



FINAL REPORT

Lot 1: Honey Value Chain Analysis

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BPV Consultancy & Research Services
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EXECUTIVE SUMMARY

The foundation for sustainable beekeeping industry in Bhutan was laid in 1997. The industry has huge potential for a large-scale production because of presence of indigenous species of bees and diverse nectar-rich vegetation in its most pristine natural environment. The indigenous *apis cerana* and *apis trigona* (*trigona* in very small quantities though) and the imported *apis mellifera* are currently used for honey production in Bhutan.

Overview of beekeeping practices and honey industry in Bhutan

Production and Productivity: Bhutan has experienced a steady growth in honey production over the recent years. The total production in 2016 was 41,924 kilograms (kgs) as compared to 18,263 kgs in 2013. In the early days, the production was limited to Bumthang, Sarpang, Tsirang, and Chhukha dzongkhags. Gradually the beekeeping practice expanded to other dzongkhags such as Dagana, Haa, Punakha, Samdrup Jongkhar, Samtse and Wangdue.

Bumthang however continues to be the beekeeping hub of Bhutan accounting for over 50% of the production every year (accounting for as high as 83% of the total production in 2013).

The honey productivity of bee species vary and is dependent on the type of hive used, as well as the management practices applied. The current average productivities of *cerana* honey in traditional logs and *langstroth* are 2.5 kg/ hive/ year and 5.5 kg/ hive/ year while some of the other beekeepers in select locations have managed productivities of up to 10-15 kg/ hive/ year and 20-25 kg/ hive/ year respectively. Based on the difference between the current productivities and the potential productivities, the yield gaps of the two hives are 80%, and 75% respectively.

On the other hand, *mellifera* bees are only kept in *langstroth* with an average productivity of 30 kg/ hive/ year in the natural habitat of Bumthang. If the hives are migrated to different regions within Bumthang, the productivity increases to an average of 50 kg/ hive/ year. Some beekeepers have managed to even produce over 90 kg/ hive/ year with effective hive migration and management practices.

Processing and Packaging: Honey is traditionally extracted through squeezing the comb with hand and draining/ filtering it through clean cloth. Most beekeepers, except the ones in Bumthang, use the draining method to extract honey. However, with the introduction of box hive with movable frames, beekeepers are slowly starting to use honey extractors. And, some of them use metal container with holes to drain/ sieve honey.

Bottling and packaging is done by select beekeepers and FGs, cooperatives, such as BeCoB, and processors and collectors, such as Bio-Bhutan, Queen's OGOP project, Youth Business Cooperatives (YBC) and SABAH Bhutan. These bottles are then sold to retail outlets and final consumers.

In most of the cases, the bottles are not sealed and some do not have labels even. The information provided on the labels is also not adequate, lacking details on: contents/ ingredients, batch

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information, packaging and expiry dates, certification/ quality details, and contact information of the producer/ processor.

On the other hand, majority of the *cerana* beekeepers fill their honey in re-used plastic bottle (mostly 750ml bottles which can fill over 1 kg of honey) available from liquor shops.

Also, some beekeepers from Bumthang sell their honey directly to the guest houses, resorts and hotels in barrels.

Honey Marketing: The honey market is segmented into wholesale and retail markets. The wholesale honey is normally sold in barrels or re-used plastic containers to processors and middlemen, and this honey is not quality checked and contains some impurities. The wholesale price for *mellifera* generally sticks to Nu. 500-600 per kg while the *cerana* wholesale price ranges from Nu. 500 to Nu. 850 per kg.

The retail segment caters to the middle and high income consumers who usually buy honey from supermarkets. This market segment goes for better packaging, branding and quality. The honey is normally packed in convenient glass jars ranging from 180 g to 500 g in capacity. The supermarket shelf prices range from Nu. 850 to Nu. 1,000 per kg for Bumthang/ *mellifera* honey. However, the *cerana* honey brands sell from Nu. 1,000 to Nu. 1,800 per kg.

The interviewed consumers and retailers shared feedback such as dissatisfaction with the available packaging options, honey crystallization and preference for *cerana* honey over *mellifera*.

Exports and Imports: The Bhutanese market is hugely under-supplied and a significant amount of honey consumed in the domestic market is imported.

A significant amount of honey targeting low and middle income population is imported. In 2016 and 2015, honey import quantities exceeded the total annual production. Indian honey brands are able to compete in the market due to lower prices, more packaging options (availability of plastic jars and different capacities), and longer shelf life.

The domestic market consumes over 99% of all the honey produced locally with the rest being exported. The total exports amounted to 0.5% in 2016 and 0.3% in 2015. Although little data is available on honey exporters, it is known that Taiwan, Hong Kong, Singapore, South Korea and Vietnam are currently the key export destinations for honey.

Based on the situational analysis of global honey trade and existing Bhutanese trends, Japan, China, and South Korea were discovered to be the top three countries in the region with extremely high demand for Bhutan honey. Additionally, based on our conversations with the stakeholders in the honey value chain, countries such as Singapore, Taiwan, Thailand and India would also be interested in importing Bhutan honey.

Bhutanese honey is well appreciated by global tourists and other visitors in Bhutan. When purchase and category managers of high-end supermarkets in the region were interviewed, they seemed keen on the prospect of trying and stocking Bhutan honey in their stores. However, their

foremost concern was maintaining consistency in supply, followed by questions concerning pricing and packaging/ labelling.

Value chain findings

Flow of Honey Volumes along Different Marketing Channels: Honey flows through three different channels. Majority of honey (~45% for *cerana* and ~50% for *mellifera*) is sold as semi-processed honey to processors such as BeCoB, Bio-Bhutan, OGOP Project, and SABAH Bhutan. These processors engage themselves in small-scale processing and packaging.

The second channel links producers directly to middlemen and consumers. In this case, producers pack the raw honey in re-used plastic bottles and distribute to middlemen for selling to consumers at the Centenary Market and roadside marketing sheds.

The third channel is beekeepers choosing to sell directly to retail consumers through stalls along the highway or to guest houses and resorts in towns closest to their villages (~35% for *cerana* and ~48% for *mellifera*).

Lastly a small percentage of honey (2-20%) is retained by producers for home consumption and for social ties especially handouts to friends and neighbours.

Value Addition and Value Capture along the Value Chain: A value addition map was developed to depict and analyse the prices in Nu/kg at each node of the chain. Taking an example from the map, the processors buy *cerana* honey at an average price of Nu. 650/kg from the producers and sell at an average price of Nu. 1,410/kg to the consumers. This means that there was an average value of Nu. 760/kg added. The percentage share of value is expressed as a fraction of margin to the consumer price.

In case of *cerana*, the producers were able to capture 46% of the retail value when they sell to processors as opposed to 75% when they sell to wholesalers/ middlemen.

In case of *mellifera*, the producers capture 35% of retail value when they sell to BeCoB versus 100% of the value when they sell directly to institutional buyers.

Costs and Gross Margins: Profitability of honey for beekeepers was obtained by calculating gross margins/kg: Nu. 460-600 /kg and Nu. 140-390 /kg respectively for *cerana* and *mellifera* honey.

The gross margins at *cerana* processing level was Nu. 600/kg. However, the overheads at the processors' end are high due to the depreciation of equipment, rent of the storage unit and retail outlets, carriage and advertising/ promotion cost and staff salaries. Although these overheads are shared among a multiple line of products sold/ processed by these processors.

BeCoB, on the other hand, has much lower gross margin of Nu. 95 per kg from sale of honey because of the low selling price of Nu. 570 per kg. Additionally, the Cooperative has huge overheads in form of salaries, depreciation of equipment, administration, transportation and maintenance costs.

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Also, since most processors are operating at relatively low honey capacity, they do not benefit much from economies of scale.

While the wholesalers and retailers buy *mellifera* honey at Nu. 570 per kg, they capture huge gross margins by selling the same packaged honey at about Nu. 1000 per kg. Analysis of the gross margins along the honey value chain shows that all factors held constant, honey enterprise is most profitable when producers sell directly to consumers or at the retailing stage, including when processors double as retailers.

Value chain linkages: Established linkages in the honey value chain consist of the relationships between local artisans and producers, producers and processors, producers and wholesalers/retailers and processors and retail outlets. The linkages between local artisans and producers are strong because of the ability of the artisans to copy and adapt modern/ box hives to local conditions. This creativity and easy access is increasing the use of box hives in certain geogs especially with strong FGs and processor relationships.

The relationship between the MoAF extension officers (EOs) and the producers are also strong, especially in case of *cerana* producers. They often get in touch with their EOs for assistance with new equipment, wax, and technical support. The EO (in coordination with the DLO) contacts the respective RLDC and/ or NH-RDC to apply for the requisite support under the beekeeping subsidy program approved under the 11th Five Year Plan (FYP).

In case of *cerana*, the linkage between producer and processor is weaker than that of *mellifera* producer and BeCoB.

In terms of market linkages, most honey trade is informal with sourcing from spot markets being common. Retailers seemed frustrated with the erratic supply of honey leading to unfulfilled consumer demand. However, some retailers are in a position to procure more honey than others (sometimes due to personal relations with supplier) and demand higher than market prices during off seasons.

Processors who have engagements with FGs do not get sufficient honey from their contracted suppliers (the beekeepers' FG), either due to bad harvest or availability of buyers at better prices.

Hence some of the interviewed processors are considering entering into a contract with the FG with specific conditions, such as: renegotiated prices, supply to the designated road point, availability of a reliable and committed group representative/leader and commitment to supply a minimum quantity per consignment.

Similarly, the understanding with direct buyers (such as guest houses/ resorts and friends/ family/ neighbours selling at Thimphu Centenary market or other Farmers' market in bigger towns) is very informal.

Honey Value Chain Governance: The institutions/ organizations able to exert control along the chain and/or enforce parameters for chain operations and quality are covered in the governance section. These include: (i) overall Coordination and Leadership under National Apiculture

Program (NAP) under NH-RDC, working in collaboration with four Regional Livestock Development Centres (RLDCs), (ii) quality inspection by BAFRA, and (iii) registration and Regulation of FGs and Coops by DAMC.

Interventions in the value chain: Most of the ongoing interventions in the beekeeping industry were discovered along the production, collection and processing activities. Very little action was undertaken at the marketing end.

SWOT Analysis

Strengths:

- Local artisans being able to customize and supply box hives
- Indigenous knowledge passed on from generations
- Farmers' willingness to sell to processors
- High level integration in the VC
- Strong consumer demand for Bhutanese honey

Opportunities:

- Availability of RGoB support and technically sound beekeepers
- Strong donor support from Helvatas, GEF/ UNDP, EU, etc.
- Strong domestic and international demand
- Low opportunity cost of production
- Limitless forage for bees
- High demand for better packaged honey in home and overseas market
- Willingness of consumers to pay higher prices for better packaging
- High demand and margins for honey sold
- Multiple labels & packaging options coming up

Weaknesses:

- Dealing with small and scattered beekeepers which is costly and time consuming
- Lack of exposure trips to advanced locations
- Limited access to finance, modern apiary management skills, modern hives and certain inputs like wax
- Lack of information of final honey prices
- Rudimentary processing technologies, poor packaging, sealing & labelling materials
- High cost of collection due to scattered small scale producers
- Customer complaints about packaging
- High transportation costs
- Inadequate supply of honey especially during off season

Threats:

- Limited productivity with *cerana* bees
- Predator attacks
- Changing climatic conditions
- Weak linkages with processors
- Unreliable supply from the beekeepers
- No economies of scale for processors
- Opportunity for a new entrant with deep pockets to monopolize the market
- Ad-hoc supply trends from the processors and beekeepers
- Cheaper & better packaged imported options available

Conclusions

Based on the industry overview and value chain mapping, following conclusions were drawn –

- Honey production and productivity is below the optimal yield in Bhutan for the two types of bee species in the Kingdom
- The honey business is a commercial enterprise in Bhutan (over 78% of the produced honey being sold in the market) with huge business potential
- With the current level of supply and demand, the local market for honey is more attractive than export markets. Export potential cannot be well quantified and realized until the supply is enhanced to meet the local demand to an extent
- Producers can capture much more revenue in the value chain if their training is extended to basic processing and filtering techniques
- Processors are wary of making huge investments in innovative packaging and modern processing techniques due to the uneven supply of honey and their inability to reap benefits of economies of scale
- Processors are more integrated than most actors in the value chain
- Honey marketing in Bhutan is semi-formal and not very well organized
- The ongoing interventions focus mostly on inputs supply and production side of the value chain, with almost no focus on the marketing end
- While most consumers are happy with the quality of Bhutanese honey, packaging is an increasing concern
- There is a big disconnect between service availability and access

Recommendations

The findings from the SWOT analysis and the conclusions sections were used to identify potential interventions that could be initiated by RGoB agencies and other value chain service providers:

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In the short term, it will be imperative to enhance production and productivity and introduce basic improvements in processing and packaging. These can be achieved with the help of following interventions –

- Enhance production through interventions targeted at (a) expansion of beekeeping to new and upcoming dzongkhags, (b) exposure trips for select small and medium scale beekeepers, and (c.) facilitate access to affordable financing for large scale producers to boost production
- Roll out of plans for the producers to switch from log hives to box hives
- Train producers into areas of basic processing and packaging at the farm-gate level
- Improve processing, packaging and quality inspection
- Review BeCoB's pricing mechanism
- Attract investments in the sector facilitate the above

In the medium term, there should be an effective transition into market-focused interventions, including –

- Develop structured trade in the honey sector through strengthening the linkages between producers, processors, and marketers
- Transition of interventions from inputs supply and production to marketing end of the value chain
- Development of market information structures for efficient delivery of information
- Adherence of packaging and labelling with 'Brand Bhutan'
- Strengthen value chains institutions in good governance, development of improved technologies locally and quality enforcement & adherence

The vision ***in the long term*** is to have achieved adequate supply for the domestic market and to explore export markets and utility of honey and its by-products in another areas. The interventions in the long term include –

- Processors' investments in export-quality processing and packaging techniques and equipment
- Research and development into high-end, niche honey varieties
- Explore export opportunities
- Research into feasibility of honey by-products and their use as input in home-made goods, such beauty or cosmetic products

LIST OF ACRONYMS

BAFRA	Bhutan Agriculture and Food Regulatory Authority
BDBL	Bhutan Development Bank Limited
BEA	Bhutan Exporters Association
BeCoB	Beekeepers Cooperative of Bhutan
BEKAB	Beekeeping Association of Bhutan
BOIC	Business Opportunity and Information Centre
DAMC	Department of Agricultural Marketing and Cooperatives
DLO	Dzongkhag Livestock Officer
DoL	Department of Livestock
EOs	Extension Officers
EU	European Union
EU-TCP	European Union Technical Cooperation Project
FGs	Farmer Groups
FYP	Five Year Plan
GEF	Global Environment Facility
GoI	Government of India
ICIMOD	International Centre for Integrated Mountain Development
MoAF	Ministry of Agriculture and Forests
MoEA	Ministry of Economic Affairs
MRP	Maximum Retail Price
NAP	National Apiculture Program
NH-RDC	National Highland Research and Development Centre
NPHC	National Post Harvest Centre

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OGOP	One Geog One Product
R&D	Research and Development
RDC	Research and Development Centre
RGoB	Royal Government of Bhutan
RLDC	Regional Livestock Development Centres
SGP	Small Grants Program
UNDP	United Nations Development Programme
VC	Value Chain
VCA	Value Chain Analysis
YBC	Youth Business Cooperative

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1. INTRODUCTION AND BACKGROUND

1.1. Project Background

Bhutan is a small mountainous country where more than 60% of the total population lives in rural areas practicing subsistence agriculture, rearing livestock, and using different varieties of forest produce. The country has an area of 38,394 sq. km and is situated on the southern slopes of the Eastern Himalayas. The country is landlocked between China in the north and India to the east, south and west. The physical feature of Bhutan is characterized by high rising rugged mountains and an intricate network of deep valleys, ravines and depressions earmarking watercourses, drainage basin, waterfalls, human settlements, glacial lakes and moraine. The most dominant land cover is forests, making up 70.46% of the land area while shrubs account for 10.43%, cultivated agricultural land and meadows account for 2.93% and 4.10% respectively. Snow cover constitutes 7.44% while bare areas constitute 3.20%¹. Degraded areas, water bodies, built up areas, marshy areas and non-built up areas constitute less than 1% each².

Development in Bhutan is guided by the philosophy of Gross National Happiness (GNH) which is based on the concept of sustainable development. This philosophy advocates that development should be planned and implemented in a holistic and balanced manner by integrating social, spiritual, economic and environmental realities of development.

Agriculture is a priority sector in Bhutan as it represents the main source of livelihood and income for two-thirds of the population and, most notably, the poorest segments of the society. The RNR is the primary sector comprising of agriculture (crops), livestock (includes honey and fishery) and forestry sub-sectors. It provides employment for over 60% and 77% of the national and rural total work force respectively³.

Bhutan is home to many species of bees, such as *apis dorsata*, *apis mellifera*, *apis cerana* and *apis trigona*. Additionally, the Kingdom is blessed with abundant bee flora in the natural vegetation, and fruit crops and vegetables. The combination of these two factors has made beekeeping an agrarian occupation practiced over generations in Bhutan. However, the commercialization of beekeeping is a recent phenomenon. Earlier, beekeeping was practiced on a small scale for self-consumption of honey or as an opportunity to earn subsidiary income.

¹ Annex 2, Terms of Reference of MoAF-EU proposal

² MoAF, 2011a

³ Labour Force Survey 2015

In a step to further the professionalization of beekeeping in Bhutan, a study on honey value chain was commissioned under the leadership of Department of Agricultural Marketing and Cooperatives (DAMC), Ministry of Agriculture and Forests (MoAF).

1.2. Objectives of the Study

The key objective of this consulting assignment is to strengthen the Bhutanese honey value chain in order to enhance production and income for the beekeepers, and ensure efficiency in value addition activities, through identification of new opportunities and addressing the existing constraints.

The scope of work in this lot is to build a comprehensive report on honey value chain, including recommendations on exports to new export destinations and training materials for the extension officers.

1.3. Methodology

This report has employed the value chain and SWOT analytical methods to achieve its objectives. The value chain approach is a framework which uses both the functional and economic analysis (at market prices) of an identified value chain (FAO, 2005). The functional analysis was used to define the actors in the honey value chains while the financial analysis was used to analyse the economic returns of the different actors in the value chain(s).

In the functional analysis, different actors in the chain and the roles they play in the chain were identified. The functional analysis involved: a) identification of physical flows, b) identification of technical functions of the chain, c) identification of agents and quantification of physical flows.

The financial analysis of the honey value chain was a data intensive approach which involved identification of the inputs used in the value chain as well as the resulting output(s) and attaching economic values to them. The aim of financial analysis was to determine: a) revenue generated by each value chain agent, b) cost benefit analysis for the value chain actors, c) profitability of the value chain, d) the margins between agents, and e) attempt to identify any inefficiencies in the chain.

