

APICULTURE: NATIONAL SCENARIO AND POLICY PROVISION

Resham Bahadur Thapa and Sabitri Baral

Institute of Agriculture and animal Science, Tribhuvan University, Kirtipur, Nepal
Industrial Entomology Division, Hariharbhawan, Lalitpur, Nepal
Correspondence: sabitribaral128@gmail.com

ABSTRACT

Apiculture is an important agricultural sub-sector in Nepal, which contributes to rural livelihoods, pollination services, biodiversity conservation, and ecosystem stability. Despite Nepal's favorable agro-ecological diversity and high potential for honey production, this sub-sector faces persistent challenges related to production efficiency, market access, quality assurance, and regulatory issues. The objective of the study was to diagnose the national trend of beekeeping, honey production and policy provision. The study included mixed methods: primary information collection by the apiculture evaluation team and secondary data from national agricultural statistics, custom records, and institutional reports. The findings indicate that in the fiscal year (2024/25) the number of domesticated bee hives and production of honey was recorded 276,183 hives, 4278.72 mt honey production, with the productivity of *Apis mellifera* 28.5 kg/hive/annum, *Apis cerana* 6.0 kg (woodlog) and 9 kg (modern)/hive/annum, which fulfilled about 75% of domestic consumption, and remaining being fulfilled through imports, primarily from India. The average cost of *A. mellifera* honey production is estimated at NRs 391.81/kg. Owing to Nepal's diverse geography, climate, and floral resources, the country is well positioned for commercial beekeeping and high-quality honey production. This study suggests a comprehensive policy and institutional reforms: strengthening laboratory facilities, research investment, national/international coordination, and promotion of domestic honey consumption emphasizing import regulation, and quality standard in harmony with international norms.

Key words: Apiculture, *Apis* species, bee forage, honey production, promotion policy

INTRODUCTION

Nepal is unique depicting climatic and geographical variations ranging from subtropical in plain terai to arctic in high mountains with rich biodiversity and cultural heritage. Majority of the population (approximately two-third) relies on agriculture, which is the foundation of Nepalese economy and also offers the labor employment, cultivation of diverse crops and cropping practices contributing to food security and national Gross Domestic Product (GDP). Traditional agriculture was dominant in the past, which has changed to modern concept of farming, i.e. farming for commercial purpose following improved agricultural practices (Gyawali & Khanal, 2021). Farmers have gained experiences in agriculture development in terms of crop farming and animal husbandry including industrial farming of small creatures like honey bees and silkworms. While, only approximately one-fourth of the farmers are involved in commercial agriculture and remaining almost all sub-sectors of

agriculture still fall under traditional practices. The growth and development of agriculture is crucial to ensure food security, reduce poverty and to boost overall economy of the country (ADS, 2015). Further, restructuring of agriculture sector is based on the principles of shared and self-rules as per new constitution (Constitution of Nepal, 2015). Under the constitutional provisions, Nepal has federal structure with three levels of government, Federal (1), Province (7) and Local (7563 Rural and Urban Municipalities).

Apiculture is a vital cottage industrial sub-sector within modern agriculture dealing with honey bees, their management and production of honey, bee wax, royal jelly, propolis and bee-venom with ecological role of bees in pollination that impact production, productivity and ecosystem services (Aryal et al., 2015; Reddy et al., 2025; Thapa, 2024). In addition, all hive products have traditional, cultural, and medicinal significance. Value chain study of bee products indicates pertinent issues such as low availability of foraging areas and high competition with foreign honey (Bhattarai et al., 2020). This sub-sector contributes a very small fraction (<1%) to agricultural GDP (Devkota, 2020), while, beekeeping has been considered as a high value income-generating agriculture activity (APP, 1995; ADS, 2015). Therefore, the objective of the study was to know the trend of beekeeping, honey production and policy provision for apiculture development. This study examines beekeeping and policy provisions at its current state and provides technical and policy related valuable information to stakeholders, entrepreneurs and policymakers in Nepal.

SEARCH STRATEGY & SELECTION PROCESS

The primary information was obtained from beekeeping farmers' survey (MoALD, 2026), data collection, observation, and discussion by a technical team comprising the Center for Industrial Entomology Development (CIED), Federation of Nepal Beekeepers (FNBK), Department of Food Technology and Quality Control (DFTQC), Ministry of Agriculture and Livestock Development (MoALD), Department of Agriculture (DoA), Plant Quarantine and Pesticide Management Center (PQPMC), Global Market Access Program (GMAP) Nepal, Dabar Nepal, Patanjali Ayurveda Nepal and Beekeeping specialist. The team visited beekeeping sites, provinces, government/private organizations, organized meetings and discussion to gather necessary information on the existing situation of beekeeping and honey production in Nepal.

For analytical purposes, annual statistics and reports published by relevant institutions- including the Department of Customs, MoALD, FNBK, Trade and Export Promotion Centre, and other concerned agencies- were reviewed and rationalized information. Other secondary source of information included reviews of related articles, reports on apiculture from research and publications such as books, bulletins, newsletters, proceedings, including relevant research articles from different national/international scientific journals and websites. All gathered information were cross-verified and confirmed by triangulation method, i.e. organizing interaction meeting with stakeholders- member of FNBK, independent beekeeping farmers, and honey entrepreneurs.

APICULTURE-TECHNIQUES IN PRACTICE IN NEPAL

Apiculture feasibility

Nepal's topography and climatic variations with floral diversity is suitable for beekeeping and honey production. All seven provinces present potential districts for honey bees from lower plains to higher hills (Table 1). Bagmati province in the central region covers 11 districts, followed by Lumbini (10 districts), Gandaki (9 districts), Koshi, Karnali (7 districts each), Far-west (5 districts) and Madesh Pradesh (4 districts), respectively. The lower plain areas are suitable for *Apis mellifera* L. and hilly areas for *Apis cerana* F. beekeeping and honey production.

The overall scenario of bee forage availability and their carrying capacity is important particularly from stand point of stakeholders- policy makers, researchers, businessmen and individual farmers. Because identification of feasible location with higher carrying capacity means farmers can harvest more honey during season and also effective management of bee colonies during off-season. There has been listing of bee flora from Chitwan (Thapa and Dangol, 1990; Thapa and Pokhrel, 2007; Rijal et al., 2018), Nawalparasi (Bista, 2021); Dolakha (Shivakoti and Bista, 2001), Pyuthan (Subedee et al., 2024) and Hidukush (Pratap, 1997). Honey potential varies from species to species and mainly depends on the climatic and soil conditions. Further, such activities in other districts can add basic information in apiculture, flora and fauna diversity, and their conservation.

