ECONOMIC ANALYSIS OF BEEKEEPING ENTERPRISES IN DANG DISTRICT, WESTERN NEPAL

A Dissertation Submitted to the Office of the Dean, Faculty of Management in Partial Fulfillment of Requirement for the Master's Degree

By

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has been prepared as approved by this campus in the prescribed format of the faculty of management. This thesis is forwarded for examination.

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We have conducted the viva-voce examination of the thesis

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and found the thesis to be the original work of the student and return according to the prescribed format. We recommended the thesis to be accepted partial fulfillment of the requirement for the degree of master of business studies (MBS).

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DECLARATION

I hereby declare that the thesis entitled "**Economic Analysis of Beekeeping Enterprises in Dang District, Western Nepal"** submitted to office of the Dean, Faculty of Management, Tribhuwan University (TU), is entirely my own work in the form of partial fulfillment of the requirement for the Degree of Masters of Business Studies (MBS) under the supervision of my thesis guide **Asso. Prof. Dr. Kapil Khanal** of Shankar Dev Campus Campus, T.U.

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ACRONYMS AND ABBREVIATION

AEC	:	Agro Enterprise Center
ASC	:	Agricultural Service Center
DADO	:	District Agriculture Development Office
FGD	:	Focus group discussion
FNBK	:	Federation of Nepal Beekeepers
FNCCI	:	Federation of Nepalese Chamber of Commerce and Industry
ICIMOD	:	International Center for Integrated Mountain Development
INCLUDE	:	Inclusive Development of the Economy Programme
INGOs	:	International Non-Governmental Organization
Kg	:	Kilogram
KIS	:	Key informant survey
MDD	:	Marketing Development Division
MT	:	Metric Ton
NARC	:	Nepal Agricultural Research Council
NRs.	:	Nepalese Rupees
PMAMP	:	Prime Minister Agriculture Modernization Project
Pvt. Ltd.	:	Private limited
SPSS	:	Statistical Package for the Social Sciences
SWOT	:	Strengths, Weaknesses, Opportunities and Threats

ABSTRACT

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This study was conducted to carry out an in-depth analysis of production economics and SWOT analysis of honeybee sub-sector in Dang district from February to March 2023. Out total 155 beekeepers registered in Bee Zone, Dang, 60 beekeepers were selected (30 from each sub metropolitan city – Ghorahi & Tulsipur) for interview by using simple random sampling technique Personal interview, focus group discussion and key informant survey methods were used for primary data collection whereas secondary data were collected from topic related publications of various institutions. Each bee-keeper with more than 20 hives was only considered for interview. In the respondent households, honey was found to be major apiary product and bee wax was the major by product. The average number of bee hive per farm in the case of *Apis mellifera* was 105.06 hives and average honey production per annum was 24.9 kg/hive. The gross return per hive and benefit cost ratio of honey production in the study area was found to be NRs. 15120 and 2.36 respectively. The gross margin was NRs. 8689.

Furthermore, indexing identified declining pasture and high competition with foreign honey as the major problem associated with the production and marketing of honeybee products, respectively. This research explored the existing scenario of honey production economics, marketing channels, SWOT analysis and major constraints in the study area.

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1. INTRODUCTION

1.1 Background of the study

Apiculture is the science and practice of beekeeping, including honey hunting. Codex Alimentarius defines honey as "the natural sweet substance, produced by honeybees from the nectar of plants or from secretion of living parts of plants, or excretion of plant-sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in honeycombs to ripen and mature" (FAO). Beekeeping is one of the promising agricultural enterprise for economically poor families. Nowadays, large number of Nepali farmers, especially rural dwellers, rely on beekeeping sector for their livelihood (Neupane and Saebjoernsen, 2014). Smallholder and marginalized farmers can also practice bee-keeping at low capital investment and less management, with profitable returns (Verma, 1990; Neupane and Saebjoernsen, 2014). Despite huge potential of apiculture development in the country, several impediments have hindered the production and rearing of bee. Owing to this fact, only 1% of the part of Agricultural Gross Domestic product has been contributed by beekeeping enterprises (Devkota, 2020) **&** (Panthi, 2013)), Out of nine species of honeybee found in the world, five species are of economically importance and have been found in Nepal viz. *Apis mellifera, Apis cerana, Apis dorsta, Apis laboriosa,* and *Apis florea* making treasure house of honeybee (Devkota, 2020). *A. cerana* is being reared traditionally in wooden log hives by farmers of rural area of hilly and Himalayan region whereas both *A. mellife*ra and *A. cerana* are reared in modern bee hives by the farmers from inner-terai, terai, and lower mid-hill regions. According to GoN, modern beekeeping was actually started in 1995, with the introduction of *Apis mellifera.* (GoN, Annual Report , 1994-1995, 1995). Beekeeping enterprises has been playing crucial role in the livelihoods improvement of rural communities in three native dynamics; one: generating activities, two: medicinal value of honey; three: it supports agricultural production through pollination activities via honeybee. (KC, Bhusal, & Kafle, 2021). In Nepal Beekeeping is done primarily for honey production (Bhandari & Kattel, 2020)). Besides this, market demand for other products such as wax, propolis, pollen, and bee venom, queens and their

larvae is also high and are primary bee products of the country (Bhandari & Kattel, 2020). Further, the pollination activities of honeybee are worth 143 times than the value of honey and other product they produce. (Neupane 2006).

Dang has been an agrarian hub since antiquity. Moreover, being endowed with abundant bee flora, diverse pastoral-forests availability, and apposite climatic conditions has added to the prospect of apiculture in Dang (DADO, 2016). Modern and traditional bee hives for *A. mellifera* and *A. cerana* counted for 10532 and 2178 respectively (DADO, 2016).

1.2. Statement of problem

Honey is the newly identified agricultural commodity for export potential. It has high level of production potential in the high hill belt of Nepal. Large amount of honey produced is exported to the Indian market. Beekeepers in Dang are predominantly smallholders and each produces honey products in less quantity. They have less control over the honey-products market. According to Bee Zone, Ghorahi under PMAMP; Poor infrastructural development, outdated and obsolete honey production technologies, improper post-harvest preservation and management practices, lack of access to market information, less, limited knowledge on value-addition schemes have constantly limiting beekeeping practices in study district. Inadequate bee research program, data on bee floral identification, pesticide use, low product quality control, low quality management of bees, colony migration and disappearance are major constraints for beekeeping in Nepal (Bhandari & Kattel, 2020)). The farmers are indulged in honey production only. However, most farmers are completely nescient about production of other honey products like royal jelly, venom, propolis, pollen, etc. from which they could have earned comparatively higher than just honey production (Thapa, Aryal , & Jung, 2018) .

Lack of knowledge about suitable management practices has reduced total honey production than that is expected to produce in Nepal (Thapa, Aryal , & Jung, 2018). The overall productivity of honey in 2019 AD has reduced by 29% than that of previous year (Dhakal et al., 2017). There is no consideration of smallholder rural beekeepers in policy-making, subsidy schemes, and trainings (Partap et al., 2017) and are not getting desirable returns (Paudel, 2017). Government agencies were not being able to address the key production problems and meet the expectation of the beekeepers (Joshi, 2004). Therefore, strategies should be made giving importance to the rural

beekeepers regarding to training programs, and providing them with improved market condition. Only then the present condition of apiculture can be encouraged to reach the commercial level.

1.2 Rationale of Study

Many researches have already been carried out in view of production and management strategies of beekeeping in different parts of the country Economic analysis of Production and marketing system of *Apis mellifera* (Budhathoki-Chhetri et al.,2021) ,Production and management of honeybee in Dang, Nepal (Kc et al.,2021), Beekeeping: Sustainable Livelihoods and Agriculture Production in Nepal (Devkota, 2020), *Pro-poorvalue chain development for A.cerena honey: Potential benefits to smallholder A.cerena beekeepers in tje Hindu kush Himalaya.* Kathmandu (Partap et al., 2017) etc. However, limited study has been performed Dang valley. Dang, being directly connected to India in the south, has high export potential of honey. This leads to a high chance of market absorption of honey products. However, the farmers are still not able to fulfill the national demand of honey requirement. All these reasons hold the necessity to perform a research on this subject in Dang district, where production potential is substantial but actual production is low. Profitability analysis and management practices will be the key concern in this study. The problem particularly lies in the conventional and faulty management practices and this study mainly focuses on the production and management strategies for successful beekeeping for good economic returns. It will be a useful reference to the concerned stakeholders in formulating and implementing effective plans and policies to promote this enterprise. Further, this study will provide clear insights into knowledge that would help farmers adopt technologies that provide them the maximum benefits.

1.4 Objectives of the study

The general objective of this study is to analyze the economics of production and marketing of honey, and major constraints of honey bee sub-sector in Dang, Nepal.

The specific objectives will be as followed.

1. To identify the major existing channels, strategies and problems in honey marketing in the study area
2. To estimate the costs and returns in honey production from *Apis mellifera*
3. To analyze major Strengths, Weaknesses, Opportunities and Threats (SWOT analysis) of honey production and marketing

2. LITERATURE REVIEW

2.1 Status of Honey production in Nepal

There is increase of bee hive number and productivity for honey in Nepal at higher rate from 2013/14 to 2014/15 and slight increment was found 2014/15 onwards (figure 1). This increment was due to practicing of modern beekeeping technology, increase in rearing of *apis mellifera*, cultivation of bee pastures and trend of bee foraging.