The internal and external situation analysis can produce a large amount of information, much of which may not be highly relevant. The SWOT analysis therefore served as an interpretative filter to reduce the information to a manageable quantity of key issues. The SWOT analysis classified the internal aspects as strengths or weaknesses and the external situational factors as opportunities or threats. Strengths served as a foundation for building a competitive advantage by value chain actors, whilst weaknesses are the constraints internal to the chain. By understanding these four aspects of the honey value chain, actors can better leverage their strengths, correct their weaknesses, capitalize on opportunities and mitigate potential threats.

1.3.1. Data Sources

Both primary and secondary data sources were used in this study. The main sources of secondary data included: MoAF, National Apiculture Program (NAP) under National Highland Research and Development Centre (NH-RDC), Department of Livestock (DoL) publications, Department of Revenue Customs (DRC), RNR Statistics, BeCoB documents, Civil Society Organizations (CSOs), private businesses, International Centre for Integrated Mountain Development (ICIMOD), Food and Agriculture Organization (FAO), development agencies and previous Value Chain Analysis (VCA) studies.

More specifically, the following information on honey in Bhutan was assembled from the sources below:

- Livestock Statistics, Department of Livestock (DoL), 2013, 2014, 2015 and 2016
- Bhutan Trade Statistics, Department of Revenue and Customs, Ministry of Finance, 2015, 2016 and H1 2017
- Honey studies by NH-RDC, Jakar and International Centre for Integrated Mountain Development (ICIMOD)
- Public and private sector players (including market leaders) that influence the flow of trade
- Underlying policies, institutional, and infrastructural issues that affect the competitiveness of the honey value chain
- Current and planned interventions of governments and development agencies in the sector

With respect to primary data, the following honey-specific data was collected:

- Costs, production, sales volumes, values and margins
- Inputs and products' prices and trends
- Types of facilities and services offered/ that are available, for the sector as well as the terms and conditions for accessing these. These were collected from buyers/processors.
- Data on support services to the honey value chain, trade volumes, costs and margins, constraints and opportunities was also collected. This data were especially collected from processors, traders and retailers.
- Other value chain institutions like market information providers, input suppliers, and technical assistance providers also provided data on nature of services they provide, their target recipients, the constraints they face in providing these services and any unexplored opportunities.

1.3.2. *Data Collection from the Field*

Field visits were conducted in select districts as shown in Table below. The dzongkhags were selected upon discussion with the DAMC, guided by the following criteria:

- Districts where the production of honey is significant by volume; and/or
- Districts where there is significant trade of honey and/or honey products;
- Areas where the consumption of honey by volume is significantly high to present an attractive market
- District where beekeeping originated and now has the strongest cooperative in the sector

Table 1: List of Districts Selected for Honey VCA

<i>Selected dzongkhag</i>	<i>Sample geogs</i>	<i>Rationale for selection</i>
Bumthang	Chhoeckhor primarily and Chummy	Most significant production and wholesaling activities; home to BeCoB
Tsirang	Doonglagang, Patshaling, and Rangthangling	Relatively significant <i>cerana</i> production
Thimphu	Chang and Kawang	Significant trading activities

From each of the dzongkhags, sample geogs were selected by the DAMC and 43 individual respondents were interviewed along the value chain⁴. The details are exhibited in the Tables below:

Table 2: Distribution of Respondents for Primary Data Collection on Honey

<i>Sl. No.</i>	<i>Dzongkhag</i>	<i>FGs/ Producers</i>	<i>Processors</i>	<i>Traders</i>	<i>Public Officials</i>	<i>Total</i>
1.	Bumthang	4	1	3	3	11
2.	Tsirang	9	-	3	3	15
3.	Thimphu	2	4	9	2	17

⁴ Sample questionnaire is attached in Annex I

Total:	43
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Table 3: List of Respondents for Primary Data Collection on Honey

<i>Dzongkhag</i>	<i>List of Respondents</i>												
Bumthang	<ul style="list-style-type: none"> - Commercial producers, including beekeeping expert Mr. Maurer - BeCoB Chairman - Farm shop(s) in town - Retailers in town - NH-RDC Officer - RELDC Officer - Chhoekhor Extension Officer 												
Tsirang	<ul style="list-style-type: none"> - 9 representative producers from Doonglagang, Patshaling and Rangthangling Farmer Groups (FGs) - Roadside stalls along the highway - Extension Officers for each of the 3 geogs - Dasho Dzongdag 												
Thimphu	<table border="0"> <tr> <td>- DAMC Officials</td><td>- 8 Eleven</td></tr> <tr> <td>- Commercial producers</td><td>- Shop no. 7</td></tr> <tr> <td>- SABAH Bhutan</td><td>- My Mart</td></tr> <tr> <td>- Bio-Bhutan</td><td>- Chuniding Foods</td></tr> <tr> <td>- YBC</td><td>- 5 Traders at the Centenary Market</td></tr> <tr> <td>- OGOP Program</td><td></td></tr> </table>	- DAMC Officials	- 8 Eleven	- Commercial producers	- Shop no. 7	- SABAH Bhutan	- My Mart	- Bio-Bhutan	- Chuniding Foods	- YBC	- 5 Traders at the Centenary Market	- OGOP Program	
- DAMC Officials	- 8 Eleven												
- Commercial producers	- Shop no. 7												
- SABAH Bhutan	- My Mart												
- Bio-Bhutan	- Chuniding Foods												
- YBC	- 5 Traders at the Centenary Market												
- OGOP Program													

1.3.3. *Data Analysis*

The data for the different value chain actors were entered in spread sheets and cleaned for any outliers. The first step of the analysis involved descriptive statistics which were conducted to aid in characterising honey production, consumption and marketing in Bhutan.

The second step involved functional and financial analysis of the honey value chain. The functional analysis of the value chain involved mapping of the value chain, identification of the roles of the different actors at different stages and quantification of volumes of honey along the value chain. The flow of volumes along the chain is an important function; however we had to base this quantification on estimates based on the findings from the field.

The third step was to undertake a financial analysis of the value chain which involved attaching prices to the various quantities of outputs and inputs along the value chain. The aim of this

analysis was to determine the financial returns to the different agents of the value chain and also determine the value added at each stage of the chain.

Finally, a SWOT analysis of the honey value chain was conducted. Factors that influence the internal workings of the chain were categorised into strengths and weaknesses, while those influencing the chain from outside were categorised as opportunities and threats. The aim was to determine the factors that make the chain competitive so as to capitalize on them but also identify those that may weaken or threaten the chain so that their effects could be mitigated.

1.3.4. Limitations

Below are a few limitations encountered during the study, due to the nature of the beekeeping industry in Bhutan and the consultant's sampling techniques –

The coverage of geographies had to be limited on sampling basis. We limited our field work to Bumthang, the most developed beekeeping destination in Bhutan, and Tsirang, an upcoming destination for beekeepers. Other upcoming dzongkhags such as Chhukha, Dagana, Samtse, Sarpang, etc. were excluded from the field itinerary.

Most of the actors were not willing to disclose information related to costs of operations and revenues which would help determine more accurate gross margins. Margins for processors, wholesalers and retailers were difficult to calculate as their revenues, costs and volumes were unavailable. Similarly the beekeepers couldn't provide accurate numbers on revenue and costs. Hence the calculated gross margins only provide estimates based on the imperfect information collected from the field.

Traders are not categorized into low, medium and large scale traders. Inadequate definition of these categories resulted into wide ranges. There are no wholesalers defined by the market. Based on the data collected from interviews and market visits, BeCoB and few middlemen could only be deduced as wholesalers in the value chain.

Information on quantity of flows from one agent to another was unavailable. After we were able to map the players in the value chain and define their technical functions, a quantification of the amount of honey they were trading would have been most helpful. However, due to unavailability of data, mapping of volumes among channels had to be based purely on guesstimates.

Information on exporters and potential export quantities was unavailable: During the consultation process, no information on honey exporters was accessible. Also, (quantifiable) analysis on export potential was difficult to perform as the current production is inadequate to meet the domestic demand, hence no supply related questions could be addressed during conversations with potential importers in the region.

2. OVERVIEW OF HONEY INDUSTRY IN BHUTAN

2.1. Beekeeping in Bhutan

The foundation for a sustainable honey industry in Bhutan was laid in 1997 with the establishment of Beekeeping Association with assistance from Helvetas. However, the development work in the industry started shaping much earlier beginning with the import of *Apis mellifera* bees from India in 1986.

In the early 1970s, *Apis dorsata* – the giant honeybee commonly known as rock bee – was more dominant in the country. However it was soon realized the species could not be domesticated. Moreover, the rock bee population declined rapidly, even disappeared in several districts, suddenly in the mid-80s in Bhutan and India.

Apiculture was increasingly recognized as a vital industry in the 90s – an industry that can alleviate poverty and contribute to conservation of genetic resources, especially with the establishment of the Beekeeping Association of Bhutan (BEKAB), now called Beekeepers Cooperative of Bhutan (BeCoB), in Bumthang.

The beekeeping industry in Bhutan has huge potential for a large-scale production because of presence of indigenous species of bees and diverse nectar-rich vegetation in its most pristine natural environment. The indigenous *apis cerana* and *apis trigona* (*trigona* in very small quantities though) and the imported *apis mellifera* are currently used for honey production in Bhutan.

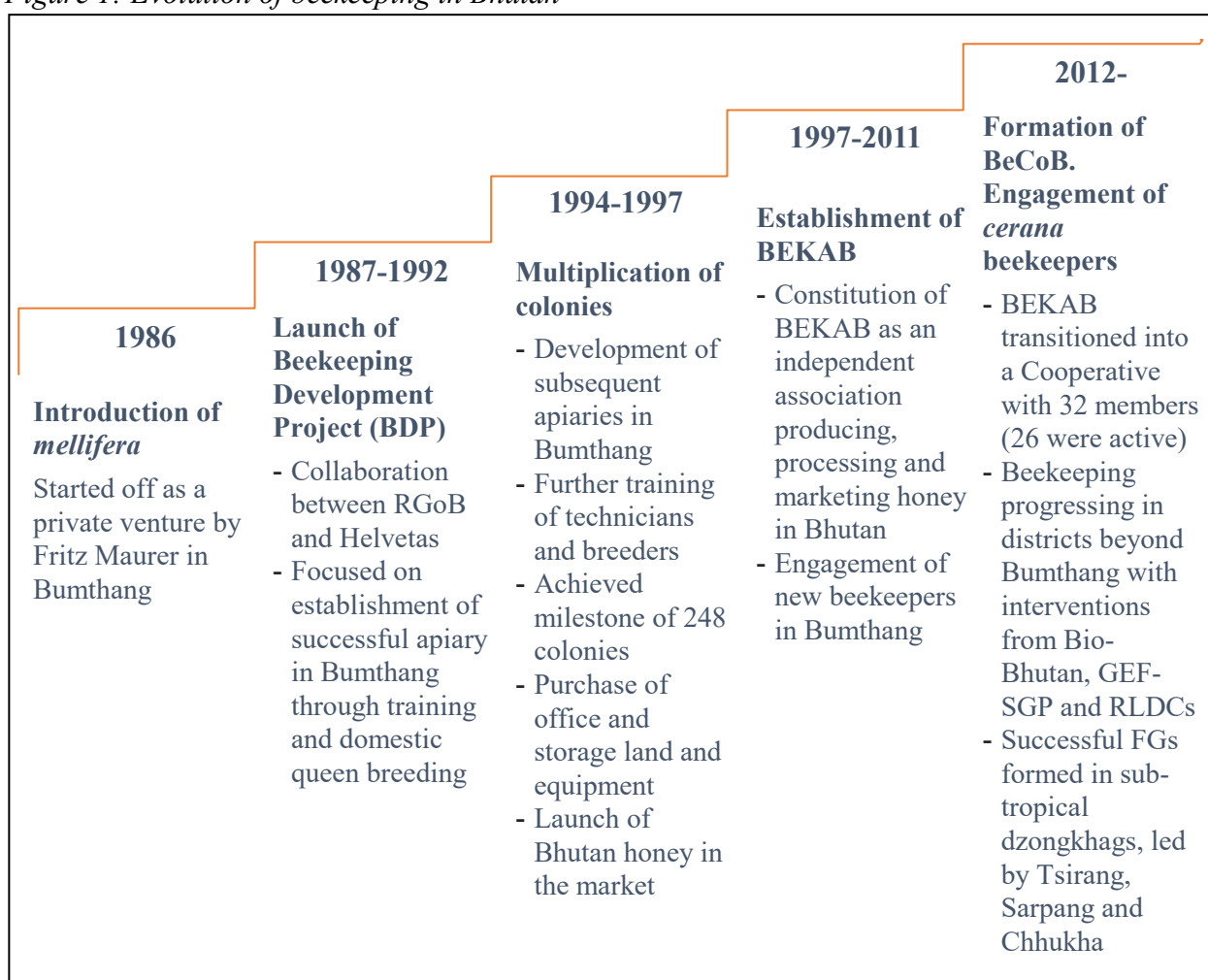
The Cooperative's primary objective is to promote a sustainable beekeeping industry in Bhutan with the purpose of adequate honey production and farm pollination. For decades, BeCoB has been furthering the development of beekeeping in the Kingdom by providing tools and resources, including training workshops, advisory services and educational materials to help local beekeepers advance their technical capacity. The Cooperative has 87 members registered as of September 2017, as compared to approximately 32 members in April 2012.

National Highland Research & Development Center (NH-RDC), DoL, MoAF, Jakar, Bumthang, in coordination with Regional Livestock Development Centers (RLDC) and Livestock Offices at dzongkhag and geog levels, supports small and medium beekeepers with necessary training and awareness programs, provision of beekeeping inputs and equipment at subsidized rates, and construction of honey collection sheds. Additionally NH-RDC is engaged in honey research in the areas of productivity, value addition, packaging, and feasibility of beekeeping in high altitudes.

2.1.1. Evolution of Beekeeping in Bhutan

Beekeeping in Bhutan dates back to 1960s and 1970s when several attempts were made by the government to introduce beekeeping although without much success. However, with the involvement of Mr. Fritz Maurer, a Swiss beekeeping expert, the developments mentioned in Figure 1 started to emerge.

Figure 1: Evolution of beekeeping in Bhutan⁵



Although commercial beekeeping started in Bumthang, farmers in the subtropical dzongkhags, such as Gelephu, Tsirang, Sarpang, Dagana, Chukha, and Samtse are increasingly adopting *cerana* beekeeping for commercial purposes.

⁵ Based on interviews with BeCoB, RDC and Bio-Bhutan

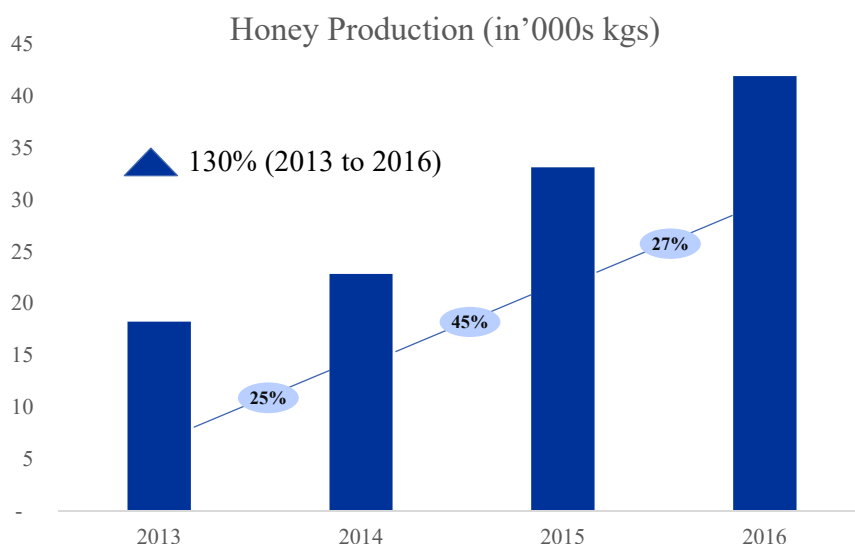
2.2. Honey Production and Productivity Trends

2.2.1. Production

Beekeeping is a very favorable enterprise for households of all sizes in Bhutan. Moreover, the uniqueness of Bhutan's natural flora and fauna contributes in production of honey with superior characteristics, such as flavor, taste, texture and color.

Figure 2: Honey Production in Bhutan (in '000s kgs)

As a result, Bhutan has experienced a steady growth in honey production over the recent years. The total production in 2016 was 41,924 kilograms (kgs) as compared to 18,263 kgs in 2013⁶. In the early days, the production was limited to Bumthang, Sarpang, Tsirang, and Chhukha dzongkhags. Gradually the beekeeping practice expanded to other dzongkhags such as Dagana, Haa, Punakha, Samdrup Jongkhar, Samtse and Wangdue.



Bumthang however continues to be the beekeeping hub of Bhutan accounting for over 50% of the production every year (accounting for as high as 83% of the total production in 2013).

The total honey production by dzongkhags is represented in the table below:

Table 4: Honey Production by dzongkhag (2013-16)³

Honey Produce (in kgs)	2016	2015	2014	2013
Bumthang	21,985	21,460	10,504	15,180
Chhukha	1,928	1,103	899	476
Dagana	2,213	2,259	2,011	
Haa	30			
Punakha	102	74	25	7

⁶ Livestock Statistics, Department of Livestock (DoL), 2013, 2014, 2015 and 2016

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Samdrup Jongkhar	262	193	68	
Samtse	3,190	3,279	1,964	
Sarpang	9,579	2,555	4,977	1,383
Tsirang	2,573	2,207	2,417	1,217
Wangdue	62			
Total	41,924	33,130	22,865	18,263
Share of Bumthang (%)	52%	65%	46%	83%

The majority of beekeepers in Bhutan are small scale producers producing *apis cerana* honey. Traditionally beekeepers used log hives for *cerana* bees; however, beekeepers are gradually transitioning to box hives with movable frames (*langstroth hives*) with ongoing awareness and subsidy programs. These beekeepers apply a mixture of indigenous management practices transferred from generations and learnings from various trainings conducted in their geogs.

On the other hand, *apis mellifera* beekeeping is popular mostly in Bumthang. The beekeepers in Bhutan are relatively more progressive averaging over 50 hives⁷ per farmer. Most farmers in Bumthang practice beekeeping on some scale. A small scale beekeeper would own around 1-5 hives producing honey for household consumption. While the large scale, commercial beekeepers own about 100-300 hives⁸. All beekeepers in Bumthang use box hives with movable frames.

In the recent years, beekeepers from Bumthang have started practicing migratory beekeeping that provides the bees with better forage and harnesses honey sources in their natural state, avoiding the dependence on concentrated bee forage plantations. The migratory practice has substantially increased the honey yield for the beekeepers. Beekeeping has started picking up in Thimphu reaping the benefits of migratory practices.