Table 1. Potential beekeeping district in Nepal

Province	District	Number of districts
Koshi	Jhapa, Morang, Sunsari, Panchthar, Ilam, Khotang, Bhojpur	7
Madesh	Sarlahi, Rautahat, Bara, Mahottari	4
Bagmati	Chitwan, Makwanpur, Dhading, Nuwakot, Lalitpur, Kavre, Sindhuli, Ramechhap, Sindhupalchok, Kathmandu	11
Gandaki	Kaski, Syangja, Nawalpur, Lamjung, Baglung, Myagdi, Gorkha, Tanahun, Parbat	9
Lumbini	Palpa, Gulmi, Dang, Arghakhachi, Pyuthan, Banke, Bardia, Kapilvastu, Rukum, Nawalparasi	10
Karnali	Surkhet, Jajarkot, Jumla, Humla, Rukum west, Salyan	7
Far-west	Kailali, Dadeldhura, Baitadi, Darchula, Bajhang	5

Source: MoALD (2026)

Beekeepers, bee colonies and honey production

The honey bee colony and honey production of two domesticated species of honey bees is presented in Table 2. The introduced honey bee, *A. mellifera* L. is well known as heavy loader and honey yielder. In the fiscal year (2024/2025), the number of domesticated bee hives and production of honey was recorded 276,183 hives, 4278.72 mt honey production, assessing the productivity of *A. mellifera* 28.5 kg/hive/annum, *A. cerana* 6.0 kg (woodlog) and 9 kg (modern)/hive/annum indicating up to 45 kg/hive/year in case of *A. mellifera* and up to 20 kg/hive/per year in case of *A. cerana*. The

average annual productivity of *A. mellifera*, *A. cerana*, and other wild honey bees have been mentioned lowest from *A. mellipona*, followed by *A. florea*, *A. laboriosa*, among the wild honey bees and domesticated honey bees (*A. cerana* 15-20 kg and *A. mellifera* 40-50 kg) production of honey per hive per year, respectively (Shrestha, 2020). Beekeepers adopted different beekeeping management practices and obtained different outcomes while rearing managed bees (Devkota et al., 2025).

Table 2. Domesticated honey bee colonies and annual honey production for the fiscal year 2024/25

Domesticated Species	Number of colony	Honey production (kg/hive/annum)	Total honey production (mt)
<i>Apis mellifera</i>	105183	28.5	2997.72
<i>Apis cerana</i> (modern hive)	85000	9.0	765.00
<i>Apis cerana</i> (woodlog hive)	86000	6.0	516.00
Grand total	276183	-	4278.72

Source: MoALD (2026)

It has been reported that little honeybee (*A. florea*), rock bee (*A. dorsata*), Asian bee (*A. cerana*), and largest Himalayan cliff honey bee (*A. laboriosa*) are native honey bees found in Nepal (Abrol, 2012; 2013). The exotic honey bee, European bee (*A. mellifera*) was introduced in Nepal for honey production in 1994 and the commercialization of modern beekeeping geared up with the introduction of *A. mellifera* (Devkota & Thapa, 2005). Studies on colony strength and performance reveal an increase in honey production of 182%, 59% and 18% for the 10, 8 and 6 frame honey bee colonies, respectively, compared to the honey production of 2.82 kg/colony from 4-frame honey bee colonies (Bhusal et al., 2011). Farmers' interest in beekeeping is in increasing trend but production has not been realized as expected.

The existing honey bee colonies and trend of honey production in Nepal for the last 25 years is shown in Fig. 1. The figure shows that apiculture growth and development was slow from 2001 to 2014 with marked increase in bee colonies after 2014, while increasing and decreasing trend in honey production was observed in the last five years.

The National Agriculture Modernization Program (NAMP, previously PMAMP) has been running beekeeping program in its command zones and super-zones in different districts of the country. The pioneering districts are Dang, Chitwan, Morang and Pyuthan, contributing to beekeepers' skill development and honey production. Similarly, other beekeeping enterprises are also involved in one or another way in beekeeping business.

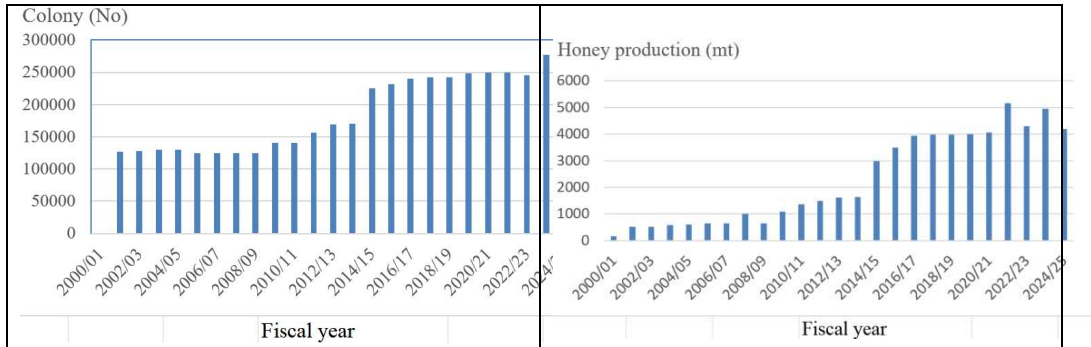


Fig. 1. Honey bee colonies and honey production in Nepal. **Source:** MoALD (2024a).

Production, consumption and trade of honey

KC et al. (2021) studied the production and management of honey bees in Dang district. Results revealed majority of farmers (77%) having 22-117 numbers of hives and rearing *A. mellifera* commercially with an average number of 98 hives and 31.2kg/hive/year productivity. Almost all respondent (89%) were found increasing their enterprise and source of income. Hive cleaning practice was adopted by majority of the farmer (40%), and feeding sugar syrup was adopted by most of the farmer (80%) during rainy and summer seasons. Table 3 represents the honey production, consumption and trade situation for last seven years. Approximately, national honey production fulfils 70-95% of the national demand and remaining supplied through import/export trade, never the less, key export markets for Nepalese honey are China, Malaysia, India, Japan, European countries, and the USA. Nepal exported meagre amount of processed and unprocessed honey in last seven years. Nepalese honey has not been able to establish a significant position in the world market with mere 0.05% share of honey in world (MoICS, 2024; FAOSTAT, 2014).