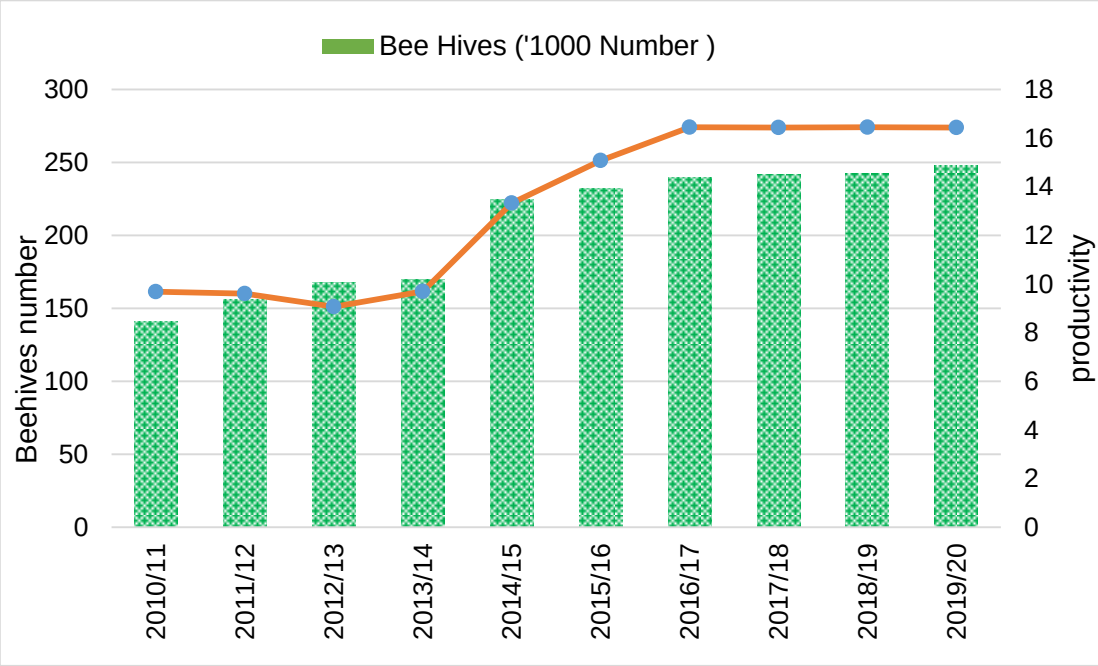

Figure 1 Trend of Honey Production in Nepal for last 10 years

Source: (MOALD, 2021/22)

It is found that, contribution of natural honey to AGDP of Nepal was declined from year 2005/06 to 2010/11 and increment was found 2015/16 onwards (figure 2). This shows that beekeeping is a potential agricultural subsector in Nepal in terms of farmer's individual economy and national economy upliftment.

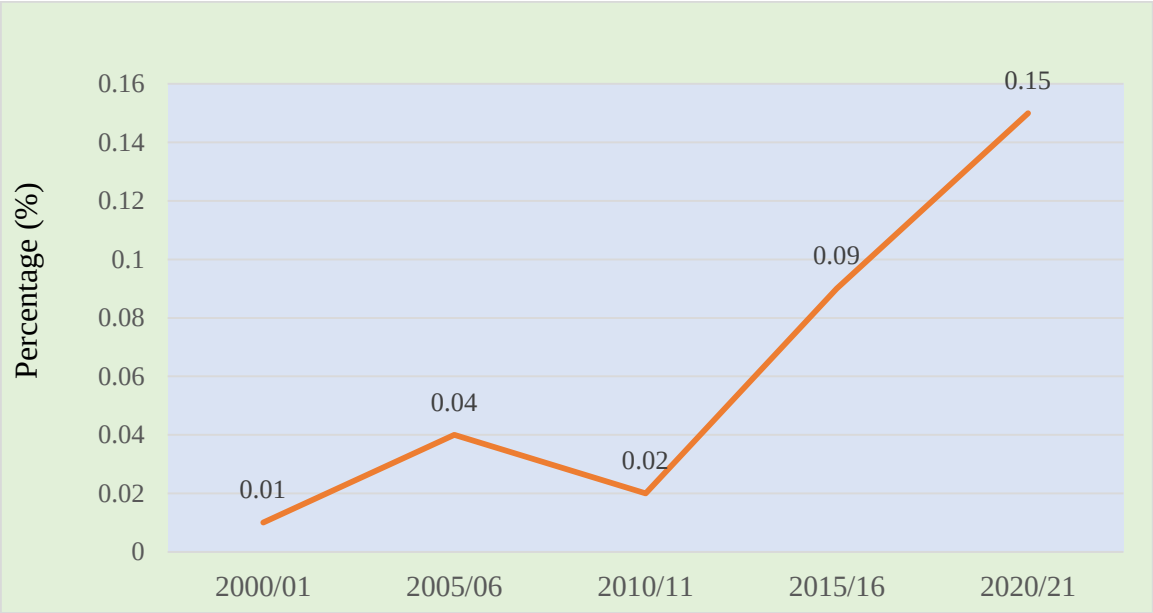

Figure 2 Trends of honey contribution to Agriculture GDP in Nepal

Source: (MOALD, 2021/22)

2.2 Economics of honey production

The benefit from honey production and other bee products are account in National economy but the benefit from crop pollination service of bee is completely forgotten (Pokhrel, 2009). In Nepal honey acts as the major bee product from which economic benefits are taken but its production is seasonal and depend upon various factors such as availability of different bee flora in between the period of November to April, scale of production, management practices and migration of colonies to various locations (INCLUDE, 2014).

Government sector started to provide data related honey only from 1996/97 (MOALD, 2017). Studies on beekeeping economics for different places showed the different data of honey production for that particular place at particular time. Beekeeping in Dang District contributes 14% to the national honey production (Kc et al., 2021, Tyalor, 2014). Average honey yield from *A. mellifera* in Dang district of Nepal was per year 31.2 kg/ hive (Kc et al., 2021) , 23.5kg/hive (Budhathoki-Chhetri1*, 2021), in Bardiya district of Nepal 34.6 kg/hive (Shrestha, 2017) , in Dang district 33.02 kg/hive (Paudel, 2003), in Haryana India 40 kg/hive (Sain & Nain, 2017) in Alberta 58.97 kg/hive and in Canada 5.79 kg/hive (Laate, 2006) in Bhutan 63 kg/hive (Pratap, et al., 2017).

2.2.1 Cost of honey production

Out of various input require for beekeeping, off-season feeding materials such as sugar/honey and human labor are most important (Paudel, 2003). Fixed cost include depreciation on bee colonies, beehives and other various tools and equipment used in apiary (Devota, 2006). Sapkota (2006) has stated that beekeeping enterprise require less inputs than other agriculture enterprise rather it need sufficient bee flora and slightly higher initial investment. He also mentioned that variable cost of beekeeping includes the labor cost, sugar and honey for off-season feeding, migration cost disease and pest control expenses and maintenance of hive. Cost of production of honey found on economic analysis in various places are mentioned here. Average variable cost honey production in Dang, Nepal was 4581.24 NRs and total fixed cost of honey production was 6322.57/hive/year (Budhathoki-Chhetri1*, 2021), in Chitwan, Nepal 1,427.59/hive/year (Paudel, 2003) NRs. 832.97/hive/year (Devota, 2006), NRs.4,370.57/hive/year (Dhakal, Regmi, Sha, & Khatri, 2017) and total cost of honey production in Chitwan, Nepal was NRs. 2,703.5/hive/year (Devota, 2006) NRs. 2,526.6/hive/year (Devkota, Dhakal, & Thapa, 2016) in Bardiya, Nepal NRs. 4,405.47/hive/year (Shrestha , 2017).

2.2.2 Gross return, Margin and benefit cost ratio of honey production

Gross return is the multiplication of total volume of product from beekeeping and average price of the product at harvesting period and gross margin is the difference between gross return and variable cost of production related to the particular enterprise (Dillon & Hardaker, 1993).

Gross margin from honey production is largely depend upon the scale of production (Paudel, 2003; Sapkota, 2006). Revenue from honey, wax and sale of bee colonies are the major benefit taking in to account from beekeeping (Devota, 2006). According to research findings, gross return and margin from honey production in Dang Nepal were NRs 9862.84 and 5281.60 ((Budhathoki-Chhetri1*, 2021), in Chitwan, Nepal were NRs. 4,038.03/hive and NRs. 2,610.44/hive (Paudel, 2003), NRs. 4,475.23 and NRs. 1,948.57 (Devkota, Dhakal, & Thapa, 2016), NRs. 7,482.12/hive and NRs. 3,111.55/hive (Dhakal, Regmi, Sha, & Khatri, 2017) in Kavrepalanchowk, were NRs. 150.01/kg and NRs. 79.90/kg (Sapkota, 2006) in Bardiya, gross return was NRs. 7,392.52/hive (Shrestha, 2017). Gross margin per kg of honey in Kailali was

65.3 %, in Surkhet 86.8 %, in Dang 96.9 %, in Pyuthan 112.6 % (INCLUDE, 2014). Also Benefit cost ratio of honey production in Dang was 2.15 (Budhathoki-Chhetri1*, 2021) Dang, Nepal was 2.41 (Devota, 2006), 1.81 (Devkota, Dhakal, & Thapa, 2016), 1.7 (Dhakal, Regmi, Sha, & Khatri, 2017) in Kavrepalanchowk, Nepal was 2.10 (Sapkota, 2006) in Bardiya, Nepal 1.67 (Shrestha , 2017) in Bangladesh 2.831 (Islam, Chhay, Mian, & Nasry, 2016) in Srinagar and Pulwama district of Jammu Kashmir were 1.47 and 1.54 respectively (John, Dar, Beigh, Bhat, & Dar, 2017).

2.3 Economics of honey marketing

Rhodes (1987) stated that agricultural marketing commonly involves many transactions between farmers, various types of agribusiness and household consumers. Primary constraint in development of beekeeping is the marketing of hive products (Abrol, 1997). When number of intermediaries in marketing channel increases the producer's share drastically reduces (Chuhan & Singh, 1998).

A market is a point, or a place or sphere within which price making force operates and in which exchanges of title tend to be accompanied by the actual movement of the goods affected (Backman & Davidson, 1962). The concept of exchange and relationships lead to the concept of market. It is the set of the actual and potential buyers of a product (Kotler & Armstrong, 2003).