Cerana and *mellifera* beekeeping practices differ in terms of origin, their hive type and size, feed and forage, advantages and disadvantages as shown in the table below:

Table 5: Differences between *cerana* and *mellifera* practices

Description	<i>Apis cerana</i>	<i>Apis mellifera</i>
Origin	Bhutan, indigenous species	Italy, but the initial ones were imported from India
Bee size and	Mild, tolerant, timid, and low stinging	Relatively bigger in size; susceptible

⁷ Interview with Tul Bahadur, BeCoB Chairman

⁸ Interviews with beekeepers in Bumthang

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resistance to diseases	bees; relatively smaller in size. Resistant to European foulbrood and Varroa mites	to brood diseases and mites; needs special management in terms of technology, knowledge, and skills
Hive type	Traditionally bred in logs; the colonies are now maintained in modern boxes with frames (the box however is smaller than <i>mellifera</i> box)	Maintained only in modern/ <i>langstroth</i> boxes with removable frames
Productivity	Average: 5.5 kg per year Maximum: 10 kg per year	Average: 30 kg per year Maximum: 90 kg per year (with migratory practices)
Advantages	No sugar feeding; 100% natural honey Natural adaptability and abundant availability Resistant to diseases and predators	Much higher productivity compared to <i>cerana</i> colonies The productivity can be further enhanced using migratory practices
Disadvantages	Low productivity Most farmers continue to breed <i>cerana</i> in log hives instead of modern boxes Primarily suited only in Southern belts of Bhutan	Compulsory sugar feeding during winter seasons Can't survive predator attacks, such as hornet, etc., especially prevalent in Southern belt Successful only in Bumthang and Thimphu so far

There's also a third kind of rare honey, locally called the *pudka* honey, produced mainly in the southern dzongkhags. The *pudka* honey is produced from the *apis trigona* species in drummer bee colonies. The productivity is very low which makes this honey extremely rare and expensive.

Apis trigona, a stingless bee species, is much smaller in size as compared to the *cerana* and *mellifera* bees - about three to five millimeters in size, with a slimmer body structure.

The honey from *trigona* bees is sometimes known as Mother Medicine – researchers believe it contains much more nutrients than regular honey. It is believed to cure common ailments, such as cough and cold, pneumonia, ingestion, wound and fracture, and some infectious diseases in Bhutan. It has a tangy, sour and sweet taste with a unique aroma. Due to its small size, these stingless bees can retrieve more nectar residing deeper in the floral nectarines.

Pudka honey contains many vitamins and minerals, among which is propolis, produced from the

bee's saliva mixed with its food such as pollen, bark, tree shoots and flowers. Each *trigona* hive is capable of producing approximately 700 grams of honey.

The farm gate price is as high as Nu. 3,000 - 4,000 per kg and the retail price can range from Nu. 4,000 – 4,500 in local markets and Nu. 5,000 – 6,000 in markets in Thimphu.

2.2.2. *Productivity*

The honey productivity of bee species vary and is dependent on the type of hive used, as well as the management practices applied. The current average productivities of *cerana* honey in traditional logs and *langstroth* are 2.5 kg/ hive/ year and 5.5 kg/ hive/ year while some of the other beekeepers in select locations have managed productivities of up to 10-15 kg/ hive/ year and 20-25 kg/ hive/ year respectively. Based on the difference between the current productivities and the potential productivities, the yield gaps of the two hives are 80%, and 75% respectively (based on the interviews with beekeepers in Tsirang and Dagana).

On the other hand, *mellifera* bees are only kept in *langstroth* with an average productivity of 30 kg/ hive/ year in the natural habitat of Bumthang. If the hives are migrated to different regions within Bumthang, the productivity increases to an average of 50 kg/ hive/ year. Some beekeepers have managed to even produce over 90 kg/ hive/ year with effective hive migration and management practices.

Although *cerana* bees produce much lesser honey, they are widely preferred by majority of the beekeepers across Bhutanese dzongkhags, except Bumthang. This is attributed to the *cerana*'s abundant availability, natural adaptability and high resistance to predators. The *cerana* preference is further accentuated by its low cost (due to no sugar feeding) and experience passed over generations.

However, it should be noted that the productivity of all beehives is also dependent on the size and type of the hive, siting of the hives and type of vegetation around the hives' site and the climatic conditions. These factors influence the strength of the bee colony and the honey yield; for example, increased rainfall decrease the annual harvest by at least 10 kg.

In addition to determining honey productivity, vegetation also affects flavor, color and viscosity of honey.

2.3. **Honey Extraction and Processing**

Honey is traditionally extracted through squeezing the comb with hand and draining/ filtering it through clean cloth. Most beekeepers, except the ones in Bumthang, use the draining method to extract honey. However, with the introduction of box hive with movable frames, beekeepers are slowly starting to use honey extractors. And, some of them use metal container with holes to drain/ sieve honey.

Nonetheless, some *cerana* beekeepers continue to use their hand despite having access to extractors because the extractor available is not of the right type (the *cerana* frames are smaller hence require a relatively smaller extractor). Some of such beekeepers also tend to sell comb honey (cut comb) instead of squeezing and draining.

Most beekeepers harvest only matured capped comb and resultant honey is generally pure.

In Bumthang, most beekeepers use BeCoB vehicles to bring their frames (honey supers) to BeCoB for extraction, filtration and moisture checks. The cooperative conducts moisture and quality checks to ensure the moisture content is below 18%.

Similarly, organizations such as Bio-Bhutan, Queen's *One-Geog-One-Product* (OGOP) project, and SABAH Bhutan collect honey from beekeeping farmer groups (FGs) in various dzongkhags and carry out primary processing. Some of their primary processing techniques include, (a.) water bath to maintain a desired honey temperature; (b.) filtration done in one of two ways – filtration machine and/ or a clean cloth to filter impurities; and (c.) quality, moisture and sugar checks.

2.4. Packaging and Labelling

Bottling and packaging is done by select beekeepers and FGs, cooperatives, such as BeCoB, and processors, such as Bio-Bhutan, Queen's OGOP project, Youth Business Cooperatives (YBC) and SABAH Bhutan. These bottles are then sold to retail outlets and final consumers.

In most of the cases, the bottles are not sealed and some do not have labels even. The information provided on the labels is also not adequate, lacking details on: contents/ ingredients, batch information, packaging and expiry dates, certification/ quality details, and contact information of the producer/ processor.

On the other hand, majority of the *cerana* beekeepers fill their honey in re-used plastic bottle (mostly 750ml bottles which can fill over 1 kg of honey) available from liquor shops.

Also, some beekeepers from Bumthang sell their honey directly to the guest houses, resorts and hotels in barrels.

Some of the most common packaging and bottling options adopted the key players in the honey industry include –

Table 6: Retail bottling and labelling options for Bhutanese Honey

Entity	Bottle Sizes and Prices	Bottle Type/ Remarks
BeCoB/ Pure Honey Label	<ul style="list-style-type: none"> 275 g: Nu. 250 500 g: Nu. 500 	Glass bottles imported from Kolkata Available in cartons of 12 bottles

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Bio-Bhutan	<ul style="list-style-type: none"> • 250 g: Nu. 450 	Glass bottles imported from Kolkata
SABAH Bhutan	<ul style="list-style-type: none"> • 180 g: Nu. 290 	Glass bottles imported from Kolkata (working on new bottle type and sizes)
OGOP Project	<ul style="list-style-type: none"> • 240 g: Nu. 295 • 350 g: Nu. 455 • 500 g: Nu. 590 	Superior glass jars imported from China, Taiwan and Thailand
YBC	<ul style="list-style-type: none"> • 250 g: Nu. 250 	Glass bottles from Post-Harvest Centre of Ministry of Agriculture and Forests
Select FGs	<ul style="list-style-type: none"> • 275 g: Nu. 250 	Glass bottles supplied by RDCs For e.g, Patshaling Beekeeping Group label
Bespoke Honey Producers	<ul style="list-style-type: none"> • 385 g: Nu. 500 • 500 g: Nu. 500 	Glass bottles imported from Kolkata For e.g, Chuniding brand

Details of some honey labels is provided in Annex II.

2.5. Marketing and Consumption of Honey in Bhutan

2.5.1. *Marketing of Honey*

Honey is mainly marketed in three forms:

- Crude honey is a mash of combs and honey including brood and dead bees. This is the lowest grade of honey and has the lowest price. This is either kept for home consumption or sold in the local markets.
- Semi-refined honey is the liquid honey that remains when the wax has been skimmed off the top of crude honey. Semi-refined honey still contains particles of wax and other debris. It attracts a higher price than crude honey and is mainly sold in re-used plastic bottles (in 750 ml capacity) in the local, vegetable markets.
- Refined honey is strained to remove all particles of beeswax and other material making it the purest form of honey. This grade of honey fetches high prices in the market and can compete favorably with imported honey. This type is usually bottled and labelled by the market participants, such as BeCoB, Bio-Bhutan, OGOP, YBC, SABAH, etc.

Currently, the domestic market consumes over 99% of all the honey produced locally with the

rest being exported. The total exports amounted to 0.5% in 2016 and 0.3% in 2015⁹.

However, the Bhutanese market is hugely under-supplied and a significant amount of honey consumed in the domestic market is imported. In 2016 and 2015, honey import quantities exceeded the total annual production. Indian honey brands are able to compete in the market due to lower prices, more packaging options (availability of plastic jars and different capacities), and longer shelf life (per their labels).

The honey products market is segmented into wholesale and retail markets. The wholesale honey is normally sold in barrels or re-used plastic containers to processors and middlemen, and this honey is not quality checked and contains some impurities. There is a lot of trade that happens at the wholesale/ farm gate level with some farmers selling directly to final consumers within local communities.

The wholesale price for *mellifera* generally sticks to Nu. 500-600 per kg while the *cerana* wholesale price ranges from Nu. 500 to Nu. 850 per kg.

The retail segment caters to the middle and high income consumers who usually buy honey from supermarkets. This market segment goes for better packaging, branding and quality. The honey is normally packed in convenient glass jars ranging from 180 g to 500 g in capacity.

The supermarket shelf prices range from Nu. 850 to Nu. 1,000 per kg for Bumthang/ *mellifera* honey. However, the *cerana* honey brands sell from Nu. 1,000 to Nu. 1,800 per kg.

The high income consumers, like the expatriates and high income earners however stated some dissatisfaction with the available packaging options. The glass bottles are not well sealed and are vulnerable to leakages and breakages when carried long distances. While most consumers are happy with the quality Bhutanese honey, some of them complained of honey crystallization and unfriendly serving options.

The consumers also stated preference for *cerana* honey over *mellifera*, mainly because of the perception that *mellifera* honey may contain sugar due the sugar feeding practiced on *mellifera* bees. They rather preferred to pay a premium price for the *cerana* honey, which is now available in better packaging from OGOP and Bio-Bhutan brands.

Some of the consumers also preferred imported honey, some of which are available in smaller quantities and/ or squeezable bottles.

2.5.2. Consumption

Honey is consumed domestically for its perceived medicinal value and as a substitute for sugar. In the farming communities, it is also used for treating cattle infected with foot and mouth

⁹ Bhutan Trade Statistics, Department of Revenue and Customs, Ministry of Finance (2015, 2016, H12017)

disease.

Data on the performance of the honey sector, especially on domestic and regional demand, is insufficient to give a clear picture of the performance of honey markets in Bhutan. In general, little documentation has been done owing to the recent commercialization of production of honey. However, there is strong evidence (from interviews with retailers and consumers) that the demand for Bhutanese honey in domestic and global markets is higher than its supply.

2.6. Honey Exports and Imports

A significant amount of honey targeting low and middle income population is imported. This is evident from the growing import numbers and by the different imported brands on the shelves of supermarkets and grocery shops around the major towns/ cities. All honey imported into Bhutan is in form of natural honey.

As supported by the numbers below, almost 100% of the natural honey is imported from India in form of packaged brands such as Dabur, Real, Gaia, etc. Other countries exporting honey to Bhutan in small quantities include Thailand and Italy.

Table 7: Honey production, import and export statistics¹⁰

Honey Stats (in kgs)	H1 2017	2016	2015
Total Imports	18,116	42,793	34,536
Share of India in Total Imports (%)	98.87%	99.94%	99.60%
Total Exports	27	226	99
Total Production	N/A	41,924	33,130
% of Exports/ Production	-	0.54%	0.30%

Increase in imports can be attributed to the supply deficit, rapid rise of supermarkets coupled with increasing consumer incomes.

Based on the interviews with the RDC, traders and BeCoB, the supply deficit could be partly due to production irregularities at the beekeepers' end and low yield due to poor beekeeping practices.

Processors, such as BeCoB, OGOP, SABAH Bhutan, sourcing their honey directly from the beekeeping FGs in the villages also complained of inconsistent volumes from the beekeepers

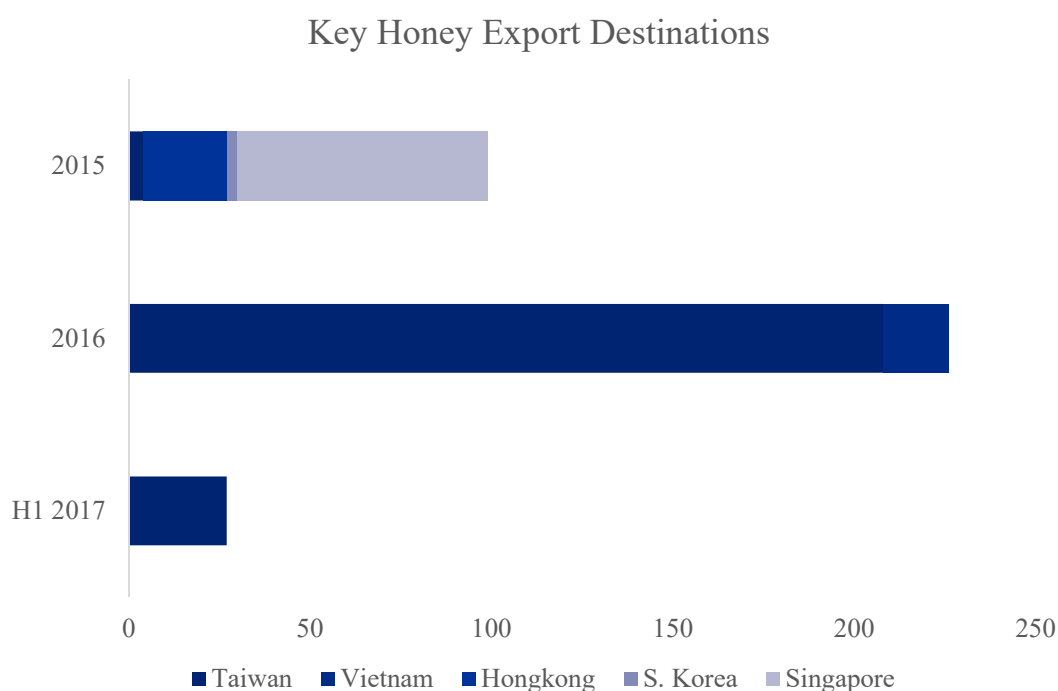
¹⁰ Bhutan Trade Statistics, Department of Revenue and Customs, Ministry of Finance

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leading to insufficient supply at their end.

Although little data is available on honey exporters, it is known that Taiwan, Hong Kong, Singapore, South Korea and Vietnam are currently the key export destinations for honey.

Figure 3: Key export destinations for Bhutan Honey



In terms of volume, Taiwan has dominated the export trends over the last couple of years. However the unit price fetched from Taiwan has been lowest so far. Singapore, on the other hand, was able to provide the highest unit price (per kg) as exhibited in the table below. The average export price per kg was US\$18.4 (~Nu. 1180 per kg) from 2015-16.

Table 8: Export Statistics for Bhutan Honey¹¹

Year	Export Stats	Quantity (in kgs.)	Price per kg (Nu.)	Price per kg (US\$)	Value (Nu.)
2016	2016 total	226	977.43	14.81	220,900
	Taiwan	208	1003.17	15.20	208,660
	Vietnam	18	680.00	10.30	12,240

¹¹ Bhutan Trade Statistics, Department of Revenue and Customs, Ministry of Finance

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2015	2015 total	99	1463.64	22.18	144,900
	Hong Kong	23	839.13	12.71	19,300
	S. Korea	3	1200.00	18.18	3,600
	Singapore	69	1730.43	26.22	119,400
	Taiwan	4	650.00	9.85	2,600

No information was available on the honey exporters¹². Although we learned about international tourists who purchased honey from their tour guides (who in turn bought honey from the traders at the Centenary Market) and Supermarkets in Thimphu. However, it is not confirmed whether the export figures above include purchase and sale of honey through these channels.

2.6.1. *Prospect of honey exports from Bhutan*

Situational analysis of global honey exports and imports:

Global sales from natural honey exports by country totaled US\$2.2 billion in 2016. Overall, the value of natural honey exports were up by an average 27.1% for all exporting countries since 2012 when natural honey shipments were valued at \$1.8 billion. Year over year, global exports of natural honey retreated in value by -3.6% from 2015 to 2016.

Among continents, European countries accounted for the highest dollar value worth of natural honey exports during 2016 with shipments amounting to \$825.3 million or 36.8% of international honey sales. That percentage compares with 23.5% from Asian exporters, 14.5% from Latin America (excluding Mexico) and the Caribbean, 10.6% from Oceania (mostly New Zealand trailed by Australia) and 7.8% from North America. African countries furnished a respectable 6.8% of exported natural honey.

Globally, fifteen (15) countries shipped over three-quarters (77.2%) of all natural honey exports during 2016 by value as displayed in the table below –

¹² Bhutan Exporters Association (BEA) too has not been engaged in honey export at any level

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Table 9: Statistics of top 15 honey exporting countries¹³

	Value of exports in US\$	Share in total honey exports (%)	Value of net exports ¹⁴	Change in export surplus since 2012
China	\$276.6 million	12.3%	Not available	Not available
New Zealand	\$206.7 million	9.2%	\$204.4 million	98.6%
Argentina	\$168.9 million	7.5%	\$168.8 million	-21.4%
Germany	\$144.9 million	6.5%	Not available	Not available
Sierra Leone	\$142.4 million	6.4%	\$142.4 million	-21231.0%
Spain	\$109 million	4.9%	\$43.7 million	38.7%
Ukraine	\$108.2 million	4.8%	\$108 million	249.7%
Mexico	\$93.7 million	4.2%	\$93.7 million	-7.6%
Brazil	\$92 million	4.1%	\$91.8 million	75.4%
Vietnam	\$75.9 million	3.4%	\$75 million	29.5%
Hungary	\$74.2 million	3.3%	\$71 million	14.5%
Belgium	\$72.4 million	3.2%	Not available	Not available
India	\$70.8 million	3.2%	\$69.7 million	21.2%
Canada	\$54.4 million	2.4%	\$25.6 million	-56.6%
Romania	\$41.5 million	1.9%	\$32.5 million	-17.6%

Among the above countries, the fastest-growing natural honey exporters since 2012 were: Ukraine (up 247.9%), New Zealand (up 98.9%), Brazil (up 75.8%), Spain (up 36.5%), Belgium (up 32.1%) and Vietnam (up 30.6%).