Table 3. Honey production and import-export situation in Nepal

Fiscal year	Production (mt)	Import (mt)	Export (mt)	Consumption (mt)	Self-sufficiency (%)
2018/19	3990	628	29.21	4589	86.95
2019/20	3997	697	10.21	4684	96.34
2020/21	4062	1596	4.55	5653	71.86
2021/22	5168	1438	15.00	6591	78.41
2022/23	4308	619	5.00	4922	87.53
2023/24	4945	808	11.00	5742	84.35
2024/25	4279	478	8.50	4749	90.15

Source: MoALD (2024b), MoALD (2026)

In terms of per capita honey consumption per day, Central African Republic is on the top followed by New Zealand and Slovenia, however, honey consumption is negligible in Nepal. The consumption of honey was calculated by dividing the total national annual honey consumption with total population,

i.e. total annual consumption (4749 mt) *1000 *1000 ÷ total population (27000000) = 175 g per person per annum in 2024/25. Sharma et al. (2016) also reported low consumption of honey in Nepal. Supply of honey in the Nepalese market from producers to the final consumers passes through different channels. It is clear that easy access to road and market is one of the main advantages of beekeeping in the study areas. Beekeepers' honey products reached to markets, for instance, over two-third share reached to Kathmandu (70%), following remaining portion to other market places, i.e. Pokhara (10%), Hetauda (5%), Narayangadh (5%), Bhairahawa (5%), and Kapilvastu (5%), respectively, and honey production and sale contributed over three-fourth of the household income of some beekeepers.

Crop pollination and biodiversity conservation

Some remarkable studies on beekeeping, pollination deficits and pollinators have been conducted in Nepal (Adhikari & Ranabhat, 2011; Aryal et al., 2016; Bista, 2021; Dubey et al., 2021; Gaire et al., 2015; Rijal, 2019; Rijal et al., 2018; Parajulee and Thapa, 2012; Pokhrel and Thapa, 2017; Pudasaini et al., 2016; Thapa, 2008; 2013; Bhusal and Thapa, 2005). More than 300,000 animal species are considered floral visitors and nearly 75% of important crops worldwide and 80% of the total number of flowering plant species are dependent upon animal pollinators (Nabhan and Buchmann, 1997). In tropical areas, more than 95% of plants depend on animal pollinators, mostly insects (Abrol, 2013). Honey bees collect nectar and pollen from flowers and in turn, pollination is the most important function of honey bees and beekeeping which improves the yield and quality of crops such as fruits, vegetable seeds, spices, oilseeds, and forage crops with scientific evidences (Thapa, 2006; Joshi & Joshi, 2010). Insects do almost 80% of total insect pollination, making them the top pollinators. Bees provide nearly 80% of total insect pollination, making them the best pollinators. In Karnali province, 70% of commonly grown crops are pollinator-dependent. However, pollination is absolutely neglected in the Nepalese agricultural system (Neupane et al., 2025). Awareness, training and apiculture good practices including integrated pest management and pollination activities are essential for conserving bees and biodiversity (Thapa & Sharma, 2024; Thapa et al., 2024; 2025a; 2025b).

A standard method to determine whether a crop benefits from insect pollination is to compare the yields of plants that are grown under three different conditions: (a) covered by nylon screen cages containing honey bee colonies; (b) covered by cages to exclude insects; (c) not caged (Thapa, 2008). Similarly, calculation is based on requirement of colonies for potential honey production as well. Sihag (1997) used the formula to calculate pollinators' requirements for crop pollination: $N = d/PE * Y/T * a$, where, N= number of pollinators required, d = floral longevity, PE = pollinating efficiency, Y = average floral density, T = average foraging duration, and a = cropped area. There remains in depth studies to continue in pollination, productivity and biodiversity perspectives.

Decline of bees

Field studies indicate a sharp decline in the bee population of *A. laboriosa* population in Kaski (Joshi et al., 2004) and *A. dorsata* in Chitwan (Pokhrel, 2009). The decline was observed both in the number of bees and the number of nests. Recently, Kortsch et al. (2024) surveyed 116 native honey bee *A. cerana cerana* beekeepers in a mountainous area of Western Nepal. Over three-fourth of the

beekeepers (76%) reported declines in honey bees, while 86% and 78% reported declines in honey yield and number of beehives, respectively. As a whole, pollinators are declining and pollination of commercial crops is seriously affected. There is also problem of biodiversity conservation due to pollination deficit. The important factor is insecticides influencing foraging behavior. Maini et al. (2010) reviewed pesticide regarding imidacloprid and colony collapse disorder (CCD) in the maize agro-ecosystems and reported effects of sub-lethal doses of imidacloprid on the foraging behavior of domesticated and wild bees. Non-*Apis* bees, like common eastern bumble bee, *Bombus impatiens* Cresson; alfalfa leafcutting bee, *Megachile rotundata* F.; and orchard mason bee, *Osmia lignaria* Say also show considerable variation in susceptibility to insecticides. The descending order of contact toxicity to *B. impatiens* was clothianidin > imidacloprid > deltamethrin > spinosad > novaluron; to *M. rotundata* it was clothianidin > deltamethrin ≥ imidacloprid > spinosad > novaluron; and to *O. lignaria* it was imidacloprid > clothianidin > spinosad > deltamethrin (Scott-Dupree, 2015). Such affecting factors including pest and diseases of bees require immediate actions. An awareness program of biodiversity conservation through pollination and additional honey production rewards to the farmers and ensure sustainability of production.

NATIONAL POLICY AND GUIDELINE

Agriculture sector has been receiving priority for the last few decades but a landless or marginalized/deprived farmers cannot choose agri-business which requires land. While, it has been observed that honey production business can be adopted successfully by the poor farmers with minimum land or no land. In this situation, the honey business with production of uni-floral honey, herbal honey, medicinally valued honey increasing their high earning capacity etc. can be the motivating factors for farmers adopting beekeeping and honey production.

The Government of Nepal has envisioned the effective implementation of Bee Promotion Policy 2073 (2017 AD). The policy has foreseen the beekeeping business to improve the socio-economic conditions of poor farmers in Nepal. There are other supportive legal instruments, namely, Agriculture Development Strategy, 2015, National Trade Integration Strategy 2080 (MoICS, 2024), Food Safety and Quality Act 2024, and Environment Protection Act 2019 to promote and develop this sector in one and another way. Policy analysis focuses on different issues: institutional and infrastructure development, species conservation, product quality, market access, capacity building, credit and finance, information dissemination, and research advancement (Kafle, 2025). For advancement of beekeeping to meet the growing demand of honey in both national and international market, the existing policies and programs implementation in explicit and coordinated manner is the prime need of today.

