding relatively low inputs in terms of labour, and time and offering a diverse range of bee products (SAWTEE, 2015). Nepal is rich in honeybee diversity, with five species, four native species, namely *Apis cerana*, *Apis florea*, *Apis dorsata*, and *Apis laboriosa* and one exotic species, *Apis mellifera* (Banjade et al., 2024; Gyawali, 2025). Among these, *A. cerana* is widely distributed in the hilly regions, while *A. mellifera* was introduced from India in the early 1990s to promote commercial beekeeping in Nepal (Ahmad & Partap, 2008; Devkota, 2020; Sivaram, 2012).

The honeybee species composition with differences in management practices across various ecological zones, plays a crucial role in shaping productivity levels, production potential, and market performance within the beekeeping sector (Devkota et al., 2025). Nepal is regarded as a promising country for producing quality honey because of its diverse climate and rich floral biodiversity (Gyawali, 2025). The national average honey productivity was 17.58 kg per hive per year, produced from approximately 245,000 bee colonies (MoALD, 2024). However, the potential for commercial honey production remains largely underutilized. Nepal's *A. mellifera* honey is prized for its quality, especially Tori (Mustard), Chiuri (Butter tree), Masala (Eucalyptus), Litchi, Rudilo (*Pogostemon spp.*), and Fapar (Buckwheat) honey, but faces challenges related to quality control, certification, branding, and access to export markets (BDC, 2024). Nevertheless, most of the honey produced in Nepal is consumed in the domestic market, with only a very small proportion being exported (DoC, 2024; BDC, 2024). Within this context, Chitwan district seems to be the most potential district for beekeeping (BDC, 2024) where *A. mellifera* was distributed to farmers at the time of introduction in Nepal (Devkota, 2020; Pokhrel, 2005). Chitwan is one of the major honey-producing districts of Nepal with abundant bee flora, especially Butter tree (*Diploknema butyracea*) which attracts beekeepers from different regions for migration of bees to Chitwan district (Bhattarai et al., 2021; Chikanbanjar et al., 2021). Average annual honey yield from *A. mellifera* in this district is around 470 metric tons from 17,500 bee colonies (BDC, 2024). The understanding of economic dynamics of the beekeeping enterprises, particularly in terms of financial viability and economic returns, is vital for enhancing the performance and sustainability of beekeeping practices (Çevrimli & Sakarya, 2019). Thus, an economic analysis of beekeeping at Chitwan district can provide valuable insights into profitability and constraints faced by beekeepers. Additionally, this study aims to assess the contribution of beekeeping on household income of beekeepers, estimate the cost of production, gross return and benefit cost ratio (BCR) of honey production and to identify major production and marketing constraints of beekeeping in the study area.

2. METHODOLOGY

Chitwan district was selected purposively as the study site because *A. mellifera* are reared commercially in this district. Among these seven local governments of the district, Kalika, Khairahani and Ratnanagar Municipalities were selected purposively due to their high concentration of commercial beekeeping enterprises and significant contribution to honey production (BDC, 2024). A list of beekeepers was obtained from the Agriculture Development Center and the

Beekeeping Development Center, Chitwan. This list served as the sampling frame for the study. A two-stage sampling procedure was employed. In the first stage, the three municipalities were purposively selected based on the intensity of commercial beekeeping activities. In the second stage, 60 commercial beekeepers were selected through simple random sampling from the official list of beekeepers. Equal representation from each municipality was ensured as far as possible to capture variations in management practices and production performance across the study area. The selected respondents were actively engaged in commercial beekeeping and maintained *A. mellifera* colonies as a primary or significant income-generating activity.

2.1 DATA COLLECTION

Both primary and secondary data sources were used in the study. Primary data were collected during 2025 through household surveys using a pre-tested structured questionnaire administered to the selected beekeepers. Information was gathered on socio-economic characteristics, colony management practices, production costs, honey yield, income from beekeeping, marketing channels, and production and marketing constraints.

