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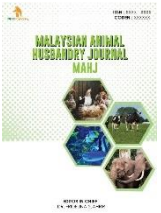

RESEARCH ARTICLE

OPPORTUNITIES OF BEEKEEPING IN KANCHANPUR DISTRICT OF NEPAL

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ABSTRACT

West Nepal, especially the Kanchanpur district, found lack of exploration in the opportunity of beekeeping. So, a survey was carried out in the households of 10 farmers in Bhimdatta municipality of Kanchanpur district. Field observation & Key Informant Interview (KII) were major methods of the study. The potential opportunities for beekeepers in Kanchanpur district include good forest coverage, existence of a variety of different species of vegetation which determines the quality of honey. On the other hand, opportunities in a reasonable state include availability of resources like hives and producers' perception for commercialization of beekeeping. Thus, the study area was found with potential opportunities of beekeeping or apiculture.

KEYWORDS

Beekeeping, farmers, hives, honey

1. INTRODUCTION

At global level the beekeeping enterprise is an imperative source for income generation both at rural and urban parts (Formato and Smulders, 2011; Mizrahi and Lensky, 2013; Rollin et al., 2016; Devkota, 2020). Honeybee provides ecological service that leads in management of ecosystems and further in crop pollination, then resulting in global food security (Potts et al., 2010; Bommarco et al., 2012; Tscharntke et al., 2012; Rollin et al., 2016). In agriculture, the role of honeybee is especially significant in flower plants and thus helps in flower fertilization and fruiting. It is recognized that beekeeping can assist in the sustainable development and resilient farmer livelihoods, that delivers the outsource of various market products such as pollen grains, propolis, bee wax, honey, etc. (Devkota et al., 2016; Devkota, 2020; Ismail, 2016). With lower expenditure and input, beekeeping has been well noticed as an economic strategy to strengthen self-reliance and employment generation, both in rural and urban parts of developing countries (Bradbear, 2009; Carroll and Kinsella, 2013; Deloitte, 2013). Most of the poor and vulnerable could be benefitted by engaging themselves and their families in apiculture. This helps them to gain a huge amount of money and expedite their family needs through this rerun.

In beekeeping, the producers must face numerous challenges in many parts of world that include consequence of climate change and environmental factors (fluctuations) such as through agrochemical poisoning, disease, and parasites, etc. that have long and short-term results in the development of beekeeping sector (Vanbergen et al., 2013; Henry et al., 2014; Odoux et al., 2014; Böhme et al., 2017; Jacques et al., 2017). These constraints directly and indirectly affect the growth and development of honeybees that declines their population and crop productivity, ultimately. Such decrease in honeybee species and beekeeping practice majorly hinders the combined effect of such variables and finally the yield or quality of the product (honey), in some specific sites, e.g., in 2005–2009 (FAO, 2016). These declines can have devastating results in the financial return of beekeepers in developing countries. Furthermore, fluctuations in honey yield and price associated with the effects of global change and suboptimal management generally raise the risk and uncertainty of beekeeping as a livelihood strategy. Farmers who are vulnerable and mostly marginalized are affected through the variation and threats caused in the economic inputs and outputs linked with beekeeping and beekeepers, this may have a serious outcome in their net return (Shiferaw and Gebremedhin, 2015). Keen study, financial literacy and technical management is utmost for better market-oriented production of honey.

A study found that out of five of the world's ten species of honeybees, in Nepal *Apis laboriosa* S., *Apis dorsata* F., *Apis florae* F., and *Apis cerana* F. including one exotic, however, well-established, and managed honeybee *Apis mellifera* L. are abundantly found, mostly in northern Himalayan region to the southern subtropical Terai region. It has been assessed that Nepalese farmers have reflected themselves as potential beekeepers in Nepal. Within limited years, Nepal has proved high productivity of honey in its local context. The Nepalese agricultural sector has been improved through continuous management of honeybee hives within an extended site of topography and environmental extremes, and in turn which also have provided support in growing the honeybee sector (Adhikari and Ranabhat, 2011; Aryal et al. 2015).

The beekeeping sector though has limited contribution (< 1%) in Agricultural Gross Domestic Product (AGDP); however, most politicians, investors and stakeholders have provided great concern and support for the sector's development and enhancement. For example, the beekeeping sector has been incorporated in the Agricultural Perspective Plan (APP) as a valuable part of a high value crop to focus producers targeting their income and marketable activities (Pokhrel et al., 2014). Likewise, the National Planning Commission (NPC) has also prioritized the scope and importance of honey production in the Tenth Plan (Pokhrel et al., 2014). Many other programs and plans have encouraged and supported apiculture that would surely promote rural and poor producers of honey in the local context. There is a huge scope of beekeeping in Nepal. Therefore, in this study we will understand various opportunities of honey production or beekeeping in the local context of Kanchanpur district.

2. MATERIALS AND METHODS

2.1 Study Area and Methodology

A survey was conducted in ward 9 and 18 of Bhimdatta municipality, Kanchanpur. The survey was carried out over six months between September 2017 and February 2018. To select participants of beekeeping

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a multistage sampling technique was deployed. Random stratified technique was used to select the participants. Throughout the list of beneficiaries of beekeeping a total of 10 beekeeping households were targeted considering them respondents in the district. Before conducting the survey all the participants were described in detail about the purpose and method of the questionnaire and study.