Bee Promotion Policy, MoALD (2017 AD) recognizes beekeeping as one of the important means of enhancing rural economy in a sustainable way with four objectives and over all sub-sectoral aspects: Objective-1) to improve bee flora and its carrying capacity strengthen, efficiently mobilization of bee flora, colony management, increase access of beekeepers to finance, infrastructure, technology, skill and market and support in honey product diversification; Objective-2) to increase the production and productivity of bee bi-product and honey bi-product, reduce the cost of production, improve the products quality, enhance the access of the bee and honey product to international market and thereby

contributing international trade balance; Objective-3) conservation and promotion of raithane and local bee species with number of colony increase for the enhancement of biodiversity conservation and pollination; Objective-4) Mainstreaming the traditional honey hunters and other socio-economically backward community in modern beekeeping profession aiming their poverty reduction. Various managerial aspects taken care are listed as follows:

Honey bee species

- *A. mellifera* species selection for its augmentation suited to inner valley and possible hills and likewise species selection of *A. cerana* for its expansion on upper hills and mountain area.
- Viewing the bee flora availability, floral carrying capacity and transportation service on bee migration of both *A. mellifera* and *A. cerana* whatever the possible practices to maximize the productivity with the rational use of bee forage areas thereby keeping intact the colony health.
- Conservation and promotion of *A. cerana* sub species available in higher hills for their augmentation in other areas with the establishment of their breeding center.
- Enhancing the biodiversity conservation of pollinated crops and other wild flora laying emphasis on the conservation and promotion of *A. laboriosa*, *A. dorsata* and *A. florea* species available in higher hills, terai, inner valley and valley, respectively.
- Carrying out the technical, social and ecological impact and potential consequences of bee colony, queen, bee package if not possible to develop in Nepal and need to import from other countries.

Bee flora management

- Bee flora survey to be carried out and prepare the bee flora calendar, based on the survey findings, declaration of bee flora area mapping it geographically.
- Code of conduct to be prepared to make available the bee flora based on the carrying capacity of bee flora in flora area.
- Provision to be made to include at least 25% of bee flora plantation under forestation agro-forestry, forestation and national natural conservation programs initiated by the government.
- Since bee flora is the base of beekeeping, beekeepers to be encouraged to grow and maintain the most promising bee flora in their surroundings.
- Awareness of GOs and other forest related stakeholders to be raised with regard to training and pruning of promising bee flora during their flowering period.
- Provision of free grazing on agriculture crops and awareness raising program to be conducted to crop growers for discouraging them on use of pesticide or other uses which do harm to bees during peak crop flowering period, if necessary only with the technical advice of subject matter specialist.
- Provision of subsidy to be made to those individual or any organization who adopts to grow most prominent bee flora such as Chiuri and Mauwha.
- Based on carrying capacity, code of conduct provision to be prepared for beekeepers to do or allow to free bee foraging under leasehold forestry, community forestry, and forestry system without any problems.

- Settlers close to forest, agriculture entrepreneurs and community forest users to be urged to create a conducive environment from their side to beekeeping business held in their respective localities.

Colony migration

- A committee formed in combination of beekeeping development program, agriculture knowledge centre, local beekeepers' group, beekeeping related entrepreneurs and other concerned stakeholders, bee flora calendar-based bee colony migratory system to be developed and adjusted accordingly.
- Beekeeping network, beekeeping association and commercial beekeepers to be inspired to explore new potential bee flora areas and provision made to all of them to take their bee colonies to any locations of Nepal without any problems.
- Provision of bee colony transportation to be made with legal provision as that of ambulance issued to ensure safe bee migration under bee migratory system.

Honey bee pests

- Strictly prohibited to import and internal transport of infected bees and infected bee related materials from one place to another.
- Restriction on banned antibiotic, sulfur, tobacco product and other materials with potential residual risk in bee colonies.
- Beekeepers to be provided services such as bee disease diagnosis, examination and control measure in major honey production areas.
- Beekeepers aware to minimize use of antibiotics and waiting at least six weeks of its use.
- Tariff discount to be made on the import of less harmful chemicals for disease and pest management of bee colonies.
- Honey testing lab to be promoted to meet the international standard and managed it accordingly.

Honey hunting

- Promotion of Api-tourism encouraged with the management of honey hunter and protection of habitat of other natural bees along with conservation and promotional activities in coordination with concerned stakeholders.
- Provision to be made to address the natural habitat, shelter of bees and their transfer to EIA report carried out before the start of heavy infrastructure works.
- Traditional honey hunting device of the honey hunters to be conserved paying cultural importance and encouraged them for safe and well managed honey hunting through orientation and training.

Honey production and marketing

- For quality honey production and good management, concerned stakeholders to be encouraged for the adoption of good beekeeping practices.
- Within the access of honey production pocket area, cooperative, private sector and honey collectors to be supported carrying out the initial honey quality test and cooling service facilities.

Incentives and subsidies

- In order to bring intensity and expansion in beekeeping development based on comparative advantage, existing subsidy level to be increased.
- Competent and enthusiastic beekeeping entrepreneurs, who wish to be involved in queen production and supply with the establishment of bank as a profession encouraged with heavy subsidy support.
- Subsidy support incentive provision to private sector beekeeping network, cooperative, beekeepers for rendering honey collection and storage, honey processing unit, preliminary disease diagnostic services.

Likewise, policies such as beekeeping loan support, beekeeping insurance, tax exemption provision, research provision on beekeeping, human resource development are also included.

While viewing the policy with the lens of bee flora and their carrying capacity, it has tried to cover in detail. Chiuri and Mahuwa have been recognized fully as one of the most prominent bee flora and has also laid emphasis on their conservation and promotion. However, the existing policy does not realize the importance of formulating the separate policy particularly focusing Chiuri and Chiuri like other bee loving flora for their conservation and promotion recognizing them as protected flora species, in line of Sal, Simal by district forest office, Ministry of Forestry. Despite having excellent provisions in bee promotion policy for the promotion and development of bee sector, due to lack of inter-ministerial, inter-departmental and inter-organizational coordination and cooperation those provisions just have remained in the document itself without effective transformation in action. Similarly, some policy provision like, bee forage conservation and plantation, exemption of road tax, treatment for the bee carrying vehicles as an ambulance are lacking behind due to lack of policy ownership by the respective organizations.

Honey bees have been definitely concerned for honey production and Nepal is rich in traditional knowledge of beekeeping and honey production. Pudasaini (2018) revealed that farmers searched honey bee colonies in hollow tree around the forest and kept *A. cerana* bees in hives made of traditional wood log with least management practices and majority of the farmers (74%) harvested honey two times in a year, first between March to May and second September to November, respectively. Such techniques of beekeeping have been handed over from generation to generation since immemorial time, therefore, their practices could be an important basis for beekeeping and colony maintenance in rural areas.