Three countries posted declines in their exported natural honey sales: Canada (down -26.4%), Argentina (down -21.4%) and Mexico (down -7.7%).

New Zealand has the highest surplus in the international trade of natural honey. In turn, this

¹³ World's top exports website (<http://www.worldstopexports.com/natural-honey-exporters/>)

¹⁴ Net exports is the value of a country's total exports minus the value of its total imports

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positive cash flow confirms the Oceania island nation's strong competitive advantage for this specific product category (Manuka honey).

On the other hand, United States has the highest deficit in the international trade of natural honey, followed by Japan. The negative net exports value confirms America's strong competitive disadvantage for this specific product category but also signals opportunities for natural honey-supplying countries that help satisfy the powerful demand from American consumers.

Table 10: Statistics of top 15 honey importing countries¹⁵

	Value of net exports (deficit), 2016	Change in net export deficit since 2012
United States	-US\$45 billion	up 96.9%
Japan	-\$14.3 billion	down -2.7%
China	Not available	up 48.8%
Russia	-\$6.5 billion	down -35.7%
Australia	-\$4.1 billion	down -9.1%
Saudi Arabia	-\$3.2 billion	up 9.9%
South Korea	-\$2.7 billion	up 26.9%
Spain	-\$2.7 billion	up 33.1%
Brazil	-\$2.4 billion	down -3.4%
Turkey	-\$2 billion	down -6.3%
Taiwan	-\$1.9 billion	up 11.6%
Romania	-\$1.8 billion	up 23.6%
Poland	-\$1.6 billion	down -20.4%
Czech Republic	-\$1.6 billion	down -17.4%
Egypt	-\$1.5 billion	up 21.6%

¹⁵ World's top exports website (<http://www.worldstopexports.com/natural-honey-exporters/>)

Potential of Bhutanese Honey Exports:

Based on the table above, Japan, China, and South Korea are the top three countries in the region with extremely high honey demand. Additionally, based on our conversations with the stakeholders in the honey value chain, countries such as Singapore, Taiwan, Thailand and India would also be interested in importing Bhutan honey.

Bhutanese honey is well appreciated by global tourists and other visitors in Bhutan. When we interviewed purchase and category managers of high-end supermarkets in the region, they seemed keen on the prospect of trying and stocking Bhutan honey in their stores. However, their foremost concern was maintaining consistency in supply, followed by questions concerning pricing and packaging/ labelling.

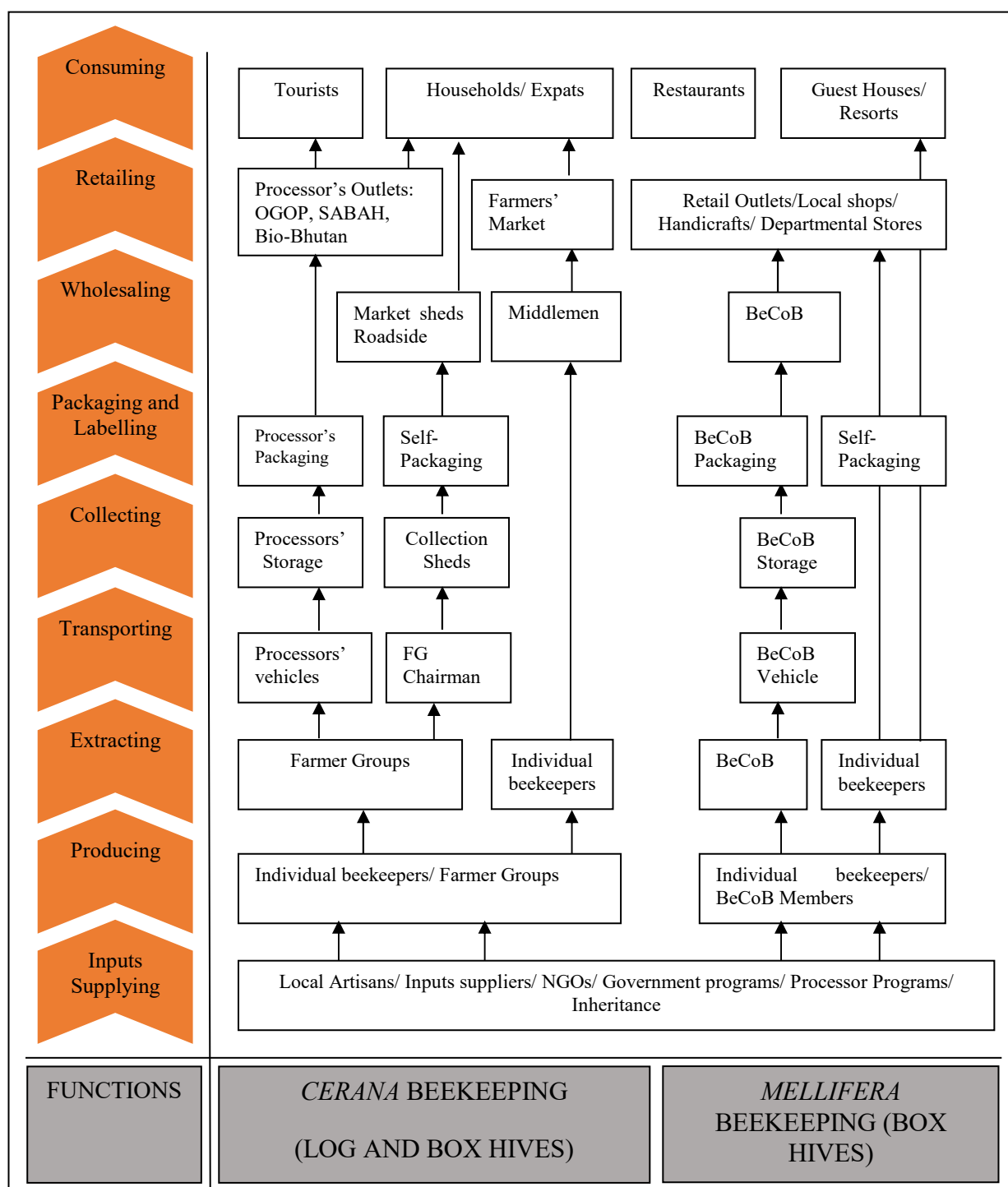
Unless the production in Bhutan is adequate to fulfil domestic demand to an extent, building a pipeline of potential buyers in the region or understanding their requirements is difficult.

3. VALUE CHAIN ANALYSIS

3.1. Core Processes within the Honey Value Chain

The key activities and processes that enable honey to reach the final consumer is mapped below:

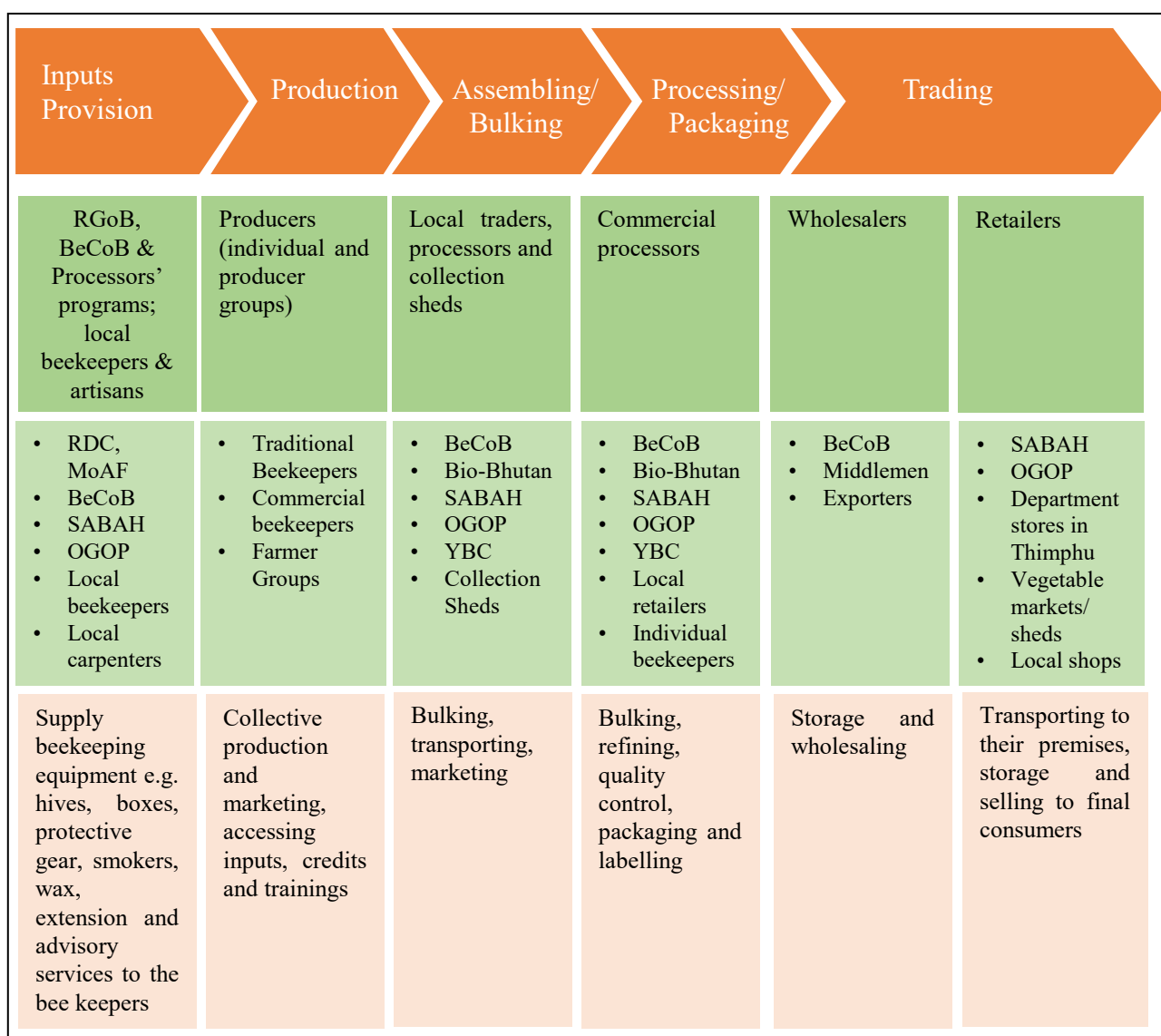
Figure 4: Honey Value Chain Core Processes



3.2. Value Chain Actors and Functions

The main actors in the honey value chain are: input suppliers, beekeepers (producers), processors and collectors who also double as transporters and wholesalers and traders, exporters, retailers and consumers:

Figure 5: Honey Value Chain Core Actors and Functions



Inputs suppliers: The key inputs suppliers include government agencies, such as RNR Research and Development Centres, (primarily National Highland Research and Development Centre (NH-RDC)), and Cooperatives, such as BeCoB. These inputs include beehives (*langstroth*/ box hives with movable frames), bee suits, honey extractors, smokers and gloves. Additionally, there are also local beehive manufacturers who make and sell box hives with or without bees in them.

Lot 1 - Value Chain on Honey, Technical Cooperation Project in support of the Renewable Natural Resources Sector in Bhutan

Some of the key inputs supplied the RDCs, with their respective prices and subsidy packages are exhibited below:

Table 11: Inputs supplied by NH-RDC under the National Beekeeping Program

Beekeeping Equipment (One time support)	Price (NH-RDC, 2017)	Subsidy Support (%)	Criteria and maximum support limit
1 set starter package (based on availability) consisting of smoker, veil, hive tools, roller, gloves, queen cage, queen gate, bee brush, transportation rope grafting tools, swarm bag	Nu. 4,000/package	80%	Maximum one per group member
Beekeeping suit (white) with veil, dungaree type	Nu. 3,900/pc	50%	Maximum one per group member
Improved movable frame hive set, empty brood box & super with 10 frames. (<i>Apis mellifera</i> & <i>Cerana</i>), without queen & bees	Nu. 3,000/set, <i>mellifera</i> & Nu. 2500/set <i>Cerana</i>	80%	Maximum 5 hives per group member
Packaging bottles with caps/ product labels/ cartoon box	Nu. 25/ bottle with cap and labels	500 Nos	One time support based on production output of more than 1000 kg per group
Automatic honey filler	Nu. 350,000	50%	Maximum one per group of minimum 50 members or producing at least 1500kg honey per year.
Casting machine	Nu. 78,000/set	80%	Maximum one per group of minimum 50 members or producing at least 1500kg honey per year
Honey extraction machine (medium size)	Nu. 35,000/set	80%	Maximum one per group of minimum 50 members or producing at least 1500kg honey per year

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Honey extraction centre, with sale counter & processing room	Nu. 0.500 Mill/centre	100% (community contract, labour contribution)	Maximum one for successful group of 50 members producing at least 1500kg honey/ year
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Additionally, the local producers and artisans also supply inputs to their fellow villagers.

Table 12: Inputs supplied by local producers and artisans

Beekeeping Inputs	Price (in Nu.)
Improved movable frame <i>Cerana</i> hive Set	Nu. 2,200 – 2,700
Improved movable frame <i>Mellifera</i> hive set	Nu. 2,500 – Nu. 3,000
Box without frames	Nu. 700
Box with live colony	Nu. 12,000
Colonies with live colony and honey (harvest season)	Nu. 15,000
Queen Bee	Nu. 1,000 – Nu. 2,000
Nuc without box (Frames with queen and bees)	Nu. 4,500
Nuc with box	Nu. 8,000
Wax	Nu. 1,000 – 1,100

Producers (beekeepers): Beekeepers are increasingly organizing themselves into farmer groups for ease of access to equipment subsidies, training and collection services especially from the government and processors. They can be divided broadly into:

- Traditional beekeepers who use log hives, box hives or combination of both to keep *cerana* bees. Majority of the beekeepers outside Bumthang practice *cerana* beekeeping
- Modern beekeepers who only use box hives with movable frames to keep *mellifera* bees. They are mostly based in Bumthang

Beekeepers who belong to groups engage in collective production and marketing, with an opportunity to access inputs, credit and training from various sources.

Marketing: Beekeepers sell their honey through the following channels:

Lot 1 - Value Chain on Honey, Technical Cooperation Project in support of the Renewable Natural Resources Sector in Bhutan

- At the farm gate – Some hoteliers/ guest houses visit the beekeepers' house/ farm to buy the honey directly from the producers, especially prevalent in Bumthang
- In bulk to processors – Some beekeepers form farmer groups/ cooperatives, collect the members' honey and sell to organizations such as BeCoB, Bio-Bhutan, SABAH Bhutan, Queen's OGOP project, YBC, etc.
- Local marketing sheds – Honey is bottled in re-used plastic bottles/ pickle jars, mostly without labels, and is sold to the marketing sheds roadside along a highway or a busy route
- Middlemen – Some honey producers sell their honey (in re-used plastic bottles) to their neighbours or friends who transport honey along with local vegetables and fruits and sell in town markets or Centenary Market in Thimphu

Processors: This is majorly done by the beekeeping cooperatives, such as BeCoB, and processors (who also double as retailers), such as Bio-Bhutan, SABAH Bhutan, and Queen's OGOP project. Their aim is to raise adequate quantities for sale to end consumers in urban centres. Since these organizations buy honey in bulk, and generally provide transport for honey collection, they are able to negotiate relatively lower honey prices. The Queen's OGOP project's aims to provide a doorstep distribution channel for the beekeepers and a fair price for their honey. These organizations buy from beekeepers and farmer groups, package and sell through their own retail outlets, local retail and handicraft shops and/ or airport outlets. They usually deal with semi-processed/liquid honey collected from different individual farmers and/or groups or contracted out-growers.

Mellifera honey is collected by BeCoB and OGOP Project at Nu. 350 per kg and Nu. 450 per kg respectively. *Cerana*, on the other hand, is collected at the following price points by:

- Bio-Bhutan at Nu. 500 per kg
- SABAH Bhutan at Nu. 700 per kg
- OGOP Project at Nu. 650 per kg
- YBC at Nu. 700-800 per kg

Some of these bulkers also undertake the task of extraction and standardized processing, along with labelling and packaging. BeCoB is one of such bulker/ processor who also conducts moisture and water tests for quality assurance.

Transporters: Major bulkers and processors offer transport services by collecting honey from designated points from the areas of production.

Wholesalers: BeCoB could be qualified as the biggest wholesaler in Bhutan who sell in bulk to the local retailers and supermarket chains. Hotels/ guest houses also buy honey at wholesale prices from the beekeepers at the farm gate.

For *cerana*, middlemen who are generally friends and neighbours of local beekeepers, buy honey at wholesale prices to sell at Centenary Market in Thimphu.

Retailers: The retailers could be classified into two categories:

- Processors who have their own retail outlets for honey, such as OGOP, Bio-Bhutan, and SABAH Bhutan. These outlets of course carry only their own honey brands
- Local retail shops in different towns and supermarkets in Thimphu, such as Eight Eleven, Shop no. 7, Tashi Supermarket and Mini Mart. Honey sold in these outlets is mainly BeCoB's brand packaged available in 275 g and 500 g glass bottles.

Consumers: Honey is used in households as a preferred sweetener in beverages. It is also used for medicinal purposes:

- Honey is used in first aid treatment especially for wounds, burns and cuts due its antiseptic and antibacterial properties
- Honey is traditionally consumed with lemon for sore throats and sometimes for stomach pains
- Honey is also used to cure cattle for foot and mouth disease

3.3. Flow of Honey Volumes along Different Marketing Channels

Honey flows through three different channels. Majority of honey is sold as semi-processed honey to processors such as BeCoB in case of *mellifera* and organizations such as Bio-Bhutan, OGOP Project, SABAH Bhutan and YBC in case of *cerana*. These processors engage themselves in small-scale processing and packaging.

However, beekeepers are now starting to form farmer groups and RDC is helping build collection sheds for honey. With such efforts, beekeepers will have the option of engaging in processing and packaging at community levels, which will help them earn higher prices compared to what processors are able to offer them. However, the marketing channels for the packaged honey in such cases are yet to be seen. For now, most of the sheds and its members are looking to sell their collected produce to processors such as OGOP Project.

The second channel links producers directly to middlemen and consumers. In this case, producers pack the raw honey in re-used plastic bottles and distribute to middlemen for selling to consumers at the Centenary Market and roadside marketing sheds.