Adcock, Halborg & Ross (2001) states marketing as 'The right product, in the right place, at the right time, and at the right price'. According to Kotler (1980) 'Marketing is the human activity directed at satisfying human needs and wants through an exchange process'. Kotler (1991) states marketing as a social and managerial process by which individuals and groups obtain what they want and need through creating, offering and exchanging products of value with others. Acharya & Agrawal (1999) state that production is the door to economic development but, which opens the lock is marketing and it aims at satisfying the customers through the exchange relationship to obtain organizational objectives.

Marketing starts with the decision-making questions like 'what', 'when', 'how much' and 'where'. According to Thompsen (1952), agricultural marketing comprises all the operations, and the agencies conducting them, involved in the movement of farm produced foods, raw materials and their derivatives. It also involved marketing cost, organizational structure, rules and regulation,

and market competition (MDD, 1999). Kaini & Singh (1998) defined agricultural marketing as a process, which includes farmer's decision to produce a saleable farm commodity and various aspects of marketing structures and system, both functional and institutional with technical and economic considerations including products assembling, preparation of market distribution, and use by final consumer.

2.4 Problems in honey bee rearing

During the winter, most Apis cerana colonies are reduced because of the harsh weather and the low number of flowers. Nevertheless, compared to *A. mellifera*, *A. cerana* can survive in low temperatures (i.e., -0.1 °C) (Thapa & Aryal, 2015) because their beehives (i.e., log hive) can protect themselves from the cold. Furthermore, *A. cerana* is resistant to the parasite, Varroa destructor. The acarid breed feeds on bee' larva. *A. mellifera* is very sensitive to this parasite and causes incapacity to fly, an abdominal malformation and appearance of cannibalism (Wikipedia, 2000) Due to deforestation, and over-harvesting, the cliff-nesting species, *A. laboriosa*, is in an alarming decline.

Honey Bees are susceptible to various kinds of disease and pests. *Apis mellifera* in Nepal is susceptible to various kind of fungal and bacterial diseases and are most susceptible to parasitic mite infestation mainly Tropilaelaps *clareae.*

3. RESEARCH METHODOLOGY

3.1 Study site

Dang is a leading of honey producing district in Nepal, as it contributes 14 percent of honey production of the country (Budhathoki-Chhetri et al.,2021). The reason behind the selection of Dang district for this study includes; suitable climatic condition for rearing of *Apis mellifera* and large number of farmers are involved in beekeeping for their livelihood, there are two sub-metropolitan cities and a rural municipality demarcated as the Bee zone by PMAMP, easily accessible for the researcher thus more affordable as travelling expenses are concerned and the area also has fair roads that are passable throughout the years.

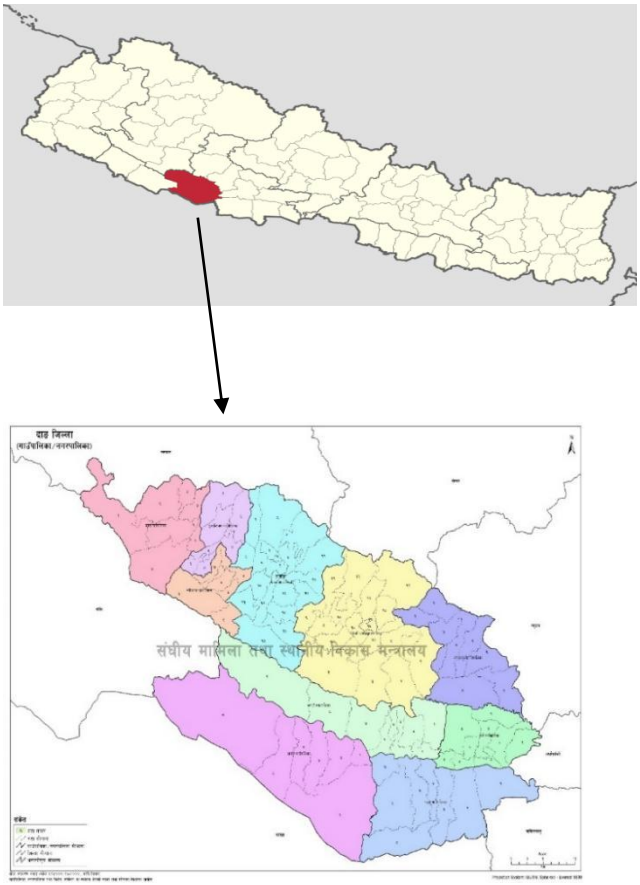

Figure 3 Map of Nepal showing study area

3.2 Population sample and sampling technique

There are altogether 155 registered farmers in bee zone. All the beekeepers in the zone area are the population for the research (Ghorahi sub metropolitan and Tulsipur sub metropolitan. The respondents were randomly selected. Altogether, (number) respondents were selected for interview by simple random sampling technique along with 2 FGDs. Pre-testing of the questionnaire was also carried out in 10 respondents which was selected randomly.

The sample size was determined by Cochran's formula:

$$n = \frac{N}{1 + Ne2}$$

Where,

N= sample size, N = population size, e = margin of error

3.3 Research instruments

Interview using semi-structured interview schedule was carried out for primary data collection. Different checklist was prepared to collect information from the beekeepers. Production level economic details was collected with interview schedule taking farmers as the respondent. Information on management practices and major constraints was also taken with interview schedule.

3.4 Data and data types

Both primary and secondary information was collected during research study. The primary sources of information were all the beekeepers selected for interview. Secondary information was collected from different articles, reports, journals, books and internet materials related to bee products production and marketing, management approaches.

Primary data was collected by Key Informant Survey (KIS), Focus Group Discussion (FGD), Interview and Questionnaire Survey.

Key Informant Survey (KIS):

Key informants are the local leaders and progressive farmers. An interview with them will allow knowing about the present policies and working of value chain. Triangulation is important with this research tool so people from different backgrounds were interviewed and their answers compared (Macgregor & Kanji, 2005).

Interview:

Both the structured and semi-structured interview was conducted with the local residents, local experts, officials and concerned stakeholders.

Focus Group Discussion (FGD):

FGD was conducted in the final session of data collection to verify the result obtained with the help of questionnaire survey. Two FGD was done.

Secondary data was obtained by the desk survey, library study, and data from Agriculture Knowledge Centre, Federation of National Beekeepers and other similar organizations. The literature of concern was gone through to collect the relevant information. Person and organization currently working or had worked on similar tasks were also consulted.

3.5 Techniques of data analysis

The collected data was entered and analyzed by using Microsoft Excel 2010, Statistical Package for Social Sciences (SPSS 25.0 V) and Microsoft Word 2020 was used for word processing.

3.6 Demographic and beekeeper's characteristics analysis

Descriptive statistical tools such as frequencies and percentage were used for analysis of different variables like gender of respondents, education status, training and subsidy received, and others too.

3.7 Economic analysis

This section includes the analysis of gross margin, net margin and benefit-cost ratio obtained from honey and other products in the study area.

3.7.1 Cost of production of honey

Both variable costs and fixed costs were considered to determine cost of production. Variable cost includes labor, comb foundation, supplementary feeding, medicines, migration cost and cost of beehive repair and maintenance. The labor cost includes cost of both family and hired labor. And fixed costs include bee colony cost, hive cost land rent cost and hive tools cost. All cost was valued at current market price.

Total variable cost = C. labor+ C. feeding+ C. drugs+ C. comb + C. migration + C. repair and maintenance+ C. marketing

Where,

C. labor = Cost on human labor used (NRs/hive)

C. feeding = Cost on supplementary feeding (Sugar + pollen + honey) used (NRs/hive)

C. drugs = Cost on drugs (NRs/hive)

C. comb = Cost on comb foundation (NRs/hive)

C. migration =Cost on migration of bee hives (NRs/hive)

C. repair and maintenance = Cost of repair and maintenance of beehive (NRs/hive)

C. marketing= cost of marketing (NRs/hive)

Total fixed cost= bee colony cost+ land rent cost+ hive cost+ hive tool cost

3.7.2 Analysis of gross margin in honey production

The gross margin of a particular enterprise is the difference between the gross revenue earned and the total costs incurred. It is a simple and quick method of planning changes in activities or analyzing a farm enterprise. In this analysis, gross margin was calculated taking hive equipment cost, feeding cost (artificial feed+ natural flora), repair & maintenance cost, labor cost, migration cost, marketing cost and cost of drug & other chemicals incurred during beekeeping.

Mathematically, GM= GR-TC

Where, GM= Gross Margin (NRs.)

GR = Gross Revenue (NRs.)

TC= Total Cost (NRs.)

3.7.3 Analysis of benefit cost ratio

Benefit cost ratio is the ratio of gross revenue with total cost. It is interpreted as the return received on the costs of one rupee.

Mathematically, Benefit Cost Ratio (BCR) = Gross Revenue/ Total Cost

3.8 Index of production and marketing problems

Scaling technique provides the direction and attitude of the respondents towards propositions. Farmer's perception towards the production and marketing problems can be presented by fivepoint scale comprising most serious, serious, moderate, a little bit and the least serious. The scale value of 1, 0.8, 0.6, 0.4 and 0.2 was used to most serious, serious, moderate, a little bit and the least serious problem, respectively. It was computed using the following formula. Mathematically, $Iimp = \Sigma (S_i f_i/N)$

Where, Iimp = Index of importance

Σ = Summation

S_i = Scale value

Fi = Frequency of respondents

N = Total number of respondents

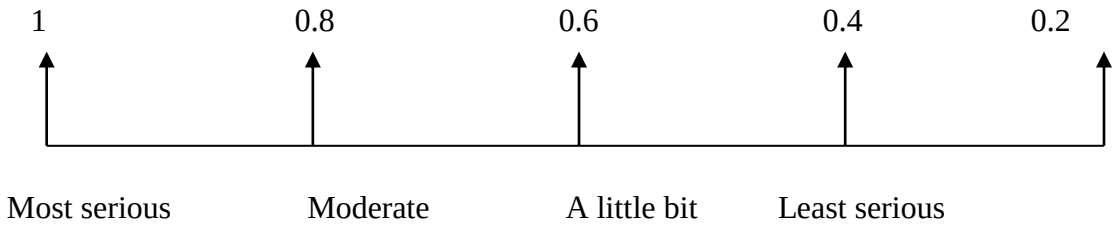

Figure 4 Ranking of scale

3.9 SWOT analysis

SWOT analysis is the scan of internal and external environment and is powerful tool in value chain analysis of agricultural products. The strength, weakness, opportunities and threats related to honeybee subsector was analyzed from field and market survey, FGD and KII.