Over 66 laws, 38 rules and regulations, 39 executive orders and 39 by-laws in Nepal are of direct concern to agriculture, however, reviews of these acts and regulations in the country reveal that none of them spell out the word pollinators and their conservation (Thapa, 2006). The generally accepted measures to conserve and utilization of honey bees and crop pollinators include:

- Conserving and restoring natural habitat.
- Growing flowering plants preferred by pollinators.
- Promoting mixed farming systems.
- Establishing nectar corridors for migratory pollinators.
- Providing habitats alongside cropland for pollinator food and shelter.
- Encouraging integrated pest and soil management.

- Discouraging misuse of agrochemicals with promotion of.
- Building knowledge gaps, such as knowing the food plants, nesting materials and nesting sites of pollinators and other finer details of how to make a pollinator-friendly habitat.

The Government of Nepal developed Good Beekeeping Practice (GBP) Implementation Directive, 2074 (2018 AD) as a technical guideline to standardize beekeeping practices across the country. It was prepared as per the provision in Bee Promotion Policy 2073 (2017 AD) and assumed to be supportive for the effective implementation of the bee promotion policy. The directive intended to promote hygienic, environmentally responsible, and quality-oriented beekeeping practices throughout the honey value chain from colony management and apiary hygiene to harvesting, processing, storage, and marketing of honey and other bee products. By introducing structured best management practices and quality standards, the directive aims to strengthen food safety systems, improve productivity, and enhance the competitiveness of Nepalese honey in domestic and international markets.

The directive aims to promote safe, hygienic, and environmentally sustainable beekeeping practices while ensuring consistent quality of honey and other bee products. It emphasizes strengthening food safety systems, improving productivity, protecting biodiversity, and enhancing market access for Nepalese honey, particularly in international markets where strict quality and safety standards apply. The directive covers the entire honey value chain including colony management, apiary sanitation, harvesting techniques, honey extraction and processing, storage, transportation, and marketing. The directive is structured into two parts, part 1 is structured around five core modules for GBP, which are based on Nepal GAP and part 2 include the Scheme owner and governance structure.

Aligned with Nepal GAP (2017 AD), the GBP includes five standard modules: i) Food safety, ii) Environmental management, iii) Worker health, safety & welfare, iv) Product quality, and v) General requirements.

Each module includes essential criteria and indicators to comply. Within each module, based on their significance, the indicators are categorized into three levels: i) Critical: These are the strictest and essential indicators related to food safety and product quality that must be adhered to without exception, ii) Major: These are important indicators and at least 90% compliance is required for certification, and iii) Minor: These are recommended indicators which, although not critical, at least 50% compliance indicators is required.

However, the directive was developed within a different institutional context and without a structured implementation framework. Since its publication, Nepal has transitioned to a federal governance system, the beekeeping sector has expanded and diversified, and global food safety requirements have continued to evolve. Visualizing these issues and gap on GBP directive, now the time is to revisit and update it to align national standards with the current policies, governance structure, strengthen food safety and traceability systems, incorporating modern beekeeping technologies, and establishing practical mechanisms that enable producers and enterprises to gradually adopt improved practices. A modernized and implementation-oriented Good Beekeeping Practice framework would significantly contribute to strengthening Nepal's beekeeping sector, improving rural livelihoods, enhancing environmental sustainability, and increasing the competitiveness of Nepalese honey in domestic and international markets.

Constraints/challenges in beekeeping sub-sector

Despite being priority program, its contribution in national economy is negligible due to many constraints/challenges. Pant et al. (2024) categorized problems of apiculture into four groups namely, forage related issues and problems, technical problems, market related problems and policy related problems. Apiculture related problems are listed as follows:

- Increasing land plotting trend and urbanization pressure on agriculture lands.
- Increasing forest fire and deforestation every year leads to reduction in forest bee flora gradually.
- Flash flood and land slide destroying agriculture lands.
- Very poor linkage between biodiversity maintenance and beneficial fauna conservation; lack of commitment to take worthy initiations from concerned stakeholders (Local governments, Line agencies, Forest Agriculture, Livestock, Community forestry, Beekeepers groups).
- Irrational use of pesticides in bee flora areas (No harmony between commercial farming and beekeeping).
- Climate change impact on flora and fauna including bee colonies.
- Poor road connectivity in existing bee flora areas, and no access of road to newly identified bee flora areas.
- Beekeepers having no adequate skill and knowledge for effective management of bee enemies, disease and pests.
- Lack of knowledge regarding export requirements and quality standards.
- Inadequate quality assurance infrastructure.
- Limited identification and linkage to international markets and underutilization of digital marketing tools.
- Price instability and delayed payments affecting small enterprises and farmers.
- Local government and beekeepers lacking apiculture short term and long term plans.
- Lack of effective cooperation and coordination among farmers/farmer groups, the private sector, and government agencies.
- High production costs and inability to compete on price with illegally imported honey due to the open border.
- Weaknesses in packaging, labelling, and branding aligned with market demand, along with misconceptions among consumers about honey.
- Unauthorized sale and distribution of substandard, counterfeit, and adulterated honey in the market.
- Insufficient awareness among farmers and business operators regarding honey hygiene, quality, and standardization.
- Limited financial and technical human resources for monitoring, honey sample testing, and quality certification.
- Persistence of export problems following the European Union's ban on Nepali honey imports in 2002/03, citing the absence of a Residue Monitoring Plan (RMP).
- Lack of technical knowledge related to honey processing, storage, and value chain development, and underutilization of processing plants established with government subsidies.

- Lack of strong research back support to this sector specifically on the part of artificial bee diet, insect pest management and bee breed improvement.