To complement the survey data, focus group discussions (FGDs) were conducted with groups of beekeepers in each municipality to validate survey findings and gain deeper insights into local beekeeping practices and challenges. In addition, key informant interviews (KIIs) were conducted with officials from the Agriculture Development Center, Beekeeping Development Center, cooperative leaders, honey traders, and experienced beekeepers to obtain expert opinions and contextual information regarding the beekeeping sector in Chitwan.

Secondary data were collected from published and unpublished reports, government documents, journal articles, policy documents, annual reports of the Ministry of Agriculture and Livestock Development (MoALD), records of the Beekeeping Development Center (BDC), and other relevant institutional publications. These data were used to supplement and validate the primary information collected during the field survey.

2.2 METHOD AND TECHNIQUES OF DATA ANALYSIS

The collected data were coded, tabulated, and analyzed using descriptive statistics. The mean, frequency and percentage were calculated using the MS Excel and the results were depicted in the tables and figures. Similarly, the benefit-cost ratio was calculated to assess the economic feasibility of the beekeeping in the study area of Chitwan. In order to calculate the B:C ratio, the gross return and total cost were calculated. Both fixed cost, namely depreciation cost of the beekeeping equipment like beehive, honey extractor and other equipment and variable costs like supplementary feeding cost, disease and pest management cost, pasture management cost, transportation cost, labour cost, repair and maintenance cost, packaging cost, comb foundation cost were taken into consideration.

Gross return was calculated by multiplying the quantity of each beekeeping product by its average market price during the harvesting period and summing the values across all products. Gross margin was estimated as the difference between gross return and total variable costs. Gross margin and benefit-cost ratio (BCR) were calculated using the following formulas

(Paudel et al., 2025):

Gross Margin (GM) = Gross Return (GR) – Total Variable Cost (TVC)

Benefit–Cost Ratio (BCR) = Gross Return (GR) / Total Cost (TC)

2.3 Indexing

Beekeepers' perception on the severity of the different production and marketing constraints were assessed by using five-point scale rated as very low, low, average, high and very high with corresponding weights of 0.2, 0.4, 0.6, 0.8 and 1 respectively (Mehta & Khatiwada, 2025).

The index value of ranking was computed by using the following formula:

$$I_{imp} = \sum (SiF_i / n)$$

Where,

I_{imp} = Index value

= Summation

Si = Scale value of i^{th} level

F_i = Frequency of value of i^{th} level

n = Total numbers of respondents

3. RESULTS AND DISCUSSION

3.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Out of the total respondents, 86.66 % were male, indicates the dominance of male population in the beekeeping sector (Table 1). Furthermore, Brahmin/Chhetri (71.66%) were the dominant group among respondents, followed by Janajati and Other (Chepang/Tharu). More than 2/3rd of the respondents' major occupation was beekeeping. Regarding the education status, majority of respondents (96.66%) were found to be literate, which is higher than the national literacy rate of 76.2% (NSO, 2025).

Table 1. Socio-demographic characteristics of respondents in the study area

Variables	Frequency	Percentage
Gender of beekeepers		
Male	52	86.66
Female	8	13.34
Ethnicity of beekeepers		
Brahmin/Chhetri	43	71.66
Janajati	14	23.34
Other	3	5.00

Variables	Frequency	Percentage
Major Occupation of beekeepers		
Beekeeping	40	66.67
Agriculture other than beekeeping	14	23.33
Business	4	6.67
Services	2	3.33
Education of beekeepers		
Illiterate	2	3.34
Literate	58	96.66