Parameters	Internal	External
Positive	Strengths	Opportunities
Negative	Weaknesses	Threats

Figure 5 Concept of SWOT Analysis

3.10 Conceptual framework:

Conceptual framework (figure 6) illustrates different factors affecting honey production. Socioeconomic factors such as; Age, education, economically active members, income, number of beehives and years of experience of farmers on beekeeping are found directly and indirectly affecting honey production. Figure 6 also shows different problems and constraints such as; disease-pest, limited technical knowledge limited bee flora, unfair pricing system are decreasing the honey production. However, extending technical knowledge about modern beekeeping, extending market information, technical and economical support from government agencies, SWOT analysis of beekeeping enterprises could improve prove production and marketing of honey.

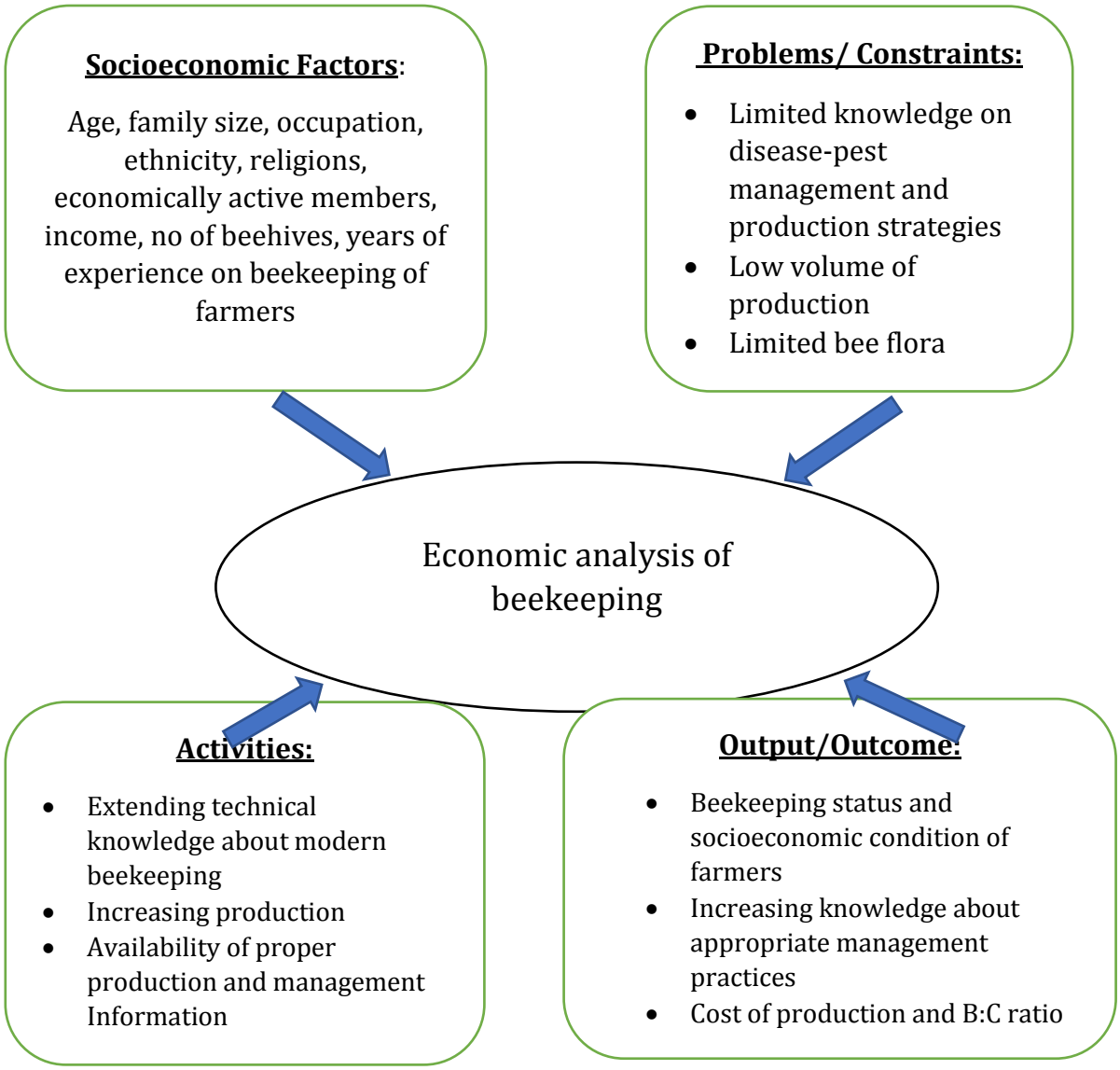

Figure 6 Conceptual framework of the stud

4. RESULTS AND DISCUSSIONS

4.1 Socio-economic and demographic characteristics of the respondents

The overall average age of respondents/decision maker was found to be 40.05 years. The average age of respondents from large holders (43.21 years) was found higher than that of small and medium farmers (37.13 years). The average farming experience was found to be 10.05 years which was found higher in large holders than that of small and medium farmers (Table 1). This showed that beekeepers start the enterprise with small and medium holding and with the progression of their experience and by continuous colony division they become large holders.

The average family size of the studied area was found to be 5.23. Similarly, the average number of male members in the sampled households was found to be 2.88. The average number of male members among large holders (2.66) was found statically lower than that of small and medium holders (3.1) at.

Similarly, average number of female members was found to be 2.37. The average farming experience was found to be 10.05 years which was found statistically higher in large holders than that of small and medium farmers. The details are presented below.

Table 1: Socio-economic and demographic characteristics (continuous variables) by bee hive size category

Variables	Small and medium 30 (50%)	Large 30 (50%)	Overall, 60 (100%)
Age of the respondent	40.06	37.13	43.21
Education of the respondent	9.43	8.74	10.17
Family size	5.23	5.26	5.21
Number of male members	2.88	3.1	2.66
Number of female members	2.37	2.19	2.55
Years of beekeeping	10.05	7.71	12.55
Total number of honey harvest	6.37	6.35	6.38
Annual income	2334927	1648599	3068588
Annual expenditure	1205832	862603	127586

Brahmins are the dominant group in the society with an average of 41.6% households followed by Janjatis (33.3%) and Dalits (25%). Respondents were equal in number from both Ghorahi (50%) and Tulsipur (50%). Among them small holder farmers (60%) are found higher than large holder farmers (46.6%) in Ghorahi sub metropolitan. On the contrary, large holder farmers (53.3%) were higher as compared to small holder farmers (40%) in Tulsipur sub metropolitan. Majority of honey sale was found to take place in wholesale only (46.6%) followed by both

wholesale and retail (28.3%) and retail only (25%). Subsidies were taken by respondents from government agencies (63.3%). Obtaining subsidies was found statistically higher in case of large holder farmers (90%) than small and medium holder farmers (36.6%). Similarly, majority of respondents have attended some form of training (65%) from government agencies. Attending training was found significantly higher in large holders (86.6%) than small and medium holders (43.3%).

Table 2: Socio-economic and demographic characteristics (categorical variables) by bee hive size category

Variables	Small and medium 30 (50%)	Large 30 (50%)	Overall 60 (100%)
Ethinicity			
Brahmin	12(40)	13(43.3)	25(41.6)
Janjati	11(36.6)	9(30)	20(33.3)
Dalit	7(23.3)	8(26.6)	15(25)
Address			
Ghorahi sub metropolitan	18(60)	14(46.6)	30(50)
Tulsipur sub metropolitan	12(40)	16(53.3)	30(50)
Selling tendency of honey			
Wholesale only	16(53.3)	12(40)	28(46.6)
Retail only	9(30)	6(20)	15(25)
Both wholesale and retail	6(20)	11(36.6)	17(28.3)
Subsidies obtained (YES)	11(36.6)	27(90)	38(63.3)
Training attended (YES)	13(43.3)	26(86.6)	39(65)

4.2 Reasons for Beekeeping:

Beekeeping is being popular among the farmers of Dang in study area. There were four categorizations for motivating factors for bee keeping which was taken for study. Among them, 15 % of the farmers were following the tradition, 40 % of the total respondents were influenced from peers, 40 % of the total respondent were influenced from other beekeepers visiting the site for foraging bees and only 5% were following continuing beekeeping regarding technical backup from various I/NGOS.