Key considerations

- Due to its geographical, biological, and climatic diversity, Nepal is increasingly recognized as a suitable country for commercial beekeeping and the production of high-quality honey. The beekeeping sub-sector in Nepal contributes significantly not only to increasing farmers' incomes, but also to environmental balance and biodiversity conservation. However, in recent years, beekeeping farmers have been compelled to exit this sub-sector due to challenges such as shortages of adequate forage areas, irrational use of pesticides, and various problems encountered during seasonal migration of bee colonies.
- Although honey produced in Nepal is of good quality, this sub-sector faces structural, policy-related, financial, and behavioral challenges in marketing. High production costs, failure to update mandatory quality standards in line with current requirements and to incorporate additional voluntary parameters, a low customs duty rate on imports (10%), and the lack of proper labeling, branding, and packaging of domestic honey have prevented Nepali honey from competing effectively to imported products. Therefore, long-term solutions dire requirement of multi-dimensional measures, including reduction of production costs, increased customs duties on imported honey, updating of quality standards, market promotion, and expansion of domestic consumption.
- For *A. mellifera* beekeeping, the production cost of honey was estimated Rs.391.81/kg (MoALD, 2024b). The benefit–cost ratio for the overall beekeeping sector was 1.36, while for honey production alone it was 1.27 (MoALD 2024b). This benefit–cost ratio indicates that beekeeping is economically profitable. In addition, the high cost of honey production highlights the need for commercial beekeepers to focus on cost-reduction strategies. In this regard, operating beekeeping under a cluster system may be an appropriate option. Collective beekeeping within clusters enables shared procurement and use of inputs (such as honey extractors, foundation sheets, and processing facilities), thereby reducing costs. This approach not only lowers production costs but also strengthens coordination in production and market access.
- Honey processing technology in Nepal remains traditional and underdeveloped, creating challenges for expansion into domestic and international markets. With the adoption of scientific and hygienic technologies, honey quality, improved equipment, business training, effective monitoring systems, and testing and certification in accordance with international standards, Nepali honey can become competitive in the global markets. Achieving this requires strong coordination among the state, private sector, cooperatives, and research institutions.
- Beekeeping-related research must be given high priority, including the establishment of a dedicated research center, investment in modern technologies, and development of skilled human resources. In addition, the physical and technical capacity of honey testing laboratories should be strengthened to ensure testing and certification in line with international standards. If subsidies are provided for tests that are either not included in existing quality standards or involve high costs, the domestic honey industry will be able to contribute significantly to the national economy through import substitution and export promotion.

CONCLUSIONS

Having the unique climatic and geographical variation ranging from subtropical to high mountain with enriched plant biodiversity, apiculture is one of the best eco-friendly agro-enterprises in Nepal. Although, apiculture contributes a very small fraction (<1%) to Agriculture Gross Domestic Product (AGDP), there are 51 potential districts out of 77 districts with good opportunity for commercialized apiculture development. In the fiscal year 2024/25, the number of domesticated bee hive and production of honey was recorded as 226,183 hive and 4278.72 mt, respectively with an average productivity of *A. mellifera* 28.5 kg/hive/year, *A. cerana* 6.0 kg (wood log) and 9 kg (modern hive). In term of per capita honey consumption per year is quite low in Nepal (175 gm) as compared to as high as in case of Central African Republic. However, honey production cannot meet the national demands. For instance, the lowest national demand was 4589 mt in 2018/19 which peaked to 6591 mt in 2021/22. This scenario predicts wide scope of increasing consumers demand thereby boosting the internal honey market. In addition, bees provide nearly 80% of the total insect pollination making them the best pollinators. In the last two decades, bees and other pollinators are declining and pollination of commercial crop is seriously affected. The main cause behind this is the irrational use of pesticides on standing crops specially at flowering stage. Regarding policy provision, there are two vital policy documents Bee Promotion Policy 2073 (2017 AD) and Good Beekeeping Practice Implementation Guideline 2074 (2018 AD). Both of the documents are courteously formulated, but due to lack of stakeholder engagement and ownership model in the changing context of the government system, their field applicability and performance are not satisfactory. Therefore, despite having ample opportunities and scope, this sub-sector is continuously facing many challenges and obstacles on the part of product quality, traceability, packaging, branding and overall market access. To overcome these challenges and obstacles, Bee Promotion Policy (2017 AD) and Good Beekeeping Practice Implementation Guideline (2018 AD) should be reviewed and implementation-oriented Policy & Good Beekeeping Practice framework developed focusing environmentally responsible and quality oriented beekeeping practices considering overall honey value chain and other bee-products; bee flora management; product quality assurance; value chain analysis, market promotion; crop pollination and biodiversity conservation. That should significantly contribute to strengthen Nepal's beekeeping sector, improve rural livelihoods, enhance environmental sustainability, and increase the competitiveness of Nepalese honey in domestic and international markets. Bee species and potential flora need to be identified based on their dominating roles in cropping and agro-forestry system with high quality products to address related problems at the local and national/international policy levels.

Guideline for production management

- Bee colony and flora determination to meet the gap between existing colonies population and carrying capacity of bee floras.
- Promotion of forestry and agroforestry laying emphasis on bee friendly plantations.
- Preparing and distribution of beekeeping materials among beekeepers at local levels, to ensure timely available of beekeeping equipment and tools at low cost.
- Initiating road side bee friendly plantations and field-based training regularly covering maximum beekeepers.

- Pest management, quality production and product management by beekeepers and processor/traders.
- Bee-pockets/district/regional/national level interaction, educational tour, and workshops.

Guidelines for apiculture promotion and biodiversity conservation

- Honey processing and branding to facilitate quality honey market both at national and international level, i.e. ensuring quality honey production and supply.
- Provision of strong research back support to this sector specifically on the part of artificial bee diet, insect pest management and bee breed improvement.
- Regular research and development activities are supportive to promote climate resilience pro-poor farming and beekeeping technology.
- Formulation of Chiuri and other major bee loving trees promotion and conservation guideline.
- Organic farming zones to ensure the beekeeping areas free from pesticide effect.
- Irrigation support to the possible extent in beekeeping areas to design the bee friendly cropping patterns in order to increase crop production/productivity and ensure bee flora availability for quality honey production.
- Community managed honey collection center and processing unit, and hive making enterprise at local levels.
- Declaration of honey production areas as honey village and apiculture eco-tourism with open door to local and abroad tourists.

To sum up, apiculture contributes to rural employment and farmers' livelihoods with nutritious bee products, pollination services, biodiversity conservation, and ecosystem stability. Hence, farmers awareness and national campaign favoring recent bee promotion policy at the national level and following good beekeeping practices at the farmers level is necessary for solving ever emerging beekeeping problems, promote hygienic beekeeping, and harvest quality bee products appreciating healthy competition at the national and international levels.