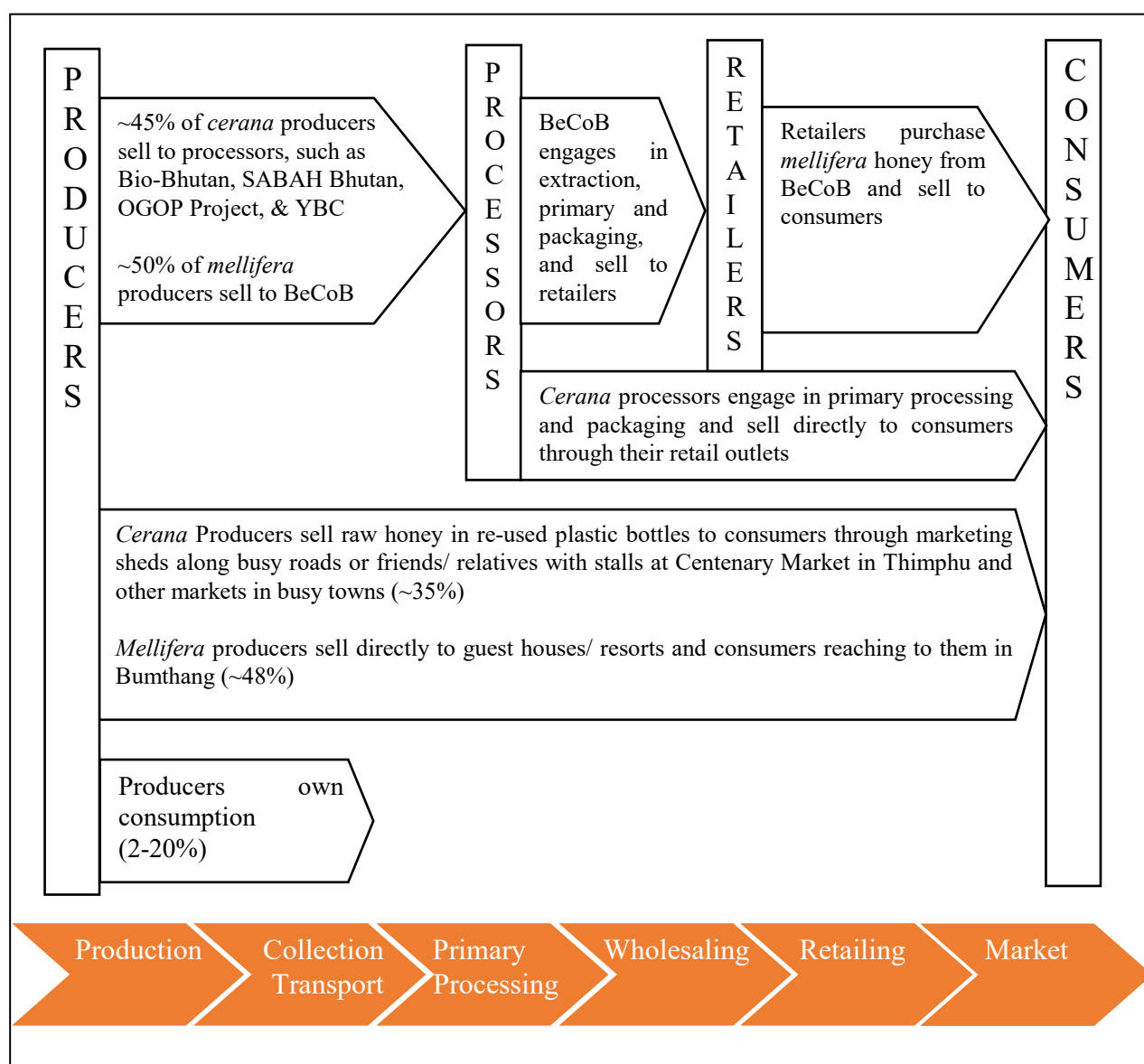
Lot 1 - Value Chain on Honey, Technical Cooperation Project in support of the Renewable Natural Resources Sector in Bhutan

The third channel is beekeepers choosing to sell directly to retail consumers through stalls along the highway or to guest houses and resorts in towns closest to their villages.

Lastly a small percentage of honey is retained by producers for home consumption and for social ties especially handouts to friends and neighbours.

Although it was very difficult to find information on volume of flows from one channel to another, we have arrived at some estimates based on the field interviews and secondary research. The mapping of volumes among channels (estimates only) is exhibited in the figure below:

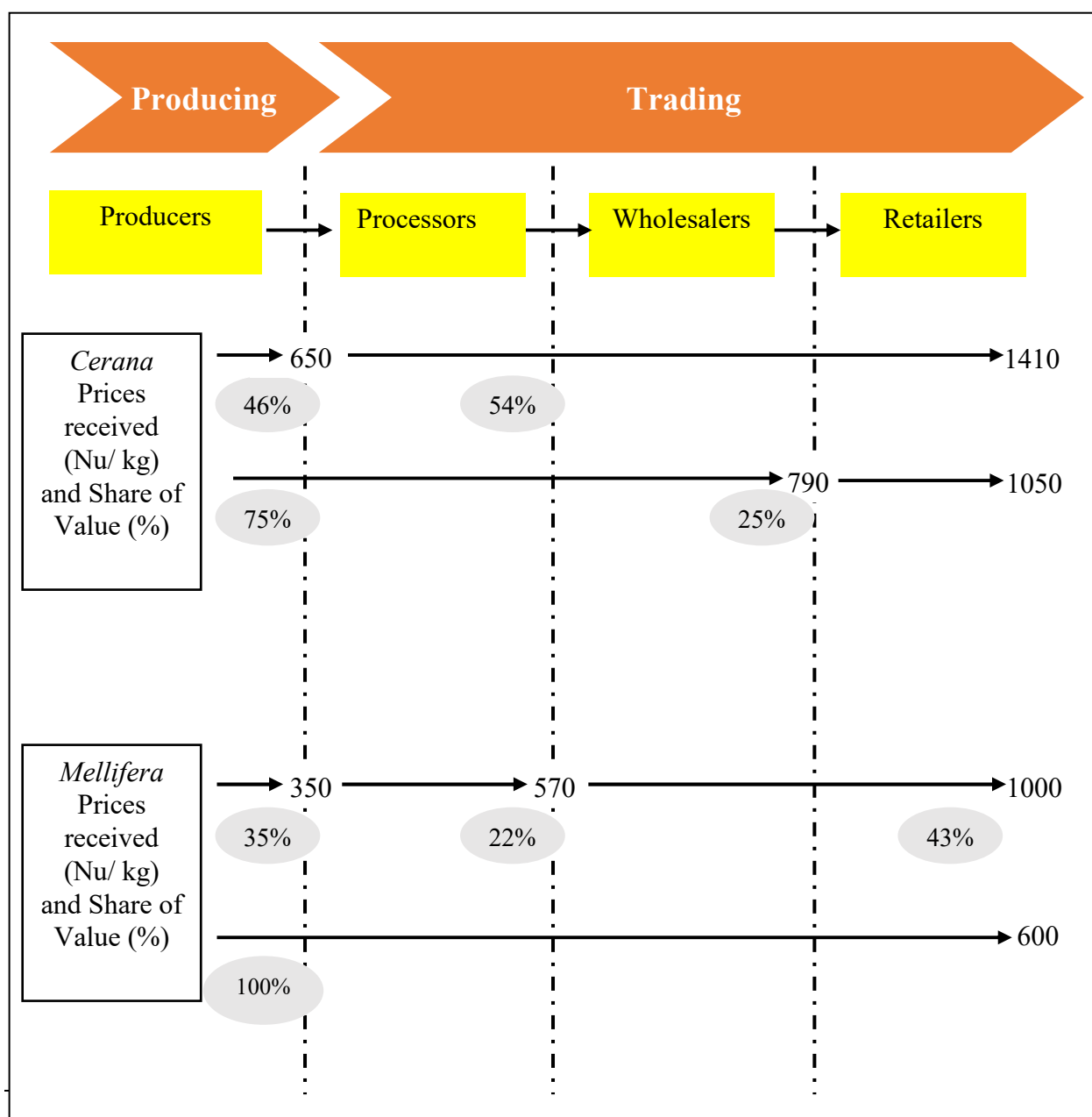
Figure 6: Volume flows of Honey along different Channels



3.4. Value Addition and Value Capture along the Value Chain

The map below depicts the prices in Nu/kg at each node of the chain. For example, the processors buy *cerana* honey at an average price of Nu. 650/kg from the producers and sell at an average price of Nu. 1,410/kg to the consumers. This means that there was an average value of Nu. 760/kg added. The percentage share of value is expressed as a fraction of margin to the consumer price.

Figure 7: Honey Prices and Share of Value Map¹⁶

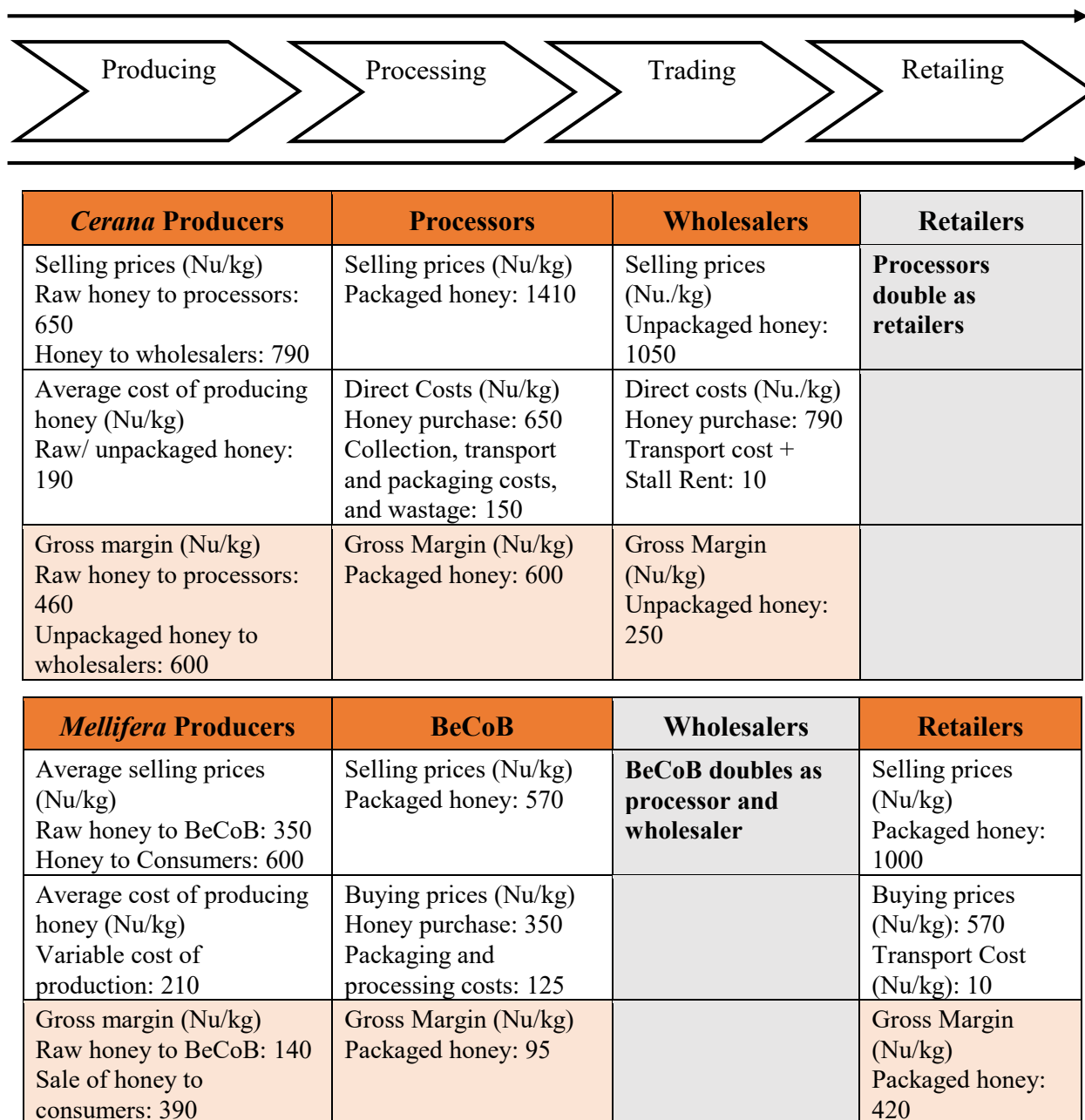


¹⁶ The prices received and used for the calculation of the value shares are averages based on primary data

3.5. Costs and Gross Margins

Profitability of honey to different actors of the value chain is summarized in the figure below where farmers sell honey and obtain the following respective gross margins/kg: Nu. 460-600 /kg and Nu. 140-390 /kg respectively for *cerana* and *mellifera* honey (the selling prices of honey was tabulated earlier in the report and the calculation of variable costs at the producers' and processors' level is exhibited in Annex III). This finding underlies the importance of value addition of honey at farm level to attract better margins for the farmers.

Figure 8: Costs and Gross Margins



Lot 1 - Value Chain on Honey, Technical Cooperation Project in support of the Renewable Natural Resources Sector in Bhutan

Profitability of farmers depends on type of bee species and hive used –

- Although the selling price of *mellifera* honey is lower, honey producers in Bumthang make more money owing to higher yield per box, experience over the years and their scale of operations
- Among *cerana* producers, beekeepers with *langstroth* hives have higher revenue with modern hives outperforming traditional hives

The cost-benefit analysis of the three types of hives used in Bhutan is shown in the table below –

Table 13: Cost benefit analysis of log, *cerana* box and *mellifera* box hives

Type of Hive	Estimated Cost	Average # hives per producer	Yield/ Hive/Year (kg)	Average Selling Price (Nu./kg)	Average Variable Cost (Nu./ kg)	Total Net Income (Nu.)
Log hive (<i>Cerana</i>)	Zero cost practically	3	2.5-12.5	700	0	5,250 – 26,250
Box hive (<i>Cerana</i>)	190	10	5.5-22.5	700	190	28,050 – 114,750
Box hive (<i>Mellifera</i>)	210	60	30-70	425	210	387,000 – 903,000

Additionally, the table below exhibits the income comparison between a *cerana* and *mellifera* beekeeper assuming each one owns 25 modern, box hives.

Table 14: Comparative analysis of income between *cerana* and *mellifera* beekeepers (box hives)

Type of Hive	Estimated Cost	Average # hives per producer	Yield/ Hive/Year (kg)	Average Selling Price (Nu./kg)	Average Variable Cost (Nu./ kg)	Total Net Income (Nu.)
Box hive (<i>Cerana</i>)	190	25	5.5-22.5	700	190	70,125 - 286,875
Box hive (<i>Mellifera</i>)	210	25	30-70	425	210	161,250 – 376,250

Processors of *cerana* honey buy unfiltered/ raw honey and sell liquid honey after processing and packaging. The gross margins at processing level of Nu. 600/kg seems higher than that of the producers on the face of it. However, the overheads at the processors' end are high due to the depreciation of equipment, rent of the storage unit and retail outlets, carriage and advertising/ promotion cost and staff salaries. Although these overheads are shared among a multiple line of products sold/ processed by these processors.

BeCoB, on the other hand, has much lower gross margin of Nu. 95 per kg from sale of honey because of the low selling price of Nu. 570 per kg. Additionally, the Cooperative has huge overheads in form of salaries, depreciation of equipment, administration, transportation and maintenance costs.

Also, since most processors are operating at relatively low honey capacity, they do not benefit much from economies of scale.

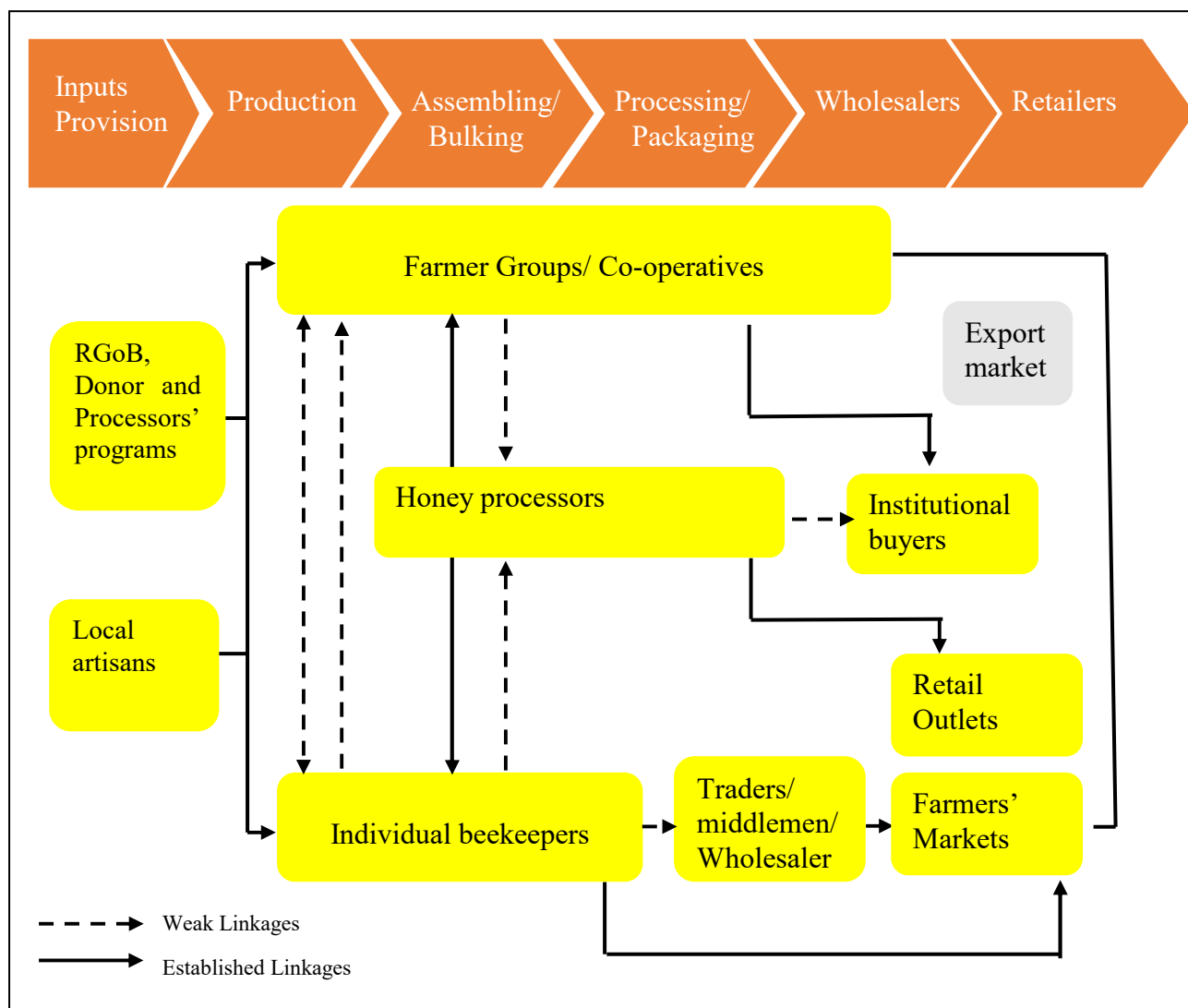
While the wholesalers and retailers buy honey at Nu. 570 per kg, they capture huge gross margins by selling the same packaged honey at about Nu. 1000 per kg. Analysis of the gross margins along the honey value chain as presented in the figure 8 shows that all factors held constant, honey enterprise is most profitable when producers sell directly to consumers or at the retailing stage, including when processors double as retailers.