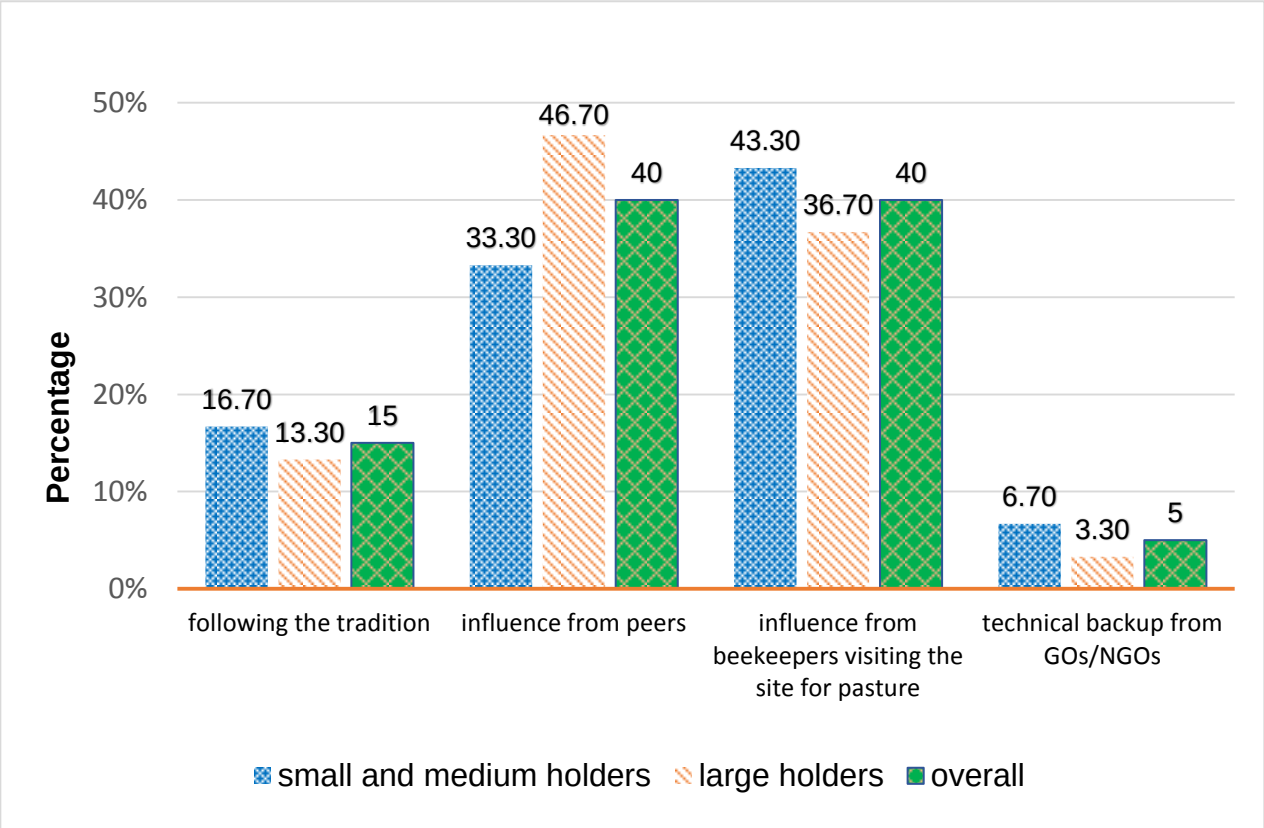

Figure 7 Reasons for beekeeping

4.3 Management practices:

The high degree of management practices followed by beekeepers enable them for higher return and smooth running of enterprise. In the study area, 90% of respondents practice artificial Queen Bee production. Likewise, 96.7 percent of total respondents use comb foundation, 61.7 % of total respondents use super in their hive and only 36.7 % of total respondent has carried out insurance of honey bees. The difference in management practices by bee hive size category was found statistically non-significant which is shown in Figure 4.3.

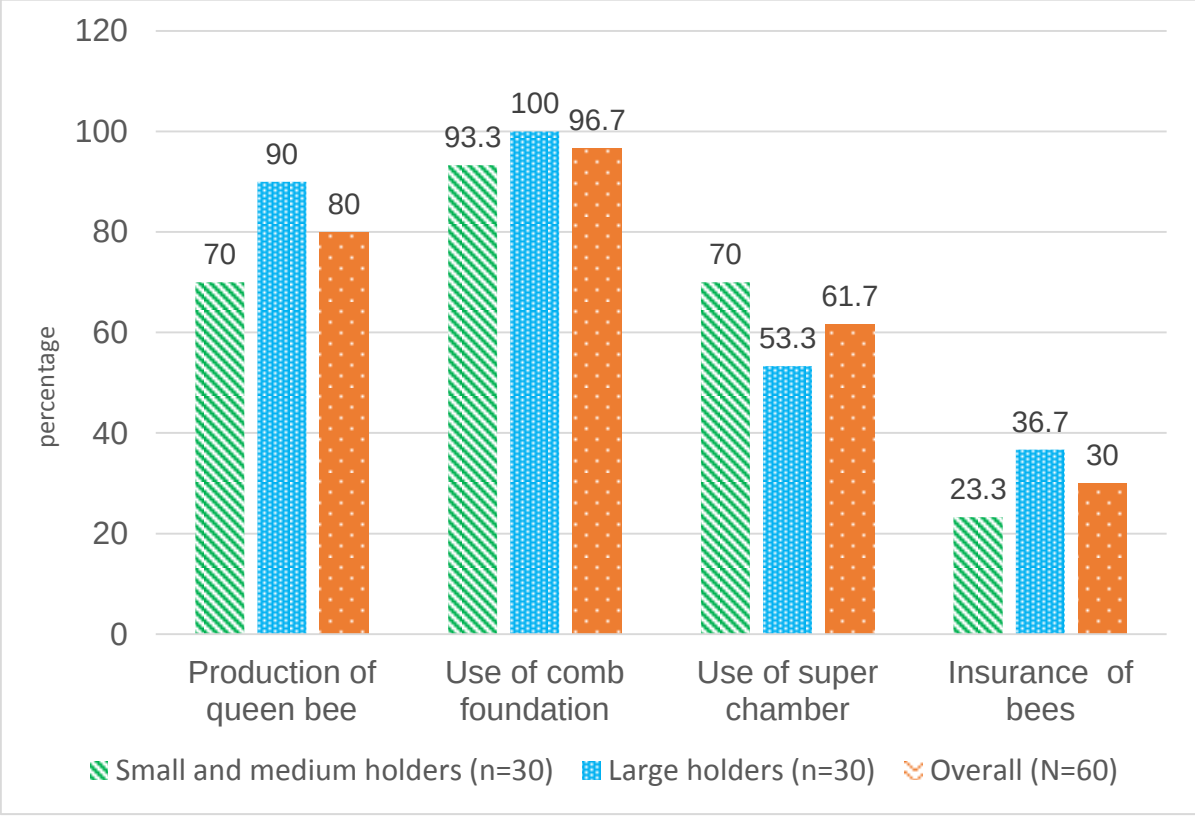

Figure 8 Management Practices

4.4 Control of parasitic mites

The infestation of mites was found as the major problems among best keepers during FGD and household survey. Formic acid (48.3%), Apistand (55%), volatiles like Sancho (43.3%) and plant extracts (41.6%) were used as management options.

Table 3: Difference in control of parasitic mites by beehive size category

Variables	Small and medium holders (30)	Large holders (30)	Overall (60)
Formic acid	13(43.3)	16(53.3)	29(48.3)
Apistand	15(50)	18(60)	33(55)
Volatiles like 'Sancho'	11(36.6)	15(50)	26(43.3)
Plant extracts	12(40)	13(43.3)	25(41.6)

Note: Figures in parentheses indicates percentage.

4.5 Control of foulbrood disease

Foulbrood disease was found to be growing incidence in focus group discussion. Among the surveyed household, 48.3% were found to be using some form of management practices for controlling the Foulbrood disease.

Table 4: Difference in control of foulbrood diseases by bee hive size category

Variable (Control of foul brood disease)	Small and medium holders (30)	Large holders (30)	Overall (60)
Yes	12(40)	17(56.6)	29(48.3)
No	18(60)	13(43.3)	31(51.6)

Note: Figures in parentheses indicates percentage.

4.6 Accidental losses

Pesticides poisoning and forest fires were major accidental losses faced by keepers. About 61.6% of beekeepers reported to have suffered losses due to pesticide poisoning (table 5). Similarly, 40% had suffered losses due to forest fire at some stage of their beekeeping experience.

Table 5: Difference in accidental losses by bee hive size category

Variables	Small and medium holders (30)	Large holders **(**30)	Overall (60)
Pesticides poisoning (yes)	17(56.6)	20(66.6)	37(61.6)
Forest fires (yes)	11(36.6)	13(43.3)	24(40)

Variables	Small and medium holders (30)	Large holders (30)	Overall (60)

Note: Figures in parentheses indicates percentage

4.7 Difference in productivity per hive:

Out of total respondents, the increment in productivity per hive was reported 10% by of small and medium holder farmers (table6) and 20% by large holder farmers this year.

Table 6: Difference in Productivity per hive

Increase	3(10)	6(20)	9(15)
Decrease	22(73.3)	13(53.3)	35(58.8)
No change	5(16.6)	11(36.6)	16(26.6)

Note: Figures in parentheses indicates percentage

4.8 Market information

The required market information was obtained by 36.6% of small and medium holders and 80% by large holder farmers (table7). Due to limited market information among small and medium holder farmers, marketing of honey was found more difficult among them and they were getting comparatively low price of honey.

Table 7: Market information

Variables Market information	Small and medium holders (30)	Large holders (30)	Overall (60)
Yes	11(36.6)	24(80)	35(58.3)
No	19(63.3)	6(20)	25(41.6)

Note: Figures in parentheses indicates percentage

4.9 Harvesting of honey per year

The harvesting of honey per year by large holder farmers (6.10) was comparatively higher than small and medium holder farmers (4.55) (table 8). The average harvesting of honey in the study area was found to be 5.3 times annually. Small and medium holder farmers were found harvesting comparatively lesser times than large holder farmers due to insufficient artificial feeding and foraging of honeybee. To increase the harvesting and production among small and medium holder farmers, there should be technical and economical support from government agencies.