REFERENCES

- Abrol, D.P. (2012). Pollination biology biodiversity conservation and agricultural production. Springer.
- Abrol, D.P. (2013). Beekeeping: A comprehensive guide to bees and beekeeping. Scientific Publishers, Jodhpur, India.
- Adhikari, S., & Ranabhat, N.B. (2011). Bee flora in mid hills of central Nepal. *Botanica Orientalis: Journal of Plant Science*, 8, 45–56. <https://doi.org/10.3126/botor.v8i0.5558>
- ADS. (2015). "Agriculture Development Strategy (2015-2035)". Government of Nepal, Ministry of Agriculture and Livestock Development, Singhdurbar, Kathmandu, Nepal.
- APP. (1995). "Agriculture Perspective Plan (APP)". NPC/HMGN and ADB, Kathmandu, Nepal.
- Aryal, L.N., Thapa, R.B., Tiwari, S. & Chaudhary, N.K. (2016). Foraging behavior of native honey bee (*Apis cerana* F.) and European honey bee (*Apis mellifera* L.) on flowers of common

- buckwheat (*Fagopyrum esculentum* M.) in Chitwan, Nepal. *International Journal of Applied Science & Biotechnology*, 4(2), 236–239.
- Aryal, S., Thapa, R. & Jung, C. (2015). An overview of beekeeping economy and its constraints in Nepal. *Journal of Apiculture*, 30(3), 135-142.
- Bhattarai, S., Pandey, S.R., Bhattarai, S.K., Karn, R., Gurung, S., Chapagain, A., Bhatta, S. & Dutta, J.P. (2020). Value chain analysis of honey bee (*Apis mellifera*) products in Chitwan, Nepal. *Azarian Journal of Agriculture*, 7(1), 26-35. <http://dx.doi.org/10.29252/azarinj.026>
- Bhusal, S.J. & Thapa, R.B. (2005). Comparative study on the adoption of improved beekeeping technology for poverty alleviation. *Journal of the Institute of Agriculture and Animal Science*, 26, 117-125.
- Bhusal, S.J., Kafle, L., Thapa, R.B. & Shih, C.J. (2011). Effect of colony strength on the performance of honey bees (*Apis mellifera*) in Nepal. *Journal of Sociobiology*, 58(2), 1-13.
- Bista, S. (2021). Development of colony management practices in *Apis mellifera* L. honey bee at mid-hill and plain areas of central Nepal. PhD dissertation, Institute of Agriculture and Animal Science, Postgraduate Program, Kirtipur, Nepal.
- Constitution of Nepal. (2015). Nepal Law Commission, Government of Nepal, Ministry of Agriculture and Livestock Development, Singhdurbar, Kathmandu, Nepal.
- Devkota, F.R. & Thapa, R.B. (2005). Foraging preference of *Apis cerana* F. and *Apis mellifera* L. on broccoli under caged and open conditions in Chitwan. *Journal of the Institute of Agriculture and Animal Science*, 26, 167-168.
- Devkota, K. (2020). Beekeeping: Sustainable livelihoods and agriculture production in Nepal. In Modern Beekeeping: Base for Sustainable Production. InTechOpen doi.org/10.5772/intechopen.90707
- Devkota, K., Ghimire, S., Timberlake, T. & Ferreira, A.B. (2025). Beekeeping development in Nepal: Benefits of *Apis cerana* despite lower honey production than *Apis mellifera*. *Bee World* 102(2), 1-6 doi.org/10.1080/0005772X.2025.2532228
- Dubey, D., Thapa, R.B., Tiwari, S., Gautam, B. & Sapkota, P. (2021). Diversity, relative abundance, and diurnal variation of insect visitors of litchi (*Litchi chinensis* Sonn.) at Rampur, Chitwan, Nepal. *Entomology Orinithology & Herpetology*, 9(2),1-5 9:226.[doi:10.35248/2161-0983.20.9.22](https://doi.org/10.35248/2161-0983.20.9.22).
- FAOSTAT. (2014). FAO statistical yearbook 2014. Food and Agriculture Organization of the United Nations, Rome, Italy. <https://www.fao.org/4/i3591e/i3591e.pdf>
- Gaire, S.K., Pokhrel, S., Thapa, R.B., GC, Y.D. & Tiwari, S. (2015). Effect of pollination on cucumber (*Cucumis sativa* L.) production in Chitwan, Nepal. *Journal of Environmental Science*, 1,128-133.
- Gyawali, P. & Khanal, S. (2021). Overview of agriculture in Nepal: Issues and future strategies. *Fundamentals and Applied Agriculture*, 6(3), 323-335.

- Joshi, N.C. & Joshi, P.C. (2010). Foraging behavior of *Apis* spp. on apple flowers in a subtropical environment. *New York Science Journal*, 3(3), 71-76.
- Joshi, S.R., Ahmad, F., & Gurung, M.B. (2004). Status of *Apis laboriosa* population in Kaski. *Journal of Apiculture research*, 43(4), 176-180.
- Kafle, N. (2025). Beekeeping in Nepal: Assessing policy effectiveness and pathways for sustainable growth. *Nepal Public Policy Review*, 25, 2025. Doi: <https://doi.org/10.59552/nppr.v5i1.91>
- 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.
- Kortsch, S., Timberlake, T.P., Cirtwill, A.R., Sapkota, S., Rokoya, M., Devkota, K., Roslin, T., Memmott, J., & Saville, N. (2024). Decline in honey bees and its consequences for beekeepers and crop pollination in western Nepal. *Insects* 2024, 15(4), 281. <https://doi.org/10.3390/insects15040281>
- Maini, S. P. Medrzycki, & C. Porrini. (2010). The puzzle of honey bee losses: A brief review. *Bulletin of Insectology*, 63(1), 153-160.
- MoA. (2017). "Honey Bee Promotion Policy 2073". Government of Nepal, Ministry of Agriculture and Livestock, Singhdurbar, Kathmandu, Nepal.
- MoA. (2018). "Good Beekeeping Practice Implementation Guideline 2074". Ministry of Agriculture and Livestock, Singhdurbar, Kathmandu, Nepal.
- MoALD. (2024a). Statistical information on Nepalese agriculture, FY 2023/24. Ministry of Agriculture and Livestock Development (MoALD), Government of Nepal. <https://moald.gov.np/content/307/statistics-information-on-nepalese-agriculture-2080-81/>
- MoALD. (2024b). Apiculture sector's Detailed Technical Report. Ministry of Agriculture and Livestock Development (MoALD), Government of Nepal.
- MoALD. (2026). Survey report on production, consumption and marketing of honey in Nepal during the fiscal year 2024/25. Ministry of Agriculture and Livestock Development (MoALD), Government of Nepal.
- MoICS. (2024). Nepal Trade Integration Strategy (NTIS). Ministry of Industry, Commerce and Supplies, Government of Nepal, Singhdurbar, Kathmandu, Nepal.
- Nabhan, G. & Buchmann, S. (1997). Services provided by pollinators. "Nature's Service: Societal Dependence on Natural Ecosystems" Society :133–150. <https://doi.org/10.1023/a:1023307309124>
- Neupane, D., Shrestha, S., Timberlake, T., Bhattarai, H.K., Khatri, L., & Bhandari, B. (2025). Pollinator policy integration in Nepalese agricultural systems. In Pandey et al. eds. *Agriculture Sector Transformation in Nepal*. Springer. pp. 421-434.
- Panta, B., Khatri, R.B. & Neupane, N. (2024). Problems of bee keeping in Nepal and way forward. *Malaysian Journal of Halal Research (MJHR)* 7(2) (2024), 53-55. Doi: <http://doi.org/10.26480/mjhr.02.2024.53-55>