To collect needful facts and information a mixed method, including questionnaire surveys, KII (Key Informant Interview), and self/field observations were applied. The set of questionnaires was prepared in local language to facilitate and easily capture the required information in a short time. Before asking and discussing the matter, individuals were ensured for their understanding and re-ensured for the information they provided.

2.2 Statistical analysis

The recorded data were all tabulated and systematically arranged treatment wise under three replications using MS- Excel which were subjected to Analysis of Variance (ANOVA) and Duncan's Multiple Range Test (DMRT-0.05 level) for mean separations using Gen stat software (Gomez and Gomez, 1984).

3. Results and Discussion

3.1 Status of beekeeping

In the study areas, out of 10 beekeepers (M:8, F:2) with the age group 30-70, most of the beekeepers (60%) found with less than 7 years of experience and skills, some (20% with more than 10 years of experience and remaining (20%) with less than 1-3 years of experience in beekeeping. We found both traditional and modern methods of beekeeping. Producers just started modern beekeeping after 2000, however, the traditional method has been practiced from a long time back. We found farmers practicing both the types of beekeeping in a traditional way, i.e., long and wall hive making. It was recorded that 5 households (HHs) practice modern methods of beekeeping, 3 households (HHs) with traditional methods of beekeeping and 2 households (HHs) with both the types of beekeeping. The respondents shared that 40% of the beekeeping was for commercial purpose while remaining for their own use/consumption. It was observed that there were 50 numbers of modern hives and 5 numbers of traditional hives (Table 1).

Table 1: Modern vs. Traditional honeybee hives

Types of hives	Number (s)	Percentage (%)
Modern hives	50	90.90
Traditional hives	5	9.09
Total hives	55	100

3.2 Income of beekeepers

It was found from the survey that significant numbers of commercial farmers have been increasing average annual income from beekeeping enterprises. Most of the honey producers or respondents found rising income after selling their surplus product except 5 respondents (Table 2). Such studies were supported through the investigation of and in such investigation it has been clear that beekeeping enterprise improves the livelihood and resilience capacity of an individual with profitable income all year round (Amulen et al., 2019). In another research carried revealed that beekeepers are highly profited through the market selling of good quality honey products, especially in local sites (Schouten, 2020). Honey has great demand, and it has been challenging for Nepal to be self-sufficient for its own citizens. People are importing better quality honey from some other cities or countries to fulfill their need.

Table 2: Average income of beekeepers

	Average annual income in 2014 (NRS.)	Average annual income in 2015 (NRS.)	Average annual income in 2016 (NRS)
Participant 1	100,000	120,000	150,000
Participant 2	80,000	120,000	160,000
Participant 3	120,000	130,000	135,000
Participant 4	140,000	140,000	145,000
Participant 5	50,000	70,000	100,000

3.3 Opportunity for beekeeping

From the study it was identified that most of the farmers were involved in agronomy, horticulture, and floriculture. The study has forest coverage where the respondents have been engaged in agricultural tasks, especially in beekeeping. It was found that a significant ratio of respondents (60% respondents) benefited from the forest, while potential honeybees directly profited from the biodiversity present in the forest coverage (80% respondents). Some producers claimed (20%) that there were certain opportunities and facilities which were lacking in hive making and vessel storage (Table 3).

Both the types of beekeeping, i.e., modern, and traditional were observed in the district. Producers focus for better return and profits through the modern method of apiculture or beekeeping. It was found that the highest respondents (90.90%) were engaged in improved hives in the study area. Through a similar study conducted in the plain part of Nepal, it was identified that there were lower volumes of improved hives (41.1%) in those sites compared with our study site (Pokhrel, 2009). According to Beekeeping section (2000), in Chitwan district (plain area as that of study site) most of the farmers have been involved in commercial production of honey through beekeeping, however, only 40% of them shared that they have been doing so as their major economic intervention in the district. Increasing numbers of beekeepers could be observed in the villages of Nepal, where they have been seeking modern and advanced methods of apiculture for quality and quantity production of honey; so that their product could be linked at local or national settings.

The adoption of *A. mellifera* could be observed in plain part of country with improved hives, and *A. cerena* with all improved (41.1%), traditional log (31.2%) and wall hives (27.6%) in hilly region of Nepal (Pokhrel, 2009). In many parts of Nepal, the development and progress of modern honeybee hives could be observed. Most of the producers are still struggling and seeking the support for quality products and extended opportunities from beekeeping. It has been found that the richness in biodiversity with variable vegetation species, forest cover including multi-varietal flowering plants are important sources for quality honey products, whereby producers improve their involvement in this sector. This not only improves individual wellbeing, but also increases living standard of local people in the district leading towards minimized poverty and food insecurity.

Table 3: Opportunity of beekeeping

Potential opportunities	Numbers			Percentage (%)		
	Yes	No	Total	Yes	No	Total
Coverage of good forest	6	4	10	60	40	100
Variety of vegetation	4	1	5	80	20	100
Easy availability of modern hives	2	8	10	20	80	100

4. Conclusion

During September 2017 to February 2018 a survey was conducted in ward 9 and 18 of Bhimdatta, Kanchanpur. Mixed methods of KII (Key Informant Interview) and field observation including key questionnaires were used as survey tools for 10 beekeeping households. The study was carried out to understand various opportunities of beekeeping in the district. The potential opportunities in the study site include good forest coverage, with varieties of vegetation to enhance the quality of honey. Producers were observed with reasonable access with hives and inputs for commercial production of honey. In the study site, modern hives were found dominantly exceeding traditional hives for beekeeping.

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