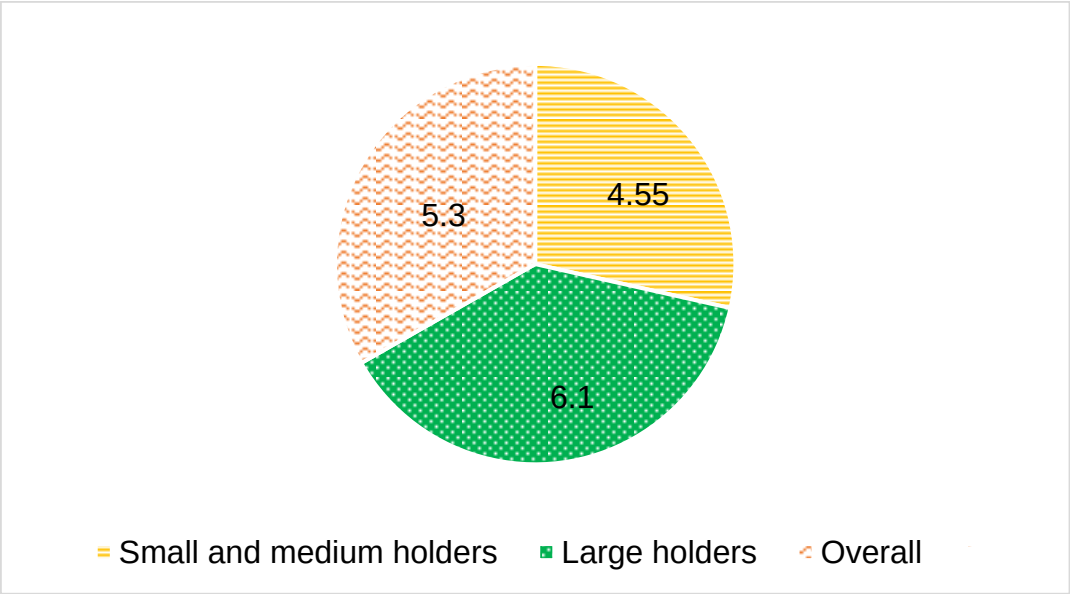

Figure 9 Harvesting honey per year

4.10 Preferred districts for bee migration

Migration of the honeybees in floral rich areas for proper supply of nectar and pollen in the hive plays a vital role for smooth running of an enterprise. Based on these, Major migratory areas for foraging of bees by beekeepers in the study area are presented in table below. Major places preferred by the beekeepers of dang are Rupandehi, Kapilvastu and Bhalubang, Dang (table 8).

Table 8: The preferred districts for bee migration along with their season and flora

District	Season	Flora
Dang	Baishakh- Ashar	Sal, Asare, Kadke, Jamuna, Kyamuna, Harro, Barro
Dang	Ashar-Ashoj	Artificial feed
Dang	Ashoj-Kartik-Mangsir	Tori
Rupandehi	Poush-Magh	Tori
Bhalubang(Dang)	Mangsir-Poush-Magh	Chuiri
Kapilvastu	Poush-Magh-falgun	Tora, Rudilo
Kapilvastu / Dang	Falgun-Chaitra-Baishakh	Rudilo, Sisoo, Masala

4.11 Economics of honey production

Production analysis

In sampled household honey found to be major apiary product and bee wax was the major by product, production of other apiary products such as pollen, royal jelly, propolis were almost nil (farmers believe that collection of other bee products decreases honey flow in hive). The average number of bee hive per farm in the case of *A. mellifera* was 105.06 hives and average honey production per annum was found to be 24.9 kg/hive (table 9). It was found to be increased than in previous years. The average honey production per hive per annum from *Apis mellifera* in Dang, Nepal was 23.5 kg (Budhathoki-Chhetri1*, 2021). But the average annual honey production/hive from *A. mellifera* in the study area was found to be much lower than 36 kg/hive

in Chitwan, Nepal (Dhakal *et al.*, 2017), 34.6 kg/hive found by Shrestha (2017) in Bardiya Nepal and 40.71 kg per hive per year in Karaj state, Iran (Vaziritabar & Esmaeilzade, 2016). And it clearly shows that there is need of improvement in beekeeping techniques and feeding practices.

Table 9: Average honey production / hive / year

Variable	Small & medium holders	Large holders	Total
Average honey production/ hive/ year	23.70	26.10	24.9

Cost of production

Total cost of production of honey was estimated to be NRs 6431.04 (table 12) which is greater than NRs 4405.47 reported by *(Shrestha, 2017)*. in Bardiya, Nepal. Total cost of production among small holder farmer was found to be NRs 6815.96 which is greater than NRs 6046.92 found among large holder farmers. This shows that there is need of economic and technical support to small holder farmers from government agencies to reduce the cost of production and increase the profit.

variable cost incurred / hive / year

Variable costs included migration cost, labor costs, feed costs, drugs and chemical costs, comb foundation costs, repair costs and marketing costs. On an average, migration cost per hive was NRs 1627.50, labor cost per hive was NRs 1381.50, feed cost per hive was NRs 821, drugs and chemical costs per hive was found to be NRs 75, comb foundation costs per hive was NRs 323.5, repair costs per hive was NRs 88.06 and marketing cost per hive was NRs 257.68 (table 110). these costs were found statistically lower in large holder farmers except drugs and chemical costs due to economies of scale.

Table 10: Variable costs per hive per year

Variables	Overall (N=60)	Small farmer & medium	Large farmer	Mean difference
Migration cost (NRs)	1627.50	1760	1495	265
Labor cost (NRs)	1381.50	1545	1218	327
Feed cost (NRs)	821	960	682	278
Drugs and chemicals (NRs)	75	65	85	-20
Comb foundation costs (NRs)	323.5	342	305	37
Repair costs (NRs)	88.06	105.50	70.62	34.88
Marketing costs (NRs)	257.68	292.36	223	69.36
Average Variable cost (NRs)	4574.24	5069.86	4078.62	991.24

Fixed cost incurred / hive / year

Fixed cost included land rent costs, hive costs, hive tool costs, and bee colony costs. In the study area average land rent costs was found to be NRs 217.5, hive costs was NRs 448.75, hive tool costs was NRs 1024.95 and bee colony costs was found to be NRs 1024.95 (Table 11).

Total fixed costs on the study are was found to be NRs 1857.2 which was almost similar to NRs 1741.33 reported by (Budhathoki-Chhetri1*, 2021) in Dang, Nepal. In the study area, total fixed costs per hive per annum among large holder farmers was found to be greater 1968.3 than 1746.1 among small holder farmers.

Variables	Overall (N=60)	Small farmer (n=30)	Large farmer (n=30)	Mean difference
Land rent cost (NRs)	217.5	210	225	-15
Hive costs (NRs)	448.75	412.5	485	-72.5
Hive tools cost	166	157	175	-18

Table 11**:** fixed cost per hive per year

(NRs)				
Bee colony costs (NRs)	1024.95	966.6	1083.3	-116.6
Average fixed costs (NRs)	1857.2	1746.1	1968.3	-222.2

Gross return

Average gross return of honey production and colony sale from *A. mellifera* was NRs.15102.50/hive/year The gross return of honey production from A. mellifera in the study area was higher than NRs. 7,482.12 /hive as reported in Chitwan (Dhakal, Regmi, Sha, & Khatri, 2017) and NRs. 7,392.52/hive as reported in Bardiya, Nepal (Shrestha, 2017).

Gross Margin and B: C ratio

Gross margin and benefit cost ratio of honey production from *A. mellifera* was NRs. 8689.4/hive and 2.36 respectively (table 12). The B:C ratio was found slightly higher as reported by Devkota, Dhakal, & Thapa (2016) i.e., 1.81 and Dhakal, Regmi, Sha, & Khatri (2017) i.e., 1.71 in Chitwan and Shrestha (2017) i.e., 1.67 in Bardiya, Nepal. Gross margin in the study area was about 4 times higher than it to be reported by Devkota *et al*. (2016) and about 2.5 times more than it to be reported by Dhakal *et al.* (2017).

Table 12: Gross margin and B/C ratio

Variables	Overall (N=60)	Small & medium holders (n=30)	Large farmer (n=30)	Mean difference
Average price of honey (NRs)	505.25	510	490.5	19.5

Average honey production per hive(kg)	24.9	23.70	26.10	-2.4
Total Income per hive (NRs)	15120.52	14509	15732.05	-1223.05
Total Cost Per hive (NRs)	6431.04	6815.96	6046.92	769.04
Gross margin per hive (NRs)	8689.4	7693.04	9685.13	1992.09
BC Ratio	2.36	2.12	2.60	-0.48

4.12 Problems in honey production and marketing

4.12.1 Production problems

There are various constraints in honey production in the study site. Those problems as perceived by farmers are Inefficient access to pasture, Barriers from local communities, Declining pasture and no new pasture, Unaffordability of input materials, Genetic deterioration of queen bee and Disease and pest. The major problem in honey production was found to be 'Declining pasture and no new pasture' with index value of 0.758 followed by 'Barriers from local communities' (index =0.683). It was found that 'Disease and pest' was ranked third (index=0.590) followed by 'Genetic deterioration of queen bee' with index 0.518 on fourth (table 14), 'Inefficient access to pasture' (index=0.462) on fifth and 'Unaffordability of input materials' (index=0.395) on sixth rank.

Table 8: production problems

Problem / Constraints	1	0.83	0.66	0.5	0.33	0.16	Total	Index	Rank
declining pastures and no new forage areas	23	15	8	5	5	4	60	0.758	I

barriers from local communities	13	16	11	9	7	4	60	0.683	II
disease and pest	8	10	15	10	9	8	60	0.590	III
genetic deterioration of the queen bee	8	7	9	11	11	14	60	0.518	IV
limited road access to pastures	5	6	8	9	17	15	60	0.462	V
unaffordability of input materials	4	4	6	7	16	23	60	0.395	VI

Problems / Constraints	1	0.8	0.6	0.4	0.2	Total	Index	Rank

4.12. 2 Marketing problems

There are various constraints in honey marketing in the study site. Those problems as perceived by farmers are long market chain to consumers, Problem of market access, Insufficient certification and lab tests, Lack of collection and processing centers and High competition with foreign honey. The major problem in honey marketing was found to be 'High competition with foreign honey' with index value of 0.773 followed by 'Insufficient certification and lab tests' with index value 0.69 (table 15). It was found from Table that 'Lack of collection and processing centers' was ranked third with index value 0.626 followed by 'Problem of market access' (index=0.493) on fourth 'Long market chain to consumers' (index 0.396) on fifth.