- Parajulee, S. & Thapa, R.B. (2012). Foraging behavior of *Apis mellifera* L. landraces under terai condition of Nepal. *Nepal Journal of Science and Technology*, 13(2), 51-56.
- Partap, U. (1997). "Bee flora of the Hindu Kush-Himalayas: Inventory and management". ICIMOD, Kathmandu, Nepal.
- Pokhrel, S. (2009). Comparative benefits of beekeeping enterprise in Chitwan, Nepal. *Journal of Agriculture and Environment*, 10, 46-59.
- Pokhrel, S. & Thapa, R.B. (2017). Insect pollination on bitter gourd production in Chitwan, Nepal. *Agriculture Development Journal*, 13, 1-12.
- Pudasaini, R. (2018). Indigenous knowledge and practices of beekeeping with *Apis cerana* in Nepal. *Journal of Apiculture*, 33(2), 71-76.
- Pudasaini, R., Thapa, R.B., Chaudhary, N.K. & Tiwari, S. (2016). Insect pollinators' diversity of rapeseed (*Brassica campestris* L. var *toria*) in Chitwan, Nepal. *Journal of Institute of Agriculture and Animal Science*, 33-34, 73-78.
- Reddy, C.A., Gogoi, J., Pathak, M., Ningthoujam, K., Kalitha, H., Sahoo, B.K., Boruah, S. & Sehgal, M. (2025). Apiculture and sericulture: Twin engines of rural prosperity. In M. Sehgal (ed.) *Integrated Pest Management: Advancement, Adoption and Ecological Challenges*. Biotica Publishers, India. pp. 97-107.
- Rijal, S.P. (2019). Pollinators deficit on rapeseed, buckwheat and bitter gourd production in Chitwan, Nepal. PhD dissertation, Institute of Agriculture and Animal Science, Postgraduate Program, Kirtipur, Nepal.
- Rijal, S.P., Thapa, R.B., Sharma, M.D., Sah, S.K. & GC, Y.D. (2018). Bee floral calendar of cultivated and wild plants available in different agroecosystems of Chitwan, Nepal. *International Journal of Research*, 6(11), 222-245.
- Scott-Dupree, C. (2015). Non-*Apis* Bees and Insecticides: Do they respond differently than honey bees (*Apis mellifera*). First National Conference on Protecting Pollinators in Ornamental Landscapes, 12-15 October, 2015, Kanunga Conference Center, North Carolina, USA.
- Sharma, K.K., Monobrullah, M., Mohanasundaram, A. & Ramani. R. (2016). Beneficial insect farming - Benefits and livelihood generation. ICAR-Indian Institute of Natural Resins & Gums, Ranchi (Jharkhand), India.
- Shivakoti, G.P. & Bista, S. (2001). Honey bee flora at Kabre, Dolakha district. *Nepal Agricultural Research Journal*, 4-5, 18-25. Doi: <https://doi.org/10.3126/narj.v4i0.4859>
- Shrestha, T.K. (2020). Basic learning for beekeeping. Bhawani Shrestha, Godawari-12, Lalitpur, Nepal.
- Sihag, R.C. (1997). Determining the required number of pollinators. In *Pollination Biology: Basic and Applied Principles*, Rajendra Scientific Publishers, Hisar, India. pp. 171-186.
- Subedee, S., Thapa, R.B. & Shrestha, T.R. (2024). Bee floral calendar of wild and cultivated plants in Pyuthan district, Nepal. *Journal of Agriculture and Forestry University*, 6(2), 63-76.

- TEPC. (2023). Trade and Export Promotion Centre. Ministry of Industry Commerce, Kathmandu, Nepal.
- Thapa, R.B. & Dangol, D.R. (1990). A preliminary survey of bee flora at IAAS and its vicinity. In IAAS Research Report, 1985-1991 (F.P. Neupane ed). Institute of Agriculture and Animal Science, Chitwan, Nepal, pp. 59-65.
- Thapa, R.B. & Pokhrel, S. (2007). An inventory of bee flora in Chitwan, Nepal. *IAAS Research Advances*, 2, 133-139.
- Thapa, R.B. & Sharma, D.R. (2024). Integrated management of rice insect pests. Proceedings of the International Plant Protection Symposium, 26-27 April 2024, Hyatt Plaza, Tahachal, Kathmandu, Nepal. pp. 115-125.
- Thapa, R.B. (2006). Honey bee and other insect pollinators of cultivated plants: A review. *Journal of the Institute of Agriculture and Animal Science*, 27, 1-23.
- Thapa, R.B. (2013). Pollinators and pollination: Insects. In P.K. Jha, F.P. Neupane, M.L. Shrestha and I.P. Khanal (eds.) Biological Diversity and Conservation Nepalpedia Series #2. Nepal Academy of Science and Technology, Lalitpur, Nepal. pp. 445-451.
- Thapa, R.B. (2024). Improving livelihood of rural people through beneficial insects and mushroom farming: Prospects and challenges. Proceedings of the International Plant Protection Symposium, 26-27 April 2024, Hyatt Plaza, Tahachal, Kathmandu, Nepal. pp. 126-133.
- Thapa, R.B. (ed.). (2008). Proceedings of the National Level Information Sharing Workshop on “Conservation and Management of Pollinators for Sustainable Agriculture through an Ecosystem Approach” Jointly Organized IAAS/MOAC, Kathmandu, Nepal, 18 July 2007 in Himalayan Hotel, Lalitpur, Nepal.
- Thapa, R.B., Baral, S., Shrestha, T.K., Kharel, L.P., Sukla, A.N., Pande, S. and Subedee, S. (2024). Basic beekeeping training manual (Nepali). Apiculture Development Center, Godawari, Lalitpur, Nepal.
- Thapa, R.B., Baral, S., Kharel, L.P., Shrestha, T.K., & Subedee, S. (eds.). (2025a). Beekeeping manual for training of trainers (ToT) officer level. Apiculture Development Center, Godawari, Lalitpur, Nepal.
- Thapa, R.B., Shrestha, T.K. & Subedee, S. (2025b). Native bees and their conservation. Proceedings of the National Plant Protection Workshop, 1 July 2025, Kathmandu, Nepal. pp. 102-116.