3.2 CONTRIBUTION OF BEEKEEPING TO HOUSEHOLD INCOME IN THE STUDY AREA

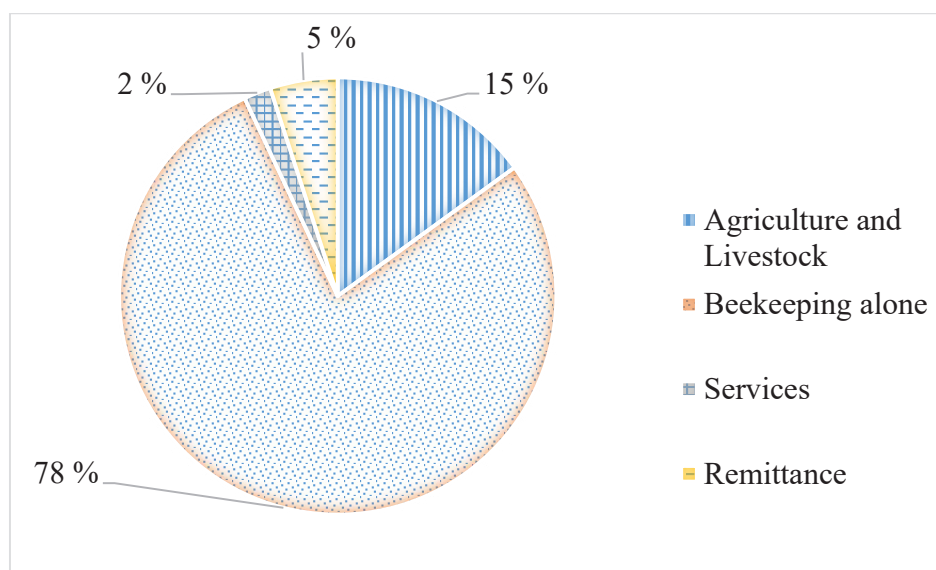


Figure 1. Contribution of beekeeping to household income

The income distribution showed that beekeeping was the dominant source of livelihood, contributing 78% of the total household income, indicating that farmers involved in beekeeping had major source of income through beekeeping (Figure 1). Agriculture and livestock (15%) provided supplementary income, while remittance and services contributed 5% and 2% respectively in the study area.

3.3 EXPERIENCE, NUMBER OF BEEHIVE AND HONEY HARVESTING FREQUENCY

The level of beekeeping experience is considered to be the number of years that an individual has been continuously engaged in beekeeping activity. The majority (35%) of the respondents had an experience of 10-15 years followed by 28.34% of the respondents that had an experience of more than 15 years as shown in Table 2. Similarly, more than half of the beekeepers had 50-100 beehive colonies. Only 15% of the beekeepers comprised less than 50 beehive colonies

and 33% maintained more than 100 beehive colonies. In addition to this, regarding the honey harvesting, the majority (63.34%) of beekeepers harvested the honey five or more than five times whereas 25% of the beekeepers harvested four times annually. This finding is aligned with the study of Pokhrel (2009) which has mentioned that beekeepers extracted honey 3-7 times (mean 4.8) from *A. mellifera* in Terai.

Table 2. Experience, number of beehives and honey harvesting frequency in the study site

Variables	Frequency	Percentage
Years of experience		
< 5	9	15.00
5-10	13	21.66
10-15	21	35.00
>15	7	28.34
Number of beehive colonies		
< 50	9	15.00
50-100	31	51.66
> 100	20	33.34
Frequency of honey harvesting		
3	7	11.66
4	15	25.00
≥ 5	38	63.34

3.4 COST ANALYSIS OF HONEY PRODUCTION

For analyzing cost of production, fixed and variable cost items for honey production were considered. The variable cost included off-season feeding cost, pasture management cost, migration cost, disease and pest control cost, labor cost, comb foundation cost, packaging cost, repair and maintenance cost etc. The fixed cost included depreciation on hives, honey extractor, honey smoker, and other hive equipment. The study found that the variable cost was NPR 3884.75/hive, accounting for 66.72% of total cost while fixed cost was NPR 1938.52/hive, representing 33.28% (Table 3).