High competition with foreign honey	23	20	7	6	4	60	0.773	I
Insufficient certification and lab tests	15	17	13	10	5	60	0.69	II
Lack of collection and processing centers	10	13	16	17	4	60	0.626	III
Expected training	1	0.67	0.33	Total (N)		Index		RANK
Problem of market access	8	6	9	20	17	60	0.493	IV
Control of diseases and pests	32	24	4	60		0.8290		I
Long market chain to consumers	5	3	5	20	27	60	0.396	V

Table 9: Marketing problems

Source: Field survey, FGD and KII

4.13 Trainings expected by the beekeepers:

The most demanded training by the beekeepers under study was ‘Control of diseases and pests’ (index=0.8290) followed by ‘Commercial production of other bee products’ (index=0.5858) on second and ‘Artificial queen bee production’ (index=0.5852) on third rank (table 16).

Table 10: Training expected by beekeepers in study area

Source: Field survey, FGD and KII

Commercial production of other bee products	12	22	26	60	0.5858	II
Artificial queen bee production	16	14	30	60	0.5852	III

4.14 SWOT analysis of beekeeping enterprises

Strengths

- Abundance of forest in the region creates favourable environment for foraging of honeybee
- Knowledge on how to make a standard hive.
- Relatively easier to rearing and handling of honebee.
- Availability of technical and economic support for beekeepers from government as well as non-government organizations
- Subsidy provided by government for beekeeping
- Bees help in agricultural production through pollination
- Adequate knowledge and Skill on honey harvesting and processing.
- Market is available at local level as well as downstream.

Weaknesses

- Wood for making beehives is very expensive.
- Hive makers do not have financial resources to establish the facility
- No schemes to provide loan/credit to beekeepers.
- Lack of clear cut policies, regulations and strategies to promote beekeeping.
- Poor marketing of products which are sold more on an individual contacts and relationship basis.
- Inadequate value addition skills and facilities.

- There is no consistency in the amount of honey produced of each type and no efforts to develop clean and nicely labelled packaging.
- Inadequate market information, weak linkage everywhere along the chain.
- Delayed in cash payment to beekeepers.

Opportunities

- Availability of government support in honey production and presence of international organizations.
- Favorable climatic conditions for beekeeping
- Diversified business can be made out like wax (candle) production, colony production, queen production, production of beehives and other beekeeping gears.
- Honey can be stored for a long time without damage.
- Deep attachment of buyers to the locally produced honey.
- Processed honey has high market demand and fetches high price.
- High local and national demand for honey.
- High quality honey and organic fetch to higher price.

Threats

- Changes in local weather induced by global climate change are affecting beekeeping.
- Diseases, Pests and parasites attack beekeeping.
- Use of chemical fertilizers and insecticides in crops are killing bees.
- Decreasing productivity of queen due to inbreeding and improper cross breeding.
- Resistance of local people in bee migration.
- Beekeepers unable to afford processing facilities.
- No system for authentication of processed honey.
- Risk of quality consistency problems.
- Availability of cheaper brands of honey in the market.
- Risks in lack of marketing efforts.

5. SUMMARY AND CONCLUSION

5.1 Summary

This study has provided clear insights about the profitability of honey production, major production problems of beekeeping enterprises and Strengths, weaknesses, Opportunities and Threats of honey production in the study area. From various results and discussions presented above, it can be concluded that beekeeping in the study area is one of the profitable business as shown by B:C ratio and high gross margin. The average honey production per annum from *A.*

mellifera was 24.9 kg /hive. The average annual variable cost of production was NRs.4574 /hive for honey from *A. mellifera*. Average gross return, gross margin and benefit cost ratio of honey production from *A. mellifera* were NRs. 15120/ hive/year, NRs. 8689/hive/year and 2.36 respectively which were found significantly higher in large holders. Declining pasture and high competition with foreign honey were the most severe production and marketing problems. Similarly, the most demanded training was for the control of diseases and insect pests. Producer-wholeseller-retailor-consumer was the most followed marketing channel in the study area.

In the study area production of diversified categories of honey according to floral source was major opportunity. A decreasing productivity of queen in *A. mellifera* due to inbreeding and improper cross breeding was the major challenge that farmers were facing. Similarly, high demand and existence of honey processing plants were major strengths, lower price and lack of whole sale price fixing authority were the major weaknesses, increasing domestic demand and availability of local market were the major opportunities and import of poor-quality honey at cheaper rate and existence of duplicate, artificial and adulterated honey in urban market were major threats of honey marketing in Dang district.

5.2 Conclusion

The average honey productivity per annum from *A. mellifera* in Dang, district is being increased than the previous year. Beekeeping practice is significant source of household economy. Considerably higher profit with benefit cost ratio shows that beekeeping is profitable in Dang district. Therefore, the investment on beekeeping enterprise is financially viable in the study area.

Small and medium holders inefficient in production per unit variable costs; therefore, there should be support for business expansion for small and medium holders. Also, there should be provision of honey quality check agency in the study area so that local quality honey will take over the foreign honey in terms of market demand and market price. Government agencies should give their concern to ensure the market for local production. There is an immense need of technical support from government authorities to honey producers regarding preservation of existing pastures and identification of new pastures, import restriction of poor-quality honey by certification and quality control mechanisms as well as for control of diseases and insect pests.

5.3 Recommendations

The recommendations of the study are as follows:

- Provide financial support and business expansion opportunities for small and medium beekeeping enterprises to improve their production efficiency and compete effectively in the market.
- Establish a quality check agency in the study area to ensure the quality of local honey, thereby enhancing its market demand and price compared to foreign honey.
- Government agencies should actively intervene to ensure a stable and supportive market environment for local honey production, possibly through market promotion initiatives and price stabilization mechanisms.
- Provide technical support and training programs for beekeepers, focusing on pasture preservation, identification of new pastures, disease and pest control, and best practices in honey production and processing.
- Implement import restrictions on poor-quality honey through certification and quality control mechanisms to protect local producers from unfair competition and maintain the integrity of the honey market.
- Encourage the production of diversified categories of honey based on floral sources to capitalize on market opportunities and meet varying consumer preferences.
- Address the challenge of declining queen productivity in A. mellifera by promoting proper breeding practices and genetic diversity to improve hive performance and honey yields.
- Strengthen and streamline existing marketing channels, such as the producer-wholesaler-retailer-consumer chain, to ensure efficient distribution and access to local honey products.
- Promote domestic honey consumption through awareness campaigns and marketing initiatives to capitalize on the increasing domestic demand and support local beekeeping enterprises.

REFERENCES

Abrol, D. (1997). *Bees and Beekeeping in India, 1st Edition.* Ludiyana,Panjab,India: Kalyani Publishers.

Acharya, S. S., & Agrawal, N. L. (1999). *Agricultural Marketing in India.* New Delhi, India: Oxford and IBH Publishing Co. Pvt. Ltd.

Adcock, D., Halborg, A., & Ross, C. (2001). *Marketing: Principle and Practices.* Harlow, England, UK: Pearson Education Limited.

Backman, T., & Davidson, R. (1962). *Marketing Principle.* New York: The Ronal Presses Co., NY.

Bhandari, P. L., & Kattel, R. R. (2020). Value Chain Analysis of Honey Sub-sector in Nepal. *International Journal of Applied Sciences and Biotechnology, 8*(1), 83-95. doi:DOI: 10.3126/ijasbt.v8i1.27804

Budhathoki-Chhetri1*, P. (2021). Economic analysis and marketing system of Apis mellifera honey . *Journal of Agriculture and Natural Resources (2021) 4(1): 154-164.*

Chuhan, R., & Singh, J. (1998). Vegetable marketing system in Azamgarth district of Utter Pradesh. *Indian Journal of Agricultural Economics*, 413.

Devkota, k. (2020). Sustainable Livelihoods and Agriculture Production in Nepal. *Nepal. In (Ed.), Modern Beekeeping - Bases for Sustainable Production. IntechOpen. https://doi.org/10.5772/intechopen.90707*.

Devkota, K., Dhakal, S., & Thapa, R. (2016). Economics of beekeeping as pollination management practices adopted by farmers in chitwan district of Nepal. *Agriculture and Food security, 6*(2), 60-70.

Devota, K. (2006). Benefit-Cost Analysis of Apiculture Enterprise : A case study of Jutpani VDC, Chitwan, Nepal. *Journal of Institute of Agriculture and Animal Science, 4*(1), 119-125.

Dhakal, S. C., Regmi, P. P., Sha, S. K., & Khatri, D. B. (2017). Allocative Efficiency of Resources on Beekeeping in Chitwan District of Nepal. *International Journal of Environment, Agriculture and Biotechnology 2, 4*(2), 1447-1451.

Dillon, J., & Hardaker, J. (1993). *Farm management research for small farm development* . Rome, Italy: Food and Agriculture Organization of the United Nations .

GoN. (1995). *Annual Report , 1994-1995.* kathmandu: Ministry of Agriculture and Cooperatives, Department of Agriculture.

INCLUDE. (2014). *Honey Value Chain.* Kathmandu, Nepal: Inclusive Development of the Economy Programme.

Islam, M. R., Chhay, L., Mian, M. M., & Nasry, A. B. (2016). The Financial Analysis of Apiculture Profitability in Bangladesh. *Asian Journal of Agricultural Extension, Economics and Sociology, 3*(1), 1-8.

John, R., Dar, J., Beigh, M., Bhat, M. A., & Dar, I. (2017). Benefit-Cost Analysis of Apiculture Enterprise in District Pulwama and Srinagar. *International Journal of Pure and Applied Bioscience, 5*(2), 51-53.