3.6. Honey Value Chain Institutions Horizontal and Vertical Linkages

Established linkages in the honey value chain consist of the relationships between local artisans and producers, producers and processors, producers and wholesalers/ retailers and processors and retail outlets. The linkages between local artisans and producers are strong because of the ability of the artisans to copy and adapt modern/ box hives to local conditions. This creativity and easy access is increasing the use of box hives in certain geogs especially with strong FGs and processor relationships.

The relationship between the MoAF extension officers (EOs) and the producers are also strong, especially in case of *cerana* producers. They often get in touch with their EOs for assistance with new equipment, wax, and technical support. The EO (in coordination with the DLO) contacts the respective RLDC and/ or NH-RDC to apply for the requisite support under the beekeeping subsidy program approved under the 11th Five Year Plan (FYP).

Figure 9: Map of Value Chain Institutions Horizontal and Vertical Linkages



3.6.1. Cerana Value Chain Linkages

Linkages between *cerana* producers and processors are established through purchase of honey directly or through establishment of collection centres (an initiative of NH-RDC) for the producers to deliver their raw honey.

Currently, the producers' FG assign a Chairman and a Collector (who may or may not be the same person). The Collector's job is to ensure safe collection of honey post-harvest from all the members and deliver it to the nearest road point, from where the processor's vehicle picks up the honey produce and transports to their storage/ processing area.

Lot 1 - Value Chain on Honey, Technical Cooperation Project in support of the Renewable Natural Resources Sector in Bhutan

In case of Bio-Bhutan, the collector earns about Nu. 20 per kg. Additionally, Bio-Bhutan would get in touch with the Chairman of the FG during the beginning of the harvest season to check whether the producers are in need of any cash advance. In either case, Bio-Bhutan will pay the outstanding amount in cash upon receipt of honey.

The relationship between the producers' FG and most processors begin with processor's provision of some basic beekeeping equipment or training, in return of which they request the group to supply their honey at wholesale prices. (The processors generally engage only with select FGs who can manage to achieve certain minimum production levels per year.) Although the engagement between FGs and some of the processors been running for years, the linkage is not very strong. Due to low yields, most producers and/or FGs fail to fulfil their minimum supply orders. And at times, when the producers are able to secure better prices in the market through direct sale to consumers, they tend to fall short on their commitment to the processors.

The linkage between *cerana* processors and retailers are almost non-existent. Most of the processors sell all/ most of their packaged honey from their own retail outlet(s), such as OGOP project, SABAH Bhutan, and Bio-Bhutan. Only Bio-Bhutan and SABAH Bhutan sometimes supply their packaged honey to some of the major outlets in Thimphu.

The relationship between *cerana* producers and middlemen/ wholesalers are also very informal. These middlemen are generally friends or relatives from the same village who carry honey, along with other fruits and vegetables, to sell in farmers market in major towns.

3.6.2. *Mellifera Value Chain Linkages*

In case of *mellifera* honey, the number of agents are limited to producers, BeCoB, retail outlets and select consumers who purchase honey (in bulk) directly from the producers.

The strongest linkage is between the BeCoB members/ producers and BeCoB. The members are bound by a contract to sell 100% of their harvest (less 15 kg for self-consumption) at Nu. 350 per kg to BeCoB. In return, BeCoB offers it members the following services to assist in their honey production and harvest –

- Extraction of honey with the modern equipment installed at the BeCoB premises
- Transportation facilities for – (a.) migration of bees (b.) extraction at BeCoB
- Sale of sugar for winter feeding, the price of which is deducted from the final payment made to the producers during the purchase of honey
- Purchase of beekeeping equipment and bottles, labels, cartons, etc. as needed
- Loan disbursement at the rate of 7% interest per annum

- Training to new members on introduction to beekeeping, apiary management practices and awareness programs

The existing members are required to pay a nominal fee of Nu. 1000 per annum and the new members a one-time, joining fee of Nu. 1,500.

However, it was discovered during our interviews in Bumthang that the members are unhappy with the uncompetitive price of Nu. 350 per kg. This drives the members to sell about 50% of the produce directly to guest houses/ resorts/ wholesalers at Nu. 500-700 per kg.

BeCoB is looking to revise its pricing policy to enhance the honey price per kg paid to its members and the price per carton it sells to retailers.

Currently, BeCoB sells honey to institutional buyers, retailers and direct consumers in cartons with a capacity of 12 bottles at the following fixed prices –

- Nu. 175 per 275 g bottle (Nu. 2,100 per carton)
- Nu. 250 per 500 g bottle (Nu. 3,000 per carton)

BeCoB tries to regulate the quantity sold per consumer to avoid monopoly/ hoarding cases. However, there are no strong or formal systems behind this regulation.

The relationship between producers and these direct consumers are informal. Most times, people from guest houses/ resorts or some wholesalers show up at the doorstep of the producers to buy honey in bulk. The prices offered by these consumers are much higher than that offered by BeCoB.

The understanding of the export market has been limited due to unavailability of data.

3.7. Existing Business Relationships with Market Off-takers

Most honey trade is informal with sourcing from spot markets being common. However the retailers are generally frustrated with the erratic supply of honey leading to unfulfilled consumer demand¹⁷. None of the respondents interviewed had any formal contracts with their suppliers.

On the other hand, some retailers are in a position to procure more honey than others (sometimes due to personal relations with supplier) and demand higher than market prices during off seasons.

Processors who have engagements with FGs do not get sufficient honey from their contracted suppliers (the beekeepers' FG), either due to bad harvest or availability of buyers at better prices.

¹⁷ Interviews with retailers in Bumthang and Thimphu

Hence some of the interviewed processors are considering entering into a contract with the FG with specific conditions, such as: renegotiated prices, supply to the designated road point, availability of a reliable and committed group representative/leader and commitment to supply a minimum quantity per consignment.

Similarly, the understanding with direct buyers (such as guest houses/ resorts and friends/ family/ neighbours selling at Thimphu Centenary market or other Farmers' market in bigger towns) is very informal.

3.8. Honey Value Chain Governance

The section on value chain governance refers to role of regulatory institutions that influence the activities ranging from honey production to its end use. These institutions/ organizations are able to exert control along the chain and/or enforce parameters for chain operations and quality.

3.8.1. *Overall Coordination and Leadership under NAP*

National Apiculture Program (NAP) under NH-RDC, works in collaboration with four **Regional Livestock Development Centres (RLDCs)**, namely Wangdue, Tsimasham, Kanglung and Zhemgang. NAP is responsible for overseeing beekeeping activities nationwide. The mandate of the Program is to support new and small-scale beekeepers and FGs through training and provision of subsidized equipment. The program also focuses on encouraging beekeeping in newer areas where honey production was not previously practiced.

NH-RDC is based in Bumthang due to birth and concentration of major commercial beekeeping activities in the region.

NAP, with the help of RLDCs and extension field staffs, has progressed steadily in past few years. With its efforts, NAP is now experiencing more and more people taking up production of natural honey¹⁸.

NH-RDC and RLDCs are also encouraging beekeepers to form farmer groups for better access to subsidized equipment and finance, and training. Additionally, they encourage young farmers and unemployed youth to take up beekeeping. NAP supports FGs and new beekeepers through its subsidy package. The beekeeping equipment and inputs are supplied at a subsidized rate (at even 80% subsidy in some cases). The details of the subsidy program is exhibited in Table 10.

Since beekeepers are scattered, NH-RDC uses the assistance of RLDCs and EOs in carrying out the developmental activities in the feasible places and for monitoring and evaluation.

¹⁸ Write-up on NAP from NH-RDC Officer

Role of NH-RDC and other stakeholders under NAP per an Apiculture Workshop (held on June 10, 2017) at the NH-RDC, Jakar:

1. NH-RDC to streamline the procurement system and facilitate availability of beekeeping equipment at cheaper rates. NH-RDC will call for tender specific to Dzongkhags.
2. The NH-RDC beekeeping subsidy package has been approved by the DoL. The subsidy package will be implemented by NH-RDC as approved. However, clear directives will have to be forwarded to the RLDCs and Dzongkhags/ geogs for implementation.
3. To handle the issue of inadequate coordination among various beekeeping stakeholders while implementing honey bee production programs, the following was agreed upon –
 - a. NH-RDC's beekeeping initiatives/ activities and capacity building be routed through the RLDCs in consultation with the Dzongkhag Livestock Office.
 - b. External agencies (NGOs and cooperatives) involved in beekeeping will have to seek prior approval from the DoL to ensure proper coordination and documentation.
4. To standardize honey labels for ensuring uniformity across the country, NH-RDC will work on creating labels with standard colour, contrast and contents for all beekeeping groups. Only the group logo on the label will differ among different FGs.
5. The practice of rearing *apis mellifera* in the temperate zone and *apis cerana* in the sub-tropical zone have resulted to zonation of bee keeping in Bhutan. NH-RDC will work on providing clear directives to the RLDCs and Dzongkhags on the zonation for beekeeping.
6. NH-RDC will facilitate multiplication and supply of colonies to aid in commercialization of *mellifera* and *cerana* beekeeping.
7. NH-RDC will undertake annual consultative meeting involving the relevant stakeholders for proper coordination and facilitation of beekeeping activities across the Kingdom.

Most recent resolutions and proceedings passed under NAP during the Apiculture Workshop:

- In addition to having a formal honey value chain, the initial requirement is to improve packaging and labelling practices to add value.
- The NH-RDC, Jakar is multiplying the honey bees colonies at the Centre and the Centre will supply the bee colonies in future, for which the Dzongkhag has to place order in advance after the new financial year budget gets approved. The centre will multiply the colonies and inform their clients once ready.
- It was recommended the relevant dzongkhags be included to build their beekeeping capacity to promote beekeeping program at dzongkhag levels

- The importance of *Trigona* species was recognized and it was stressed that NH-RDC in collaboration with the RLDCs would conduct studies in consultation with other innovative farmers.
- The beekeeping FGs mentioned that queen gate and wax are important materials for beekeepers. Since queen gate is not readily available in Bhutan, it will be of advantage if a queen gate punching machine each is made available to the beekeeping groups. NH-RDC, Jakar is in the process of procuring the queen gate punching machine and other materials for supply to the beekeeping groups.

3.8.2. *Quality inspection by BAFRA*

Bhutan Agriculture and Food Regulatory Authority (BAFRA), MoAF regularly conducts inspection/ quality checks to test water and moisture content in BeCoB honey. Additionally, BAFRA is assisting BeCoB with the attainment of ISO certification in 2017.

However, other Bhutanese honey brands did not mention any involvement of BAFRA in their quality inspection process.

3.8.3. *Registration and Regulation of FGs and Coops by DAMC*

The Cooperatives Rules and Regulations of Bhutan, 2010, covers all aspects of cooperative development such as registration, monitoring, mediation and conciliation as well as the provision of legal advice and services related to research, education and information. It also covers the registration of informal FGs. Within the MoAF, the Department of Agriculture Marketing and Cooperatives (DAMC) was created in 2009 to effectively implement the Cooperative (Amendment) Act of Bhutan, 2009.

FGs and cooperatives are considered as significant means of increasing the economies of scale, cooperation and good governance within the farming communities. As of mid-2017, DAMC had registered 182 farmer groups engaged in agriculture, 114 engaged in livestock enterprises, 32 engaged in forest enterprises and 2 non-RNR groups. Altogether, there are 329 registered farmer groups in the country and 10 agriculture farmer cooperatives, 27 livestock cooperatives, 3 forestry related cooperatives and 10 non RNR related cooperatives registered with the DAMC.

Additionally, DAMC has established marketing sheds along major highways in Bhutan to provide honey producers and farmers sales outlet for their products close to the farm gate.

3.9. **Other Service/ Assistance Providers in Honey Value Chain**

The strength of any value chain is exemplified by the service providers that support it and the specificity of their operations. HELVETAS and Mr. Fritz Maurer have played key roles in laying a foundation for beekeeping in Bhutan.

HELVETAS Swiss Interco-operation is an international network of independent affiliate members working in the field of development cooperation and emergency response. The HELVETAS network has over six decades of development experience with its 1,600 staff members' work in over 30 countries. The affiliated members share a common vision of adhering to one common strategy built on defined working approaches and thematic areas of intervention.

HELVETAS Bhutan is one of the decentralized country programs of HELVETAS Swiss Interco-operation which has been operating in Bhutan under an agreement with the Royal Government of Bhutan since 1975. It implements its programs and projects in three of HELVETAS' five thematic areas through local partners at both national and local levels. HELVETAS Bhutan builds on opportunities arising from the democratization process by creating spaces for disadvantaged men and women and by promoting equitable shares in social and economic benefits.

In 1997, HEVETAS assisted in establishment of beekeeping as one of the first successful associations, laying the foundation for a sustainable honey industry in Bhutan. This is the result of a complex development process by Mr. Fritz Maurer and RGoB, including the import of *apis mellifera* bees from India in 1986.

During the course, HELVETAS funded the operations of the Association and its purchase of land, property and equipment in Jalkhar, Bumthang.

Global Environment Facility (GEF) Small Grants Programme (SGP) under UNDP has also supported beekeeping in Bhutan working with Bio-Bhutan on the following projects –

- Support to beekeepers of local *apis cerana* bees to conserve wild bees in Bhutan in Lalikharka, Tsirang between 2009 and 2011
- Up scaling local beekeeping in Dovan geog, Sarpang from 2011 to 2014

As a result, the number of association members in Lalikharka increased to 36 active members who were all equipped with improved box hives and the required technical skills. The Association supplied about 272 kgs of honey to Bio-Bhutan in 2017.

Similarly, the active members in Dovan increased to 100, all of who were all equipped with improved box hives and the required technical skills. As of October 2017, at least 70 beekeepers were supplying about 3-4 kgs of honey per year to Bio-Bhutan.

European Union (EU) appropriated Nu. 5M to set up 500 hives apiary for research and development purpose at NH-RDC, Jakar, Bumthang¹⁹.

The International Centre for Integrated Mountain Development (ICIMOD) has been supporting MoAF in promoting beekeeping as an income and employment generating option for

¹⁹ Honey Value Chain Study by Dr. Nar B Tamang and Kabi Raj Gurung; funded by ICIMOD

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the rural people, particularly youth. In this context, the programme is working in collaboration with NH-RDC, Jakar and the Department of Livestock (DoL) to build the capacity of institutions and farmers. Capacity building efforts include training officers and farmers, conducting hands-on workshops and visits, and providing equipment support.

As a result, several rounds of training in bee management, queen rearing, management and control of bee diseases, pest and predators, bee flora and pollination management, and marketing of honey and other bee production were organised in different geogs in Bhutan. Specialised trainings in beehive and other equipment making and mass queen rearing were provided to key enterprising farmers. Visits of key farmers and officers to successful beekeeping areas and bee enterprises in Nepal were made, and equipment support provided to build the capacity of district offices.

Generally, farming enterprises suffer from paucity of financial services. RGoB initiatives such as the launch of **Rural Enterprise Development Corporation Limited (REDCL)** (previously BOIC) provide fund for the non-formal rural activities on a low interest rate of 4% per annum and without any collateral requirement. The loan principal amount can range from Nu. 100,000 to 500,000 while processing time ranges from one to two months. As of October 2017, loans were disbursed to two beekeepers while three applications were under process²⁰.

Larger-scale beekeepers also apply for loans from banks such as **Bhutan Development Bank Limited (BDBL)**.

Similarly, **BeCoB** also offers loan facility for its members. Additionally, the Cooperative provides its members with access to training, sugar feed, equipment, and market.

The processors assist the beekeepers with an initial training, and sometimes supply of equipment, which assures them with a minimum supply of honey from the respective beekeepers' group.

Every geog with progressive beekeeping now has local carpenters/ artisans who build and sell box hives to the beekeepers. Some of these geogs also have an expert, commercial beekeeper who is often hired by one of the many institutions for training purposes.

²⁰ Interview with REDCL Officer, Bumthang

Table 15: Summary of Value Chain Service Areas and Providers

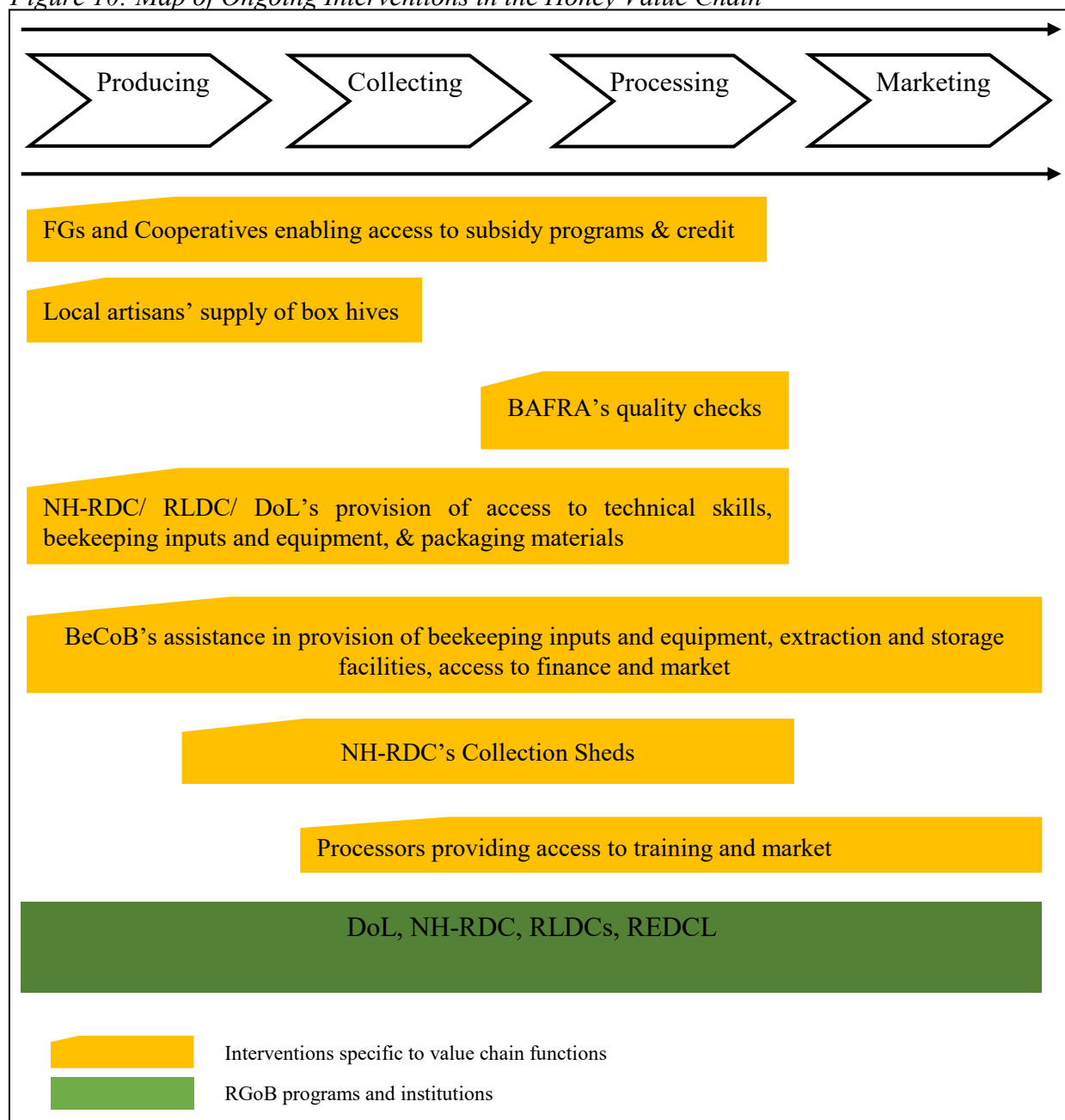
Service Area	Service Providers
Foundation of Beekeeping in Bhutan	HELVETAS, Mr. Fritz Maurer, BEKAB
Training (technical and management skills)	ICIMOD, NH-RDC and RLDCs, BeCoB, GEF SGP, Bio-Bhutan, SABAH Bhutan, OGOP Program
Access to Market	DAMC, BeCoB, Bio-Bhutan, SABAH Bhutan, OGOP Program, YBC, Traders at Farmers' Markets/ Wholesalers, Guest Houses/ resorts
Access to Equipment	NH-RDC and RLDCs, Local artisans, BeCoB
Access to Finance	REDCL, BDBL and BeCoB
Quality inspection	BAFRA

3.10. Ongoing Interventions in the Honey Value Chain

Besides linkages between primary value chain actors, the honey value chain is supported by other organizations/ institutions at the macro-level. These organizations have different roles and responsibilities right from research and development, dissemination, production, processing, transporting and marketing. These include bilateral partners, CSOs, government ministries and related agencies and processors in the private/ CSO sector (Figure below).