Table 3. Cost analysis of honey production in the study area

Items	Cost (NPR/hive)
Fixed cost	
Depreciation of beehives	697.30
Depreciation of honey extractor	786.67
Depreciation of other equipment's	454.55
Total fixed cost	1938.52

Items	Cost (NPR/hive)
Variable cost	
Artificial feeding cost	1833.34
Bee protection chemical cost	185.78
Pasture management cost	128.56
Transportation cost	258.14
Labor cost	722.56
Repair and maintenance cost	115.45
Packaging cost	247.12
Comb foundation cost	259.28
Miscellaneous cost	134.52
Total variable cost	3884.75
Total cost	5823.27

3.5 PRODUCTION STATUS AND PRICE OF HONEY AND BEESWAX

The average honey and beeswax productivity of *A. mellifera* was found 28.2 kg/hive/year and 1.24 kg/hive/year, respectively. The minimum productivity of honey was recorded at 18 kg/hive/year and beeswax 0.75 kg/hive/year. Similarly, the maximum productivity of honey was recorded at 36 kg/hive/year and beeswax 3.0 kg/hive/year (Table 4). A study by Dhakal et al. (2017) reported the average annual honey production of 36 kg/hive in Chitwan, and Shrestha (2017) also reported 34.5 kg/hive in Bardiya, Nepal. Moreover, average number of bee hives in the study area was found 71 ± 5.24 for honey production. As beekeepers produced honey of different flora, the average honey price per kg was ranging from NPR 300 to NPR 600, whereas average unit price of honey was calculated NPR 425/kg. Similarly, the average price of beeswax was found NPR 600/kg in the study area.

Table 4. Production status and price of honey and beeswax in the study area

Items	Average	Minimum	Maximum
Honey (kg/hive/year)	28.2	18	36
Beeswax (kg/hive/year)	1.24	0.75	3.00
Honey (NPR/kg)	425	300	600
Beeswax (NPR/kg)	600	500	700
Average number of hives/HH	71 ± 5.24		
$\pm$ Standard deviation			

3.6 RETURN FROM HONEY AND OTHER PRODUCTS

The return from the beekeeping is the sum of the return from honey and beeswax. The income from the honey (NPR 11900) was 15 times higher than the income from the beeswax (NPR

744). The results show that the gross return of the beekeeping was found to be NPR 12644 as shown in Table 5.

Table 5. Return from honey and other products in the study area

Particulars	Amount (NPR)
Return from honey	11900.00
Return from beeswax	744.00
Gross return	12644.00

3.7 BENEFIT-COST RATIO

The average total cost/hive was NPR. 5823.27, which gives the return of NPR. 12644. Profitability analysis shows the beekeeping is economically viable with an overall gross margin of NPR 8759.25. The benefit cost ratio with beeswax income was found to be 2.17, whereas without beeswax income was 2.04 as shown in Table 6, showing that producing other bee products is more profitable than just producing the honey. In the study area, honey was identified as the primary apiary product, while beeswax contributed as a secondary income source. Other potential hive products such as pollen, propolis, and royal jelly were not practiced by beekeepers, suggesting scope for product diversification in the future.

These findings are consistent with previous studies in Nepal. For instance, Dhakal et al. (2017) reported a gross return of NPR 7482.12 per hive in Chitwan, while Shrestha (2017) found NPR 7392.12 per hive in Bardiya, and Budhathoki-Chhetri et al. (2021) reported NPR 9862.84 per hive in Dang. Similarly, benefit-cost ratio (BCR) was found 2.17, signifies that the beekeeping can be a profitable business, whereas 1.81 BCR reported by Devkota et al. (2016), 1.71 by Dhakal et al. (2017) in Chitwan and 2.15 by Budhathoki-Chhetri et al. (2021) in Dang.

Table 6. Benefit-cost ratio in the study area

Particulars	Amount (NPR)
Total fixed cost	1938.52
Total variable cost	3884.75
Total cost	5823.27
Gross return	12644
Gross margin	8759.25
BC ratio with beeswax	2.17
BC ratio without beeswax	2.04

3.8 HONEY MARKETING IN THE STUDY AREA

The Figure 2 shows the distribution of honey among different market actors. The beekeepers sold their honey directly to wholesaler (40%), indicating that a large portion of honey was

sold in bulk through wholesale channel. Whereas consumer represent 30%, suggesting that the market is inclined toward local consumers. Local traders account for 18% that play an intermediary role in collecting and distributing honey within local markets. Retailers account 12%, indicating limited sell of honey from formal retail honey outlet.