Kaini, B. R., & Singh, P. (1998). Status of horticultural marketing research and extension in private and public sectors. *In: Proceeding of National Seminar on Fruits and Vegetable Marketing in Nepal. Support to New Kalimati Market Project. September 15-16, 1998.* Kathmandu, Nepal: Food and Agriculture Organization (FAO).

KC, G., Bhusal, P., & Kafle, K. (2021). PRODUCTION AND MANAGEMENT OF HONEY. *Food and Agri Economics Review (FAER), 2*(1), 101-106. doi:DOI: http://doi.org/10.26480/faer.02.2021.101.106

Kotler, P. (1980). Principle of Marketing. London: Printice Hall Pvt. Ltd.

Kotler, P. (1991). *Marketing Management: Analysis, Planning, Implementation, and Control,.* Upper Saddle River, NJ: Pearson Printice Hall Pvt. Ltd.

Kotler, P., & Armstrong, G. (2003). *Principle of Marketing* (10th Edition ed.). London: Printice Hall Pvt. Ltd.

Laate, E. (2006). *Economics of beekeeping in Alberta.* Alberta, Canada: Economics section, Alberta Agriculture and Forestry Economics and Competitiveness Branch.

Macgregor, J. A., & Kanji, N. (2005). *Understanding Market-based Livelihoods in a Globalizing World: Combining Approaches and Methods.* London: International Institute for Environment and Development.

MDD. (1999). *Agricultural Marketing System in Nepal.* Kathmandu, Nepal: Marketing Development Division.

MOALD. (2021/22). *Statistical Information on Nepalese Agriculture.* Kathmandu, Nepal: Ministry of Agriculture and Livestock Development Division.

Panthi, T. R. (2013). *Brief Introduction to Honeybees and Community.* Makwanpur,Nepal: Multi-dimensional Resource Center Nepal (MRC Nepal).

Pokhrel, S. (2009). Comparative benefits of beekeeping enterprise in Chitwan, Nepal. *The Journal of Agriculture and Environment, 2*(1), 10-12.

Pratap, U., Halder, C., Rema, J., Gurung, K., Tamang, N., Wangchuk, S., . . . Hussain, S. (2017). *Pro-poorvalue chain development for A.cerena honey: Potential benefits to smallholder A.cerena beekeepers in tje Hindu kush Himalaya.* Kathmandu, Nepal: ICIMOD Research Report.

Sain, V., & Nain, J. (2017). Economics and Importance of Beekeeping. *Biomedical Journal of Scientific and Technical Research, 3*(1), 12.

Sapkota, B. (2006). *Economics of honey Production and Marketing in Kavrepalanchowk District of Nepal.* IAAS, Rampur, Chitwan: Unpublished M.Sc Thesis in Agricultural Economics, TU.

Shrestha, A. (2017). Study of Production economics and production problems of honey in Bardiya District,Nepal. *Sarhad Journal of Agriculture, 5*(2), 240-245.

Thapa, R., & Aryal, S. (2015). An overview of Beekeeping Economy and Its Constraints in Nepal. *Researchgate, 5*(1), 50-62.

Thapa, R., Aryal , S., & Jung, C. (2018). Beekeeping and honey hunting in Nepal: Current status and future perspective. *6*(2), 70-75.

Thomsen, F. L. (1952). Agricultural Marketing. *American Journal of Agricultural Economics, 34*(1), 142-143.

Tyalor, J. (2014). *Honey Subsector, Value Chain Study.* Kathmandu: Inclusive Development of the Economy Programme (INCLUDE).

APPENDICES

Appendix I: Questionnaire

Dear respondents,

I am Sabina Acharya a **Post** graduate student of **Shanker Dev Campus, Tribhuvan** university, **Kathmandu, Nepal**. I am doing my **Masters of Business Studies (M. B. S.)** thesis research on **'EC'ECONOMICS OF PRODUCTION AND MARKETING ANALYSIS OF HONEY IN DANG DISTRICT, WESTERN NEPAL'.**

ONOMICS OF PRODUCTION AND MARKETING ANALYSIS OF HONEY IN DANG DISTRICT, WESTERN NEPAL'. You being a beekeeper are selected as one of my respondent. It would be great help for me if you provide answers of the questionnaire. Your help will be highly acknowledged.

Interviewer: ……..…… Form No: …….

Date: ……..

A. Personal background Phone no: ……..

SN	Details	Response
1.	Name	
2.	Ethnicity	
2	Address	
3	Gender	a. male b. female
4	Age	
5	Primary occupation	a. Agriculture b. service c. business d. labor/ wages d. other
6	Occupation of other active members	a. Other agricultural activities b. business c. service d. foreign employment e. none
7	Education	
8	Family size	a. male…….. b. female…….. c. total…….
9	Years of beekeeping	

10	Total annual income	
11	Total annual expenditure	

12.Why did you start beekeeping?

Reasons	Yes	No
Following to tradition		
Influenced from neighbours		
Influenced from visiting bee-rearers		
Technical backup from GOs, I/NGOs		

13. Management Practices

Technology	Yes	No	Remarks
Artificial Queen Production			
Use of Comb Foundation			
Use Super in every hive			
Insurance of Honey bees			

B. Honey production and beekeeping information

14. Type of Bee species: a..*Apis cerana* b. *Apis mellifera*

15. No. of bee hives:

16. Types of bee hive

Type of bee hive	Number
Modern hive	
Traditional log hive	

17. Investment on fixed cost and returns :

Particulars	Source	Quantity	Rate (Rs)	Amount
Hive cost				
Hive tool				
Land Rent				

18. Investment on variable capital and Returns

Particulars	Source	Quantity	Rate (Rs.)	Amount
Variable cost per year Repair & Maintenance				
Labors Family Permanent Wage basis (migration/ harvesting)				
Migration cost Transportation Loading & unloading Land rent				
Comb Foundation				
Feeding cost (artificial feed)				
Cost of drug & other chemicals				
Buckets for storage				
Total cost				
Production Honey Wax Propollis Pollen Others				

Sale of honey bee with hive Sale of honey bee without hive				
Sale of Queen Bee				
Total Return				

19. Harvesting of honey per year? Max……. Min……..

20. Have you maintain any flowering plant as source of nectar for beekeeping ? a. Yes b. No

If Yes, Name them……

Particulars	Unit	Revenue (Annual)
Land covered by such plantation	Kattha (……)	
Avg annual cost of maintaining such plantation	NRs	

21. Major Districts where Bees are taken for foraging?

District	Season	Flora	Cost	District	Season	Flora	cost

C. Marketing information

22. What you generally do?

a) First you seek the market and harvest honey

b) You first harvest honey and then seek the market

c) Forward Contract

d) Others (specify……)

23. After harvesting, what sorts of activities are conducted?

a) Storing b) transporting to local market c) Packaging d) Export

24. Do you store bee products? a) Yes b) No

If yes, how long after harvest ……

25. Are you getting market information to know the market price of honey? (a. yes b. No)

26. If yes, what type of communication means that you are using?

a) Radio b) TV c) Neighbor d) Phone e) Mobile app

27.To whom do you sale your honey and other bee products ?

Parties	Amount (Kg)	Rate	Bee Products			
			Wax	Pollen	Propollis	Others
Consumers						
Retailors						
Processors cum wholesalers						
Cooperatives						
Middle man/ Collection agent/ Market facilitator						
Gift to relatives and Neighbours						
For home consumption						

D. Ranking of production problems / constraints

28. What are the production constraints of beekeeping?

Production problem	Ranking
lack of efficient road access to pastures	
Barriers from local communities in access to foraging areas	
Declining pastures and no identification of new forage areas	
Unaffordability of input materials	
Genetic deterioration of the queen bee	
lack of technical knowledge on control of disease and pest	

29. (If pest and diseases are one of the major problems then),

a. Have you done anything to control foulbrood disease? yes ☐ no ☐

b. How are you coping up with the mite infestation?

Strategies	Yes	No
Formic acid		
Apistand		
Other volatiles like Sancho		
Plant extracts		

30. Have you ever faced the following problems since you started beekeeping?

a. pesticide poisoning in bees yes ☐ no ☐

b. forest fire causing destruction of entire colony yes ☐ no ☐

E. Ranking of Marketing problems / constraints

Marketing Problem	Ranking
Long market chain to consumers	
Problem of Market access	
Insufficient certification and Lab tests	
Lack of Collection and processing centers	
High competition with foreign Honey	

F. Framework conditions

31. Access to agricultural services and facilities

Agricultural services and facilities	Yes	No	Remarks
Training Government I/ NGOs			
Membership in farmers' group/Cooperatives			
Credit facilities Loan From Bank Loan from local money lender Loan from groups Loan from Cooperatives			
Subsidies Government I/NGOs			

32. Involve in any group or cooperative? a. Yes b. No

If Yes, Name of cooperative

……..

Position……

Support from cooperative ……..

33. Before group, did you sale your product? If sale which market outlet and quantity of produce? Traders come in your places or you went there?

……

34. How much price did you get before collective marketing? And how much price are you getting now?

……

35. Are you willing to continue beekeeping practice? Yes ☐ ☐

No If Yes, Why?.....

If No, Why?.....

36. Role of Women's participation in beekeeping?

Role	Yes	No
Harvesting		
Artificial Feed Preparation		
Marketing(Dealing with VC actors & price fixation)		
Insect pest management		
Packing & Packaging		

37. How much did you sell last year and at what price?

No. of bee hive……Reason for increasing/ Decreasing……..

Honey …….

Bee products ……..

38. What type of trainings do you want from the Bee Zone/ AKC/ Bee development sector??

Expected training	Ranking
Queen bee production	
Control of diseases and pest	
Production of other bee products like wax, propolis, pollen etc	

39. SWOT analysis of honey marketing

Strength	Weakness
Opportunities	Threats

ECONOMIC ANALYSIS OF BEEKEEPING ENTERPRISES IN ...

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