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Figure 10: Map of Ongoing Interventions in the Honey Value Chain



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In addition to the processors' training and access to market, NH-RDC assists the beekeepers in provision of subsidized beekeeping inputs and equipment.

NH-RDC, under NAP, has initiated to construct 4 honey collection centres/sheds with assistance from Government of India (GoI) –

1. Jigmecholing, Gelephu (Complete)
2. Lokchina, Chhukha (Complete)
3. Dagana (Work in Progress)
4. Tsirang (Work in Progress)

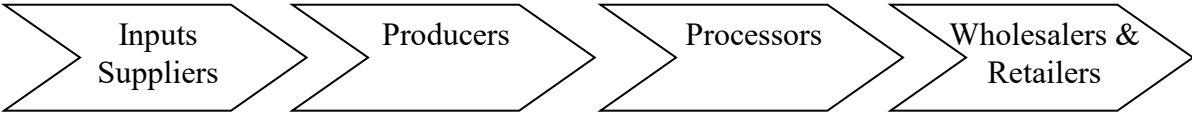
NH-RDC is helping the FGs in the respective locations to set up these collection sheds to upgrade the producers' processing and packaging capabilities. These sheds provide a platform for the producers to supply to the processors or use the packaged honey bottles to directly sell in the markets.

Per the apiculture workshop in June, NH-RDC will also begin to upgrade and standardize honey packaging and labelling practices in Bhutan.

Also, BeCoB, with assistance from BAFRA, is undergoing ISO certification to upgrade its quality and management standards.

4. SWOT ANALYSIS FOR THE HONEY VALUE CHAIN

Table 16: SWOT analysis for the honey value chain

Strengths			
<ul style="list-style-type: none"> Local artisans being able to customize and supply box hives 	<ul style="list-style-type: none"> Indigenous knowledge passed on from generations 	<ul style="list-style-type: none"> Farmers' willingness to sell to processors High level integration in the VC 	<ul style="list-style-type: none"> Strong consumer demand for Bhutanese honey
Opportunities			
<ul style="list-style-type: none"> Availability of RGoB support and technically sound beekeepers Strong donor support from Helvatas, GEF/ UNDP, EU, etc. 	<ul style="list-style-type: none"> Strong domestic and int'l demand Low opportunity cost of production Limitless forage for bees 	<ul style="list-style-type: none"> High demand for better packaged honey in home and overseas market Willingness of consumers to pay higher prices for better packaging 	<ul style="list-style-type: none"> High demand and margins for honey sold Multiple labels & packaging options coming up
			
Weaknesses			
<ul style="list-style-type: none"> Dealing with small and scattered beekeepers which is costly and time consuming Lack of exposure trips to advanced locations Limited budget 	<ul style="list-style-type: none"> Limited access to finance, modern apiary management skills, modern hives and certain inputs like wax Lack of information of final honey prices 	<ul style="list-style-type: none"> Rudimentary processing technologies, poor packaging, sealing & labelling materials High cost of collection due to scattered small scale producers 	<ul style="list-style-type: none"> Customer complaints about packaging High transportation costs Inadequate supply of honey especially during off season
Threats			
None	<ul style="list-style-type: none"> Limited productivity with <i>cerana</i> bees Predator attacks Changing climatic conditions Weak linkages with processors 	<ul style="list-style-type: none"> Unreliable supply from the beekeepers No economies of scale Opportunity for a new entrant with deep pockets to monopolize the market 	<ul style="list-style-type: none"> Ad-hoc supply trends from the processors and beekeepers Cheaper & better packaged imported options available

4.1. Inputs suppliers

At the inputs level, three levels of challenges were reported by the producers –

- Inadequate access to finance for large scale producers looking to take their production levels to the next phase
- Lack of opportunity to take exposure/ familiarization trips to expert beekeeping locations, inside and outside of Bhutan
- Slow transition from log hives to modern, box hives for small scale *cerana* producers

Part of the challenges above could be attributed to the high investment required and the high cost of operation due to the scattered nature of the producers. Moreover, the input suppliers are not in a position to speculate reliable information on demand for bee hives.

Despite several challenges, the government has put in place several strategies to support the sectors including: the subsidy program that provides beekeeping inputs and equipment at subsidized rates to encourage new and young beekeepers, development of National Apiculture Strategy and the training imparted.

4.2. Beekeepers

Beekeeping has been practiced in Bhutan for generations, although in log hives. Moreover, the abundant flora of the Kingdom provides ample forage for the bees, especially the indigenous *cerana* bees. Beekeeping work is generally performed by multiple members of the family, limiting the need to hire labour (unless the number of colonies are high). Also, most producers do not practice beekeeping as a full time occupation, allowing them to focus on farming or carpentry or other part-time jobs.

However, beekeepers face challenges such as limited access to finance, modern apiary management skills, modern hives and certain inputs like wax, limited *cerana* productivity, absconding behaviour of bees and predator attacks (hornets and wasps in case of *cerana* and bear attacks in case of *mellifera* producers in Bumthang).

Also, climate change and untimely rains are also beginning to hamper the production.

On the other hand, some honey producers have gained valuable knowledge over time and are able to take advantage of increasing demand for honey in Bhutan.

4.3. Processors

Honey processing in Bhutan is still at a basic level, especially at the packaging level. Most processors are not able to secure consistent supply of honey, due to low productivity or availability of buyers at higher prices. Moreover, they suffer from high cost of collection, due to scattered small scale producers, and inability to reap benefits of scale, due to low supply volume from farmers.

One of the biggest strengths of the processors is their level of integration in the value chain. Most processors also act as wholesalers or retailers in the chain, helping them achieve high margins. Few of interviewed processors are planning strengthen their linkages by entering into formal contracts. Some of them also offer access to credit and technical assistance to their producers.

There is a huge opportunity in the market for high-quality processing and packaging. There is evidence to support that buyers in the domestic as well as overseas market are willing to pay a premium for a high-quality, naturally produced/ organic, Bhutan honey. This also implies that processors may face the threat of new entrant.

4.4. Wholesalers and Retailers

Traders in the honey value chain include wholesalers and retailers. Although they do not add any value to the final product, they play a crucial role in making the product reach the final consumers. For *cerana* honey, the processors mostly double as retailers; while for *mellifera*, BeCoB acts as a wholesaler who supplies to most retail outlets of the country (depending on the supply).

Most retailers stock BeCoB honey, while a few others have started keeping *cerana* honey brands, such as Bio-Bhutan and SABAH Bhutan. However, all retailers complain of less than adequate supply of honey. Some of them have also experienced their customers being unhappy with the current level of packaging. As a result, most supermarkets and retailers maintain stock of imported honey, especially the cheaper, easily available, Indian brands.

Although, when available, retailers are able to make steep margins on Bhutan honey due to high consumer demand.

5. CONCLUSIONS

Honey production and productivity is below the optimal yield in Bhutan for the two types of bee species in the Kingdom. This has resulted into a supply gap in the domestic market and lack of trying in the international markets. Poor management technique and slow transition from log to modern hives are two of the main causes of low productivity among *cerana* producers leading to a yield gap of 75-80%.

Overall, there's also a huge production gap due to the nascence of beekeeping in many dzongkhags and limited access to finance for large scale, commercial beekeepers in Bumthang. This implies interventions should not only focus on awareness and subsidy programs to encourage new beekeepers, but also work with existing medium to large scale producers to identify gaps and solutions.

The honey business is a commercial enterprise in Bhutan (over 78%²¹ of the produced honey being sold in the market) with huge business potential. A few of the *mellifera* beekeepers, with sizeable number of colonies, earn over Nu. 900,000 per annum from their beekeeping operations. Coupled with the high local demand, the implication is honey is a potential enterprise with capacity to fulfil the 11th FYP vision of 'self-reliance and commercialization in livestock products'. It also implies huge revenue potential for medium and large scale beekeepers if provided with adequate assistance.

With the current level of supply and demand, the local market for honey is more attractive than export markets. Export potential cannot be well quantified and realized to a great extent until the supply is enhanced to meet the local demand. Honey prices in the local market are high enough and the quality regulations less stringent as compared to the export market. Based on the export statistics from Department of Revenue and Customs, the unit honey prices received from the export markets were not significantly higher (in some cases even lower) than the domestic market. This implies the focus of the honey industry should be on fulfilling demand in the domestic markets in the short and medium term.

Producers can capture much more revenue in the value chain if their training is extended to basic processing and filtering techniques. Beekeepers who sell their produce to processors can capture only 35% - 46% of the value generated as a percent of the selling price. This is because the producers are unaware of basic filtering and processing techniques, which could be performed at home as well. Most of their beekeeping training is focused on basic beekeeping and management technique, with almost no focus on basic processing and packaging, value chain and market information.

²¹ Honey produced v. honey sold, Livestock Statistics, 2013-2016

Processors are wary of making huge investments in innovative packaging and modern processing techniques due to the uneven supply of honey and their inability to reap benefits of economies of scale. This results in consumers unhappy with the current packaging options offered by the processors. Moreover, increasing number of consumers complain of the crystallization of *mellifera* honey. All of this calls for the processors to invest in better packaging and processing methods. The status-quo could present a challenge to the processors in the long term when they seek to scale their sales in domestic and export markets.

Processors are more integrated than most actors in the value chain. The mapping out of core processes brought out an interesting level of integration at the processing stage. Most of the processors are collecting and bulking, transporting, processing and retailing honey. Such integration allows them to capture huge portion of revenues in the value chain (except in BeCoB's case). Lessons from such models can be used to enhance the performance of other value chain actors, such as the producers.

Honey marketing in Bhutan is semi-formal and not very well organized. Currently, most retailers are only able to stock *mellifera* honey, the supply of which is erratic. And when there's adequate supply, the retailers end up capturing more margins than the producers or BeCoB. There is no regulation on honey pricing or maximum retail price (MRP) printed on the honey bottles, leading for the customers to pay outrageous prices, especially in the off-season. None of the benefits of such high retail prices are passed to the producers.

The ongoing interventions focus mostly on inputs supply and production side of the value chain, with almost no focus on the marketing end. The mapping of the interventions along the value chain revealed a vacuum at the marketing end. While there are a number of initiatives to encourage new beekeepers, increase productivity with introduction of box hives, and train existing beekeepers, there are no processes in place for the producers to have access to market information, or initiatives for market regulation. Hence many interviewed retailers and their customers expressed dissatisfaction with the overall availability and packaging of Bhutanese honey.

While most consumers are happy with the quality of Bhutanese honey, packaging is an increasing concern. Most of Bhutan's honey available on shelves is bottled in usual glass, pickle jars available in 500 and 250 g sizes. None of these bottles are sealed; some of these are sold without labels. The labelling is also not per standards, most of them lacking information on contents/ ingredients, packaging and expiry dates, certification/ quality details, and contact information of the producer/ processor. Packaging for *cerana* honey sold by producers directly to consumers is worse; it is sold in re-used alcohol bottles without much filtering or processing.

Moreover, some consumers are growing mistrustful of *mellifera* honey due to its crystallization during winter months. While some experts²² are of the opinion that crystallization points to the

²² Interview with Mr. Fritz Maurer

natural state of honey, consumers are becoming wary of added sugar in the *mellifera* honey. The doubt is further compounded by the fact that the honey bottles are not sealed and the information provided on the labels do not address to any insecurities about the content.

There is a big disconnect between service availability and access. There are a few inputs supply programs, financial products and other services available in the market; however the core actors are not happy with their access.

One of interviewed beekeepers mentioned: “REDCL’s loan is not practically mortgage free, and in most cases do not exceed Nu. 100,000. Such an amount is insufficient for taking my production to the next level of growth. And, the process is too tedious.”²³

Another beekeeper from Tsirang complained: “We receive multiple rounds of basic beekeeping training (from the processors/ donor programs/ government agencies) without any exposure to the practical skills or education trips to destinations with expert beekeepers”.

Hence there is need to link farmers whose capacity has been built, to financial service providers as they do not qualify for the Ministry’s subsidy programs. The small scale producers, on the other hand, need exposure to practical training and travel programs, and in-hone processing and filtering techniques.

²³ Interview with one of the *mellifera* beekeepers in Bumthang

6. RECOMMENDATIONS

6.1. Matrix of Proposed Interventions

In this section, the findings from the SWOT analysis and the conclusions sections are used to identify potential interventions that could be initiated by RGoB agencies and other value chain service providers.

Table 17: Matrix of proposed interventions

	Short term	Short – medium term	Long term
Factors internal to the Value Chain	<ul style="list-style-type: none"> • Enhance productivity with better hives and management techniques • Better processing, packaging and quality inspection • Review of BeCoB's pricing mechanism 	<ul style="list-style-type: none"> • Develop structured trade in the honey sector through strengthening the linkages between producers, processors, and marketers • Adherence of packaging and labelling with 'Brand Bhutan' 	<ul style="list-style-type: none"> • Processors' investments in export-quality processing and packaging techniques and equipment
Factors external to the Value Chain	<ul style="list-style-type: none"> • Expansion of beekeeping to new and upcoming dzongkhags • Exposure trips for select small and medium scale beekeepers • Facilitate access to affordable financing for large scale producers to boost production • Attract investments in the sector to facilitate the above 	<ul style="list-style-type: none"> • Transition of interventions from inputs supply and production to marketing end of the value chain • Development of market information structures for efficient delivery of information • Strengthen value chains institutions in good governance, development of improved technologies locally and quality enforcement & adherence 	<ul style="list-style-type: none"> • Research and development into high-end, niche honey varieties • Explore export opportunities • Research into feasibility of honey by-products and their use as input in home-made goods, such as beauty or cosmetic products

6.2. Outline of Potential Interventions

6.2.1. *Potential short-term interventions:*

In the short term, it will be imperative to enhance production and productivity and introduce basic improvements in processing and packaging. These can be achieved with the help of following interventions –

Roll out of plans for the producers to switch from log hives to box hives: NH-RDC is already working with beekeepers in different dzongkhags, in coordination with RLDCs and extension officers, to replace log hives with modern, box hives. It should be further supplemented with efforts from the processors to work closely with the farmer groups (FGs) supplying them honey. The processors should help their respective FGs by providing them access to credit and modern hives and management techniques.

Enhance production through interventions targeted at three levels: Based on the classification of beekeepers by their scale of operations, following interventions are recommended –

- Expansion of beekeeping to new and upcoming dzongkhags: NH-RDC, along with Dzongkhag Livestock Offices, are introducing beekeeping in new destinations, such as Wangdue, Gasa and Haa, with distribution of *cerana*, *mellifera* or both type of bees and other beekeeping inputs. Such efforts should be continued (and stepped up, depending on funding) in the short run for rapid yet systematic introduction across Bhutan.
- Exposure trips for select small and medium scale beekeepers: Select members from interested FGs should be exposed to more practical training to improve their productivity and colony management techniques. Beekeepers expressed interest in visiting successful beekeepers in areas such as Bumthang, Gelephu, etc. and/ or beekeeping areas in Nepal, possibly.
- Facilitate access to affordable financing for large scale producers to boost production: If select beekeepers from Bumthang could be identified and groomed as ‘champions’ with access to affordable financing, they could in turn train other large to medium scale beekeepers across Bhutan in successful colony management techniques, packaging and processing, and other business skills.

Training for producers into areas of basic processing and packaging at the farm-gate level: Separate non-production related training should be organized for FGs and beekeepers to help them understand how they could capture more value along the chain with minor improvements in processing and packaging.

Additionally, BAFRA should extend its quality inspection to other commercial processors and beekeepers, especially the ones retailing on a relatively large scale.

BeCoB should consider revising its strategy on the following fronts: BeCoB has been a pioneering cooperative in the honey industry, with its most recent initiative being ISO certification. On top of these, the following revisions in its strategy would help setting a market standard for Bhutan honey –

- Sealing the packaged honey bottle to ensure zero tampering and avoid leakages and customer complaints
- Revising the label to include information on contents/ ingredients, packaging and expiry dates, certification/ quality details, and BeCoB's contact information
- Revising the pricing strategy to capture more revenue in the value chain (currently, BeCoB makes least margins in the value chain), including changes such as
 - Increasing the purchase price of honey from its members from Nu. 350 per kg: Presently the member beekeepers refrain from selling 100% of their honey to BeCoB as they manage to get better prices in the market. If BeCoB could match market prices paid by resorts/ guest houses, etc., BeCoB could almost double its production and reap benefits of economies of scale
 - Fix the margins made by retailers by introduction of an MRP and separate wholesale and retail prices (depending on volume purchased). Currently consumers pay about Nu. 1,000 per kg for BeCoB honey, out of which retailers make 43% without adding any value. With certain regulations from BeCoB, more value can be retained by farmers and the Cooperative.