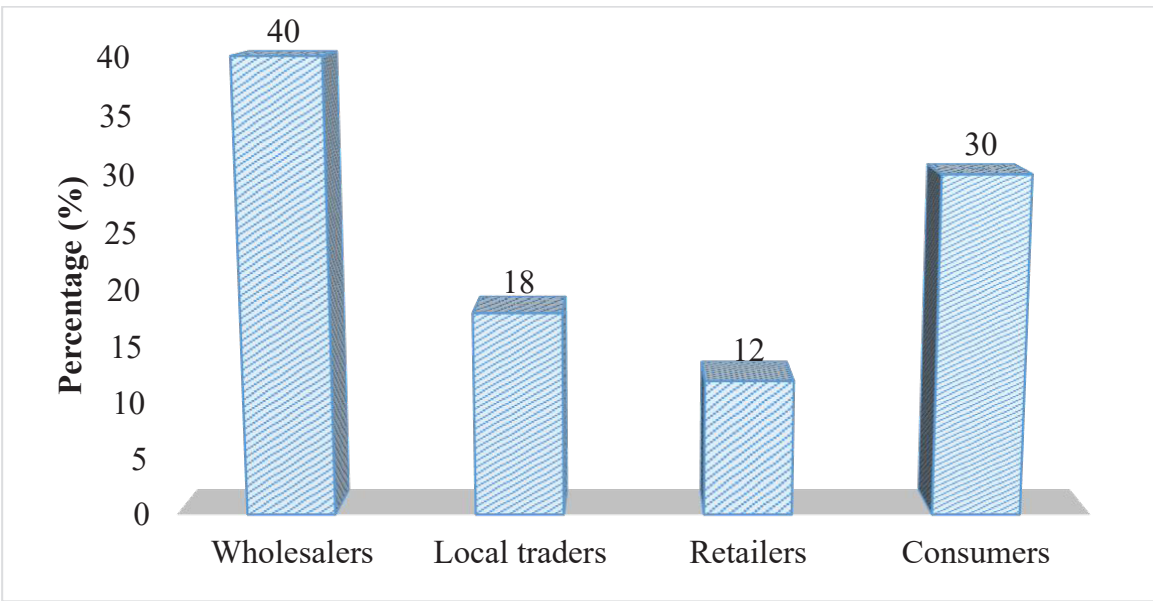


Figure 2. Marketing of honey in the study area

3.9 PROBLEMS IN HONEY PRODUCTION

The index analysis indicates that disease and pest’s infestation was the most severe problem faced by beekeepers (0.85). Pesticide exposure is the second most critical constraint (0.73), underlining the negative impact of agrochemicals on beekeeping. Shortage of forages ranks third (0.68), suggesting seasonal and spatial limitations of floral resources (Table 7). The increase in number of beekeepers over the period results the lack of forages in Chitwan in recent years (FNBK, 2020). Similarly, Shrestha (2017) mentioned the high cost of bee hive and inadequate availability of modern equipment are major problems in beekeeping. Budhathoki-Chhetri et al. (2021) reported decreasing bee forage area, shortage of quality beekeeping equipment and pests, predator and pesticide threats some serious constraints of *A. mellifera* beekeeping in Dang valley.