Attract investments in the sector to facilitate the above: All the interventions above will help build a foundation to take apiculture to the next level in Bhutan. All sources of funding should be explored to achieve the requisite results.

6.2.2. *Potential medium-term interventions:*

In the medium term, there should be an effective transition into market-focused interventions, including –

Develop structured trade in the honey sector through strengthening the linkages between producers, processors, and marketers: Once the beekeepers are able to achieve a certain level of production, it will be easier for them to negotiate their prices and assistance needed from processors and enter into fixed contracts. Also, after the beekeepers have acquired productivity and basic processing and packaging skills, they will be able to strengthen their relationships with wholesalers and direct consumers through consistent supply and better packaging and prices.

Adherence of packaging and labelling with 'Brand Bhutan': Ministry of Economic Affairs (MoEA) has developed Brand Bhutan, packaging all positive attributes of Bhutan into an export-quality, premium brand. Once the Brand is implemented and its guidelines are developed, honey

processors should consider undergoing its accreditation process and attaining its Seal of Origin, ensuring consistency and high-quality packaging in all varieties of Bhutanese honey.

Transition of interventions from inputs supply and production to marketing end of the value chain: The honey market requires a number of market-related initiatives, including –

- Development of improved technologies and lab capabilities to test honey samples and award accreditation/ certification
- Access to high-quality packaging materials and labels for interested producers
- Introduction of high-quality packaging and labelling standards
- Compliance with Brand Bhutan standards

Development of market information structures for efficient delivery of information: Provision of information on institutional demand (from 5-star, 4-star and 3-star hotels, guest houses, resorts, etc.) and pricing will create a steady market for producers, while the processors can focus on retail consumption and export markets.

6.2.3. *Potential long-term interventions:*

The vision in the long term is to have achieved adequate supply for the domestic market and to explore export markets and utility of honey and its by-products in another areas. The interventions in the long term include –

Explore export opportunities: Once the domestic demand is relatively fulfilled and the quality of honey is improved, the industry should consider exploring export licensing regulations and quality requirements, for honey export to three Asian destinations with highest honey demand – Japan, China and South Korea, followed by other countries such as Singapore, Taiwan, India and Thailand.

Research into feasibility of honey by-products and their use as input in home-made goods, such beauty or cosmetic products: Raw, natural honey is in high demand for multiple industries such as alcohol, pharmaceuticals, cosmetics and beauty products. With suitable R&D, if value added products using honey and its by-products can be developed at home, it could lead to creation of a cottage industry at the grassroots level. The products could be distributed through the same channels working with textile and other home-made products.

Processors' investments in export-quality processing and packaging techniques and equipment: Once the production volumes are higher and the export potential explored, the processors can use the opportunity to invest into high-quality equipment and realize premium prices on product superior to what is presently processed and packaged. Moreover, with higher volumes, the processors have the prospect to reap economies of scale.

Research and development into high-end, niche honey varieties: There is also potential for Bhutan to invest into R&D of high-end, niche honey varieties, on the lines of Manuka honey. Manuka is a medicinal, well-processed honey from New Zealand which demands a price point almost twice that of other international, organic honey brands. Bhutan already produces small quantities of a niche variety (*pudka* honey) from *trigona* specie. However, it further research is required on techniques to increase productivity, and its medicinal benefits.

ANNEX I: SAMPLE QUESTIONNAIRE FROM THE FIELD VISITS**I (a). Questionnaire for Beekeepers in the Field:****General issues, including technology**

1. What are the general perspectives of beekeeping business in your region? From the point of view of –
 - a. Income –
 - b. Cost –
 - c. Effort –
 - d. Other notes –
2. Number of hives operated?
3. Estimated number of bees per hive?
4. Honey yield per hive?
5. Number of harvests per year?
6. Honey yield per harvest?
7. What bee species are used?
 - a. *Mellifera*
 - i. Productivity:
 - ii. Honey price:
 - iii. Other advantages/ disadvantages:
 - b. *Cerana*
 - i. Productivity:
 - ii. Honey price:
 - iii. Other advantages/ disadvantages:
8. What is the total cost in operating beekeeping practice in –
 - a. One time set up cost:
 - b. Annual costs:
9. Total annual income from beekeeping?
10. What beekeeping (hive) practices are common in the region?

Hive type	Productivity per hive	Other advantages/ disadvantages
Log hive		
Movable frame		
Other		

11. List and details of beekeeping inputs –

Item	Source	Price
<i>Mellifera</i>		
<i>Cerana</i>		

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Log hive		
Movable frame		
Other hives		
Extracting equipment		
Suits		
Other equipment		

12. What flowers/ crops do the bees generally feed on?
 a. Any chemical or pesticides used in 5 km radius?
13. What do you feed the bees during dry/ non-flowering season?
14. Is migratory beekeeping practiced?
 a. Yes/ No
 b. Advantages/ disadvantages
15. What approach is adopted for –

Harvesting Honey	<ul style="list-style-type: none"> • Extractor • Squeezing and draining
Stocking Honey	

16. In your opinion, what could be done to increase the efficiency of honey production in your region?

Honey

17. Common practices for –

	Sale to BeCoB/ other groups	Sale in open markets
Honey harvesting		
Processing		
Transportation		
Packaging		
Jar size		
Jar type		
Labeling		
Prices received (per kg of honey)		

Market

18. At what price point are you able to sell honey to –

Potential buyers	Price per kg	Payment terms
BeCoB/ other farmer group/ Coops		

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Retailers		
Exporters		
Middlemen		
Direct consumers (Marketing sheds/ vegetable market)		

Quality

19. How would you grade your honey quality –
 - a. Natural
 - b. Organic
 - c. Flavor
20. What challenges are faced in maintaining homey quality?
21. Are there any sector programs aiming to improve honey quality? Details?

Bee Health

22. Threats regarding bee health prevention and combat in your region?
 - a. Pests
 - b. Predators
 - c. shortage of feed and forage
23. What bee diseases do you encounter in the region? Prevention practices?
24. How are diseased hives handled?
25. Swarming
 - a. # times a year:
 - b. How do you avoid swarming?
26. How does the bee health issue/ swarming affect profits and competitiveness?

Government programs

27. Technical assistance received so far –

Providers	Program details	Success/ Failure (benefits received)
Extension agents		
NGOs		
Exporters		
RGoB		
Cooperatives		

Taxes and exemptions

28. Which types of taxes are paid by farmers?

29. In which way do these taxes interfere in honey production/ processing/ input purchases?

Credit availability and access

30. Financing options –

- a. Self-financing
- b. Financial agents/ institutions
 - i. Names of financial agents
 - ii. Rate of interest

31. Types of credit available –

- c. Working capital
- d. Investment credit
- e. Others

I (b). Questionnaire for Processors:

Technology (current level; identification of bottlenecks; suggestion of policies)

1. List of installations/ equipment / processes
2. How do the installations compare to industry benchmarks
3. Are there regular investments in R&D? Are there partnerships for R&D?
4. The location issue (how your location influences your performance)
5. Are there any foreseen investments?
6. By-products processing (if not processing, how by-products are being disposed?)
7. The issue of quality: perceptions of the respondent
8. Level of idle capacity (how much and why)/scale issues (size versus operational costs). What is the ideal capacity of the plant, considering economies of scale?

Value Chain

1. Players
2. Value added at each level
3. General issue (general evaluation of system efficiency)
4. Sources of product acquisition and governance structure
5. Payment practices (pricing, live weight, other, grace period).
6. Are there any programs for quality improvement
7. Average distances from suppliers, type and costs of transport (who is responsible for transport, supplier or buyer?).
8. Efficiency of transport system (type of vehicle, losses, out-sourcing versus own fleet).
9. Other inputs (electric power, water, other)
10. Are there monitoring/technical assistance programs for suppliers

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Quality

1. Are there systems of quality management?
2. Are you satisfied with the systems in place?
3. Aspects of food safety management?
4. What certifications you think the present state could be eligible for?

Management

1. Are there managerial systems for cost control?
2. How is the administrative efficiency evaluated?
3. Is there formal strategic planning?
4. Financial data available (cash flow, investment analysis, other)
5. Credit (operating/investment/exports) availability and access
6. Marketing strategies (brands, media, other)

Market

1. Product primarily sold to?
2. General issue (trends, evaluations, other).
3. Main product(s) and by-product(s) sold
4. Main markets (local, regional, national, international, institutional).
5. Governance structures (vertical integration, contracts, and partnerships).

I (c). Questionnaire for Retailers in Thimphu:

1. Where is honey purchased from and at what price?

Honey Supplier	Location	Avg. Qty.	Transport costs	Purchase Price	Selling Price
BeCoB					

2. Are there any other costs you have to incur while purchasing honey?
3. Do you keep any other honey variety apart from BeCoB/ Bumthang honey?

Other honey type	Purchase price	Selling price
SABAH		
OGOP		
Bio-Bhutan		

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4. Does the price remain uniform all throughout the year? What price do you sell during the off seasons?
5. Do you stock non-Bhutanese honey types as well?

Imported Honey name	Imported from	Purchased at	Sold at

6. Do you think you have sufficient honey supply? Or you could buy and sell more per year?
7. Do you receive any customer feedback on the honey sold?

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ANNEX II: EXAMPLES OF SELECT HONEY LABELS

BeCoB Honey:



NH-RDC Honey (not for retail sale)



Patshaling Farmer Group



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OGOP Honey:



Bio Bhutan Honey:



SABAH Bhutan Honey:



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ANNEX III: CALCULATION OF VARIABLE COSTS PER KG

III (a) For Producers (*Cerana* and *Mellifera*)

COST OF HONEY PRODUCTION

Semi-Variable Costs	Cerana				Malifera			
	Units	# units per box	Cost per unit	Cost per box	Units	# units per box	Cost per unit	Cost per box
Box	pcs.	1	2650	2650	Pcs.	1	3000	3000
Box Life (yrs.)				7				7
Cost of box per yr.				378.57				428.57
Variable Costs								
	Units	# units per box	Cost per unit	Cost per box	Units	# units per box	Cost per unit	Cost per box
Wax	kgs.	1.5	1000	1500	kgs.	3	1100	3300
Labour				0	days	0.4	500	200
Bottles/ barrels/ misc.				0	pcs.	70	20	1400
Sugar				0	kgs.	40	45	1800
Transportation				0	kms.	7	20	140
Rent paid to farms/ lease				0				75
Tot. cost per box				1,878.57				7,343.57
Yield per box				10				35
Variable Cost (VC) per kg				187.86				209.82
Rounded VC per kg				190				210

III (b) For Processors (*Cerana* and *Mellifera*)

PROCESSORS' VARIABLE COST

	Cost per kg	
	Cerana Processors	BeCoB
Glass bottles (250g)	33	33
Labels	24	24
Shrink wrap	1	1
Collection and transportation	25	0
Wastage (15%)	64	64
Bottle breakage (5%)	1	1
Purchase cost of Honey	650	350
Total VC per kg	798	473

ANNEX IV: TRAINING MATERIALS FOR EXTENSION STAFF

Per the terms of reference (ToR), the consultant is required to submit training materials that can aid in strengthening of the honey value chain. The training needs were identified in the Conclusions section of the value chain report.

IV (a) Training Background

NH-RDC is working with respective dzongkhags and RLDCs to extend basic beekeeping training for new beekeepers and advanced training on pests and diseases, colony cycle and seasonal management techniques for existing beekeepers.

However the industry participants have little understanding on the commodity value chain, its respective actors and value captured by each, and initiatives that could strengthen the value chain and the margins captured by the beekeepers.

Hence it was recommended that the findings of the value chain analysis be disseminated to all extension staff and relevant stakeholders during national and regional workshops organized by DAMC. In addition to the value chain recommendations, the following training materials, based on the report findings and international best practices, shall be disseminated to the extension staff.

IV (b) Gaps Analysis

Based on the stakeholder and producer interviews, it was realized that most honey training in Bhutan is focused on beekeeping practices and honey production. Here is a summary of our findings on beekeeping training practices in Bhutan –

Training Area	Existing training material/ practices	Gaps Analysis
Honey Production	<ul style="list-style-type: none"> - Beekeeping: Introduction and getting started - Bee Species, colony cycle and management, and bee diseases and parasites - Transferring colonies from traditional to modern hives - Seasonal Management 	<ul style="list-style-type: none"> - More practical training through exposure trips to expert beekeepers' apiaries within Bhutan and other Himalayan locations, such as Nepal and select locations in India
Honey Marketing	No materials on marketing/ post-harvest was discovered in the training folder received from NH-RDC	Techniques on how to add value for producers though superior –

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		<ul style="list-style-type: none"> - Processing - Storage - Packaging and Labelling - Marketing
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As mentioned earlier in the report, producers can capture much more revenue in the value chain if their training is extended to basic processing and filtering techniques. Beekeepers who sell their produce to processors can capture only 35% - 46% of the value generated as a percent of the selling price. This is because the producers are unaware of basic filtering and processing techniques, which could be performed at home as well. Most of their beekeeping training is focused on basic beekeeping and management technique, with almost no focus on basic processing and packaging, value chain and market information.

IV (c) Training Objectives:

Trainees would have previously learned from the report dissemination about the honey value chain, its actors and their functions and linkages, and existing challenges in the value chain and how to address them.

The following training materials aim to provide further information on how to store honey safely, know-how on honey quality and types, and uses of honey.

Additionally it is noteworthy for the extension staff to learn and educate that solidification of honey is a natural phenomenon, although the speed and extent depend on the source, season, and location of the honey store. Solid honey can be liquefied by standing the honey jar in hot water. Solid honey can also be eaten without liquefying.

IV (d) Resource Materials:

1. Introduction:

Honey is a sticky, semi-liquid product made by honeybees from the natural nectar or honeydew of flowers and plants, which is collected, processed, concentrated, and stored by the bees in combs. Honey has been used as food and medicine.

Honey production involves the complete process of beekeeping management, harvesting combs from a bee colony, extracting the honey from the combs, and processing and packaging.

2. Harvesting:

Harvesting is the process of extracting honey from honeycombs taken from honeybee colonies. Honey can be harvested from wild bee colonies ('honey hunting') or from domesticated bees. Majority of honey in Bhutan is harvested from domesticated *Apis cerana* and *Apis mellifera* bees.

To maximize income from commercial beekeeping, it is important to produce a large volume of good quality honey. At the same time, it is important to remember that bees store honey to use as food. The harvested honey should be in excess of the needs of the colony, and harvested at a time when the colony can still replenish its stores. Proper colony management is necessary to maintain honey quality and increase the amount of honey produced.

a. Harvesting Methods:

- Only harvest during the honey flow period.
- Set up the extractor in a closed room or in a tent made of fine mesh netting away from the apiary. Use a big dish or tray to collect drips.
- Lift each frame from the super and identify combs ready to harvest. Lift out frames containing combs in which more than 70% of cells are capped. Brush the bees off the comb back into the hive. Take as many frames as will fit in the extractor (2, 4, or 8). If all frames are filled they can all be harvested.
- Replace the frames taken for harvesting with old frames with cleaned comb if available.
- The frames in the brood chamber with honey should be left to fulfil the colony's needs. Although it is possible to harvest frames from the brood chamber, this is not good practice and will weaken the colony.
- Take the frames to the honey extractor in a bowl or other container to prevent dripping.
- Remove the caps from the cells on both sides of the comb with a sharp knife; collect the caps in a dish.

- Place frames in the extractor and rotate it to force the honey out of the combs. Pour the honey collected at the base of the extractor into a stainless steel container or glass jar.
- Put the frames with empty combs back into the hive if no extras were available, or store for later use.

3. Processing

Honey is itself a processed product. The nectar collected in the crop of forager bees is passed to house bees and mixed with different enzymes to convert the sucrose into *levulose* and fructose before depositing in comb cells. Excess water is evaporated through fanning and heating and the cells are only sealed after the honey has ripened.

In honey production, processing mainly refers to removing any wax particles, brood, or foreign materials from the honey extracted from the combs, and on occasion treating the honey to obtain a particular consistency. The methods used for processing can have a marked effect on honey quality.

The following MUST be paid attention to in order to maintain quality:

- Processing should be carried out in a clean, dry environment.
- The processing area should be closed so that bees can't enter.
- The utensils used in processing should be made of good quality food grade stainless steel, glass, or plastic, and be clean and dry.
- The processing method may differ according to the diversity of the forage. Different methods are used for processing uni-floral and multi-floral honey, and for producing liquid, solid, creamed, and comb honey.
- Honey should not be heated directly. The quality decreases markedly if heated beyond 40°C.
- You should consult with a honey technician if you intend to heat the honey during processing.

a. Filtering Methods:

Two main methods are used for processing honey to remove contaminants: sedimentation and heating. Occasionally, beekeepers need to evaporate excess moisture to prevent fermentation, especially with *Apis mellifera* honey. Evaporation takes place if the heating method is used to remove contaminants. If cold sedimentation is used, warm dry air can be blown across the surface of the cleaned honey to achieve the same effect. High moisture levels are less common if care is taken only to harvest combs in which at least 70% of the cells are capped.

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Sedimentation method: The honey is filtered through a double layer of muslin cloth and then allowed to sediment for at least 48 hours in a container holding more than 100 kg of the liquid. The portion at the bottom with sediment is removed through an outlet at the bottom of the container, and the remainder stored and used for bottling and sale. The honey with sediment can be used to feed the bees during the dearth period.

Heating method: In the heating method, honey is heated in a water bath to a temperature below 40°C and then filtered through muslin or steel mesh before cooling and storing in airtight bottles. Heating is also used to evaporate excess moisture and improve the keeping quality.

Figure 1: Honey Sedimentation

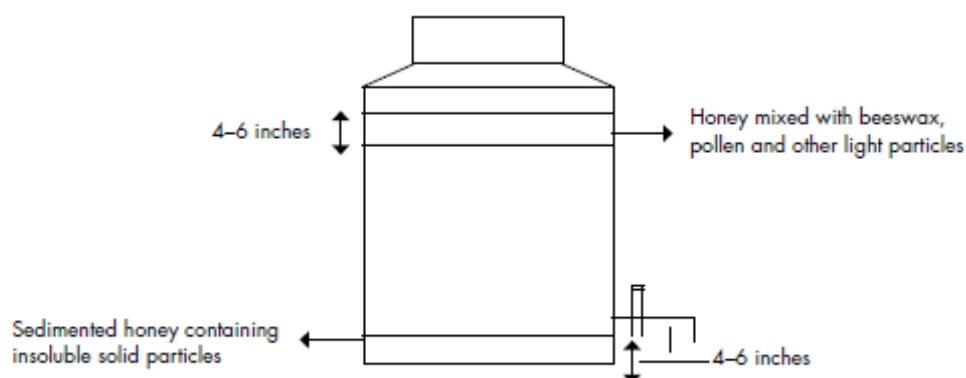