Table 7 : Ranking of problems in beekeeping in the study area

Problem	Index Value	Ranking
Disease and pests infestation	0.85	I
Pesticide exposure	0.73	II
Shortage of forages	0.68	III
High cost of modern bee hive	0.56	IV
Lack of technical knowledge and skill	0.43	V

3.10 PROBLEMS IN HONEY MARKETING

The results show that insufficient certification and laboratory testing was the most serious marketing related problem (0.76) followed by abundance of untrustworthy traders (0.65), reflecting issues of market reliability. High competition with imported honey was the third major constraint (0.58), suggesting pressure on local honey producers in the market followed by the issue of adulterated honey (0.51), highlighting concerns over product authenticity and consumer trust. Moreover, Budhathoki-Chhetri et al. (2021) listed lack of market information, insufficient certification and lab tests and lack of collection and processing unit are some major problems of beekeeping sector in Nepal.

Table 8. Ranking marketing problems of beekeepers in the study area

Problem	Index Value	Ranking
Insufficient certification and lab test	0.76	I
Abundance of untrustworthy traders	0.65	II
High competition with the imported honey	0.58	III
Issue of adulterate honey	0.51	IV
Lack of processing, labelling and packaging	0.42	V

4. CONCLUSION

Beekeeping, contributing more than three quarters of total household income and benefit cost ratio (2.17), advocates very strongly on profitable potential of beekeeping in the study area. In the study area honey is major product and exploration of other high value hive products is negligible, suggests untapped opportunities for income diversification. Despite the profitability of beekeeping, beekeepers face several challenges, where disease and pest infestation and pesticide exposure were the most serious production constraints, threatening colony health and productivity. Similarly, lack of certification and laboratory testing facilities, the presence of untrustworthy traders, and competition from imported honey are major marketing problems. Overall, the findings suggest that intervention on disease and pest management, pesticide regulation, forage expansion and strengthening the honey certification will enhance the profitability of beekeeping to household livelihood economy.

DECLARATION

The authors declare no conflict of interest.

REFERENCES

- Ahmad, F., & Partap, U. (2008). *Living with honeybees: A decade of enrichment of thought and understanding*. In *Sustainable mountain development: Himalayan honeybees* (pp. 26–30).
- Banjade, D., Dahal, B., Khanal, D., & Shrestha, A. (2024). *Role of Apis laboriosa bees for the Himalayan biodiversity conservation and their potential conservation efforts*. *Tropical Agrobiodiversity*, 5(2), 76–80.
- BDC. (2024). Annual progress report. Fiscal Year 2023/24, Beekeeping Development Center, Chitwan, Nepal.
- Bhattarai, S., Pandey, S. R., Dutta, J. P., Timal, S., & Bam, R. (2021). Determinants and resource use efficiency of honey production (*Apis mellifera*) at Chitwan, Nepal. *Sarhad Journal of Agriculture*, 37(3), 781–790. <https://doi.org/10.17582/journal.sja/2021/37.3.781.790>
- Budhathoki-Chhetri, P., Sah, S. K., Regmi, M., & Baral, S. (2021). Economic analysis and marketing system of *Apis mellifera* honey production in Dang, Nepal. *Journal of Agriculture and Natural Resources*, 4(1), 154–164. <https://doi.org/10.3126/janr.v4i1.33249>
- Çevrimli, M. B., & Sakarya, E. (2019). *Economic analysis of beekeeping enterprises in Aegean Region, Turkey*. *Ankara Üniversitesi Veteriner Fakültesi Dergisi*, 66(2), 109–115. <https://doi.org/10.33988/auvfd.547464>
- Chikanbanjar, R., Pun, U., Bhattarai, B., & Kunwar, R. M. (2021). *Chiuri (Diploknema butyracea (Roxb.) H.J. Lam): An economic tree for improving livelihood of Chepang communities in Makwanpur, Nepal*. *Ethnobotany Research and Applications*, 21, 1–11. <https://doi.org/10.32859/era.21.15.1-11>
- Devkota, K. (2020). *Beekeeping: Sustainable livelihoods and agriculture production in Nepal*. In *Sustainable agriculture and food security*. IntechOpen. <https://doi.org/10.5772/intechopen.90707>
- Devkota, K., Ghimire, S., Timberlake, T., Ferreira, A. B., & dos Santos, C. F. (2025). Beekeeping development in Nepal: Benefits of *Apis cerana* despite lower honey production than *Apis mellifera*. *Bee World*, 102(2), 50–55. <https://doi.org/10.1080/0005772X.2025.2532228>
- Dhakal, S. C., Regmi, P. P., Thapa, R. B., & Shah, S. K. (2017). Allocative efficiency of resource use on beekeeping in Chitwan District of Nepal. *International Journal of Environment, Agriculture and Biotechnology*, 2(4), 1447–1451. <https://doi.org/10.22161/ijeab/2.4.1>
- DoC. (2024). Nepal Foreign Trade Statistics. Fiscal Year 2023/24, Government of Nepal Ministry of Finance, Department of Customs, Tripureshwor, Kathmandu.
- Gyawali, A. (2025). *Evaluating the status and potential of honey production in Nepal: Insight from pollen analysis and beekeeping practices* (Master's thesis, Department of Biological and Environmental Sciences, University of Gothenburg, Sweden). GUPEA. <https://gupea.ub.gu.se/items/57d00ad9-d7e5-47a4-abba-0c5c7c98556c>

- Khun, S., & Serey, M. (2024). *A review on the aspect of beekeeping and economic efficiency*. International Journal of Integrative Research, 2(2), 107–114. <https://doi.org/10.59890/ijir.v2i2.1223>
- Mehta, A., & Khatiwada, R. (2025). Assessing factors influencing the adoption of orchard management practices among walnut growers: A study of exotic and native Jumlish varieties of Nepal. *Selcuk Journal of Agriculture and Food Sciences*, 39(1), 64–80. <https://doi.org/10.15316/SJAFS.2025.007>
- MoALD. (2024). Statistical Information on Nepalese Agriculture 2022/23. Government of Nepal, Ministry of Agriculture and Livestock Development, Singh Durbar, Kathmandu, Nepal.
- MoALD. (2025). Statistical Information on Nepalese Agriculture 2023/24. Government of Nepal, Ministry of Agriculture and Livestock Development, Singh Durbar, Kathmandu, Nepal.
- NSO. (2025). *Nepal in figures 2025*. Government of Nepal, National Statistics Office. <https://nsonepal.gov.np/content/13393/nepal-in-figures-2025/>
- Paudel, A., Tiwari, N. P., Dhungana, S., & Britton, L. L. (2025). Economic profitability and efficiency of honey production from the Asian honeybee (*Apis cerana*) in the mid-hills of Nepal. *Journal of Agriculture and Food Research*, 102153. This study assessed profitability using gross margin, net margin, and benefit–cost ratio of beekeeping enterprises in Nepal.
- Pokhrel, S. (2005). *Behavior and management of domesticated and wild honeybees (Apis spp.) in Chitwan, Nepal* (Doctoral dissertation, Tribhuvan University, Nepal).
- Pokhrel, S. (2009). *Comparative Benefits of Beekeeping Enterprise in Chitwan, Nepal*. *Journal of Agriculture and Environment* 10: 46-59. DOI: 10.3126/aej.v10i0.2129.
- Samanta, K., Haque, K. N., Ghorai, S., & Das, R. (2024). *Role of honey bees as beneficial insects: Significance and challenges*. *International Journal of Advanced Biochemistry Research*, 8(4S), 197–203. <https://doi.org/10.33545/26174693.2024.v8.i4Sc.964>
- SAWTEE. (2015). Nepalese Honey: Potential and Challenges in Export. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Trade Promotion Programme, National Trust for Nature Conservation (NTNC) Complex, Khumaltar, Lalitpur, Nepal.
- Shrestha, A. (2017). Study of production economics and production problems of honey in Bardiya District, Nepal. *Sarhad Journal of Agriculture*, 34(2), 240–245. <https://doi.org/10.17582/journal.sja/2018/34.2.240.245>
- Sivaram, V. (2012). *Status, prospects and strategies for development of organic beekeeping in the South Asian countries*. Division of Apiculture and Biodiversity, Department of Botany, Bangalore University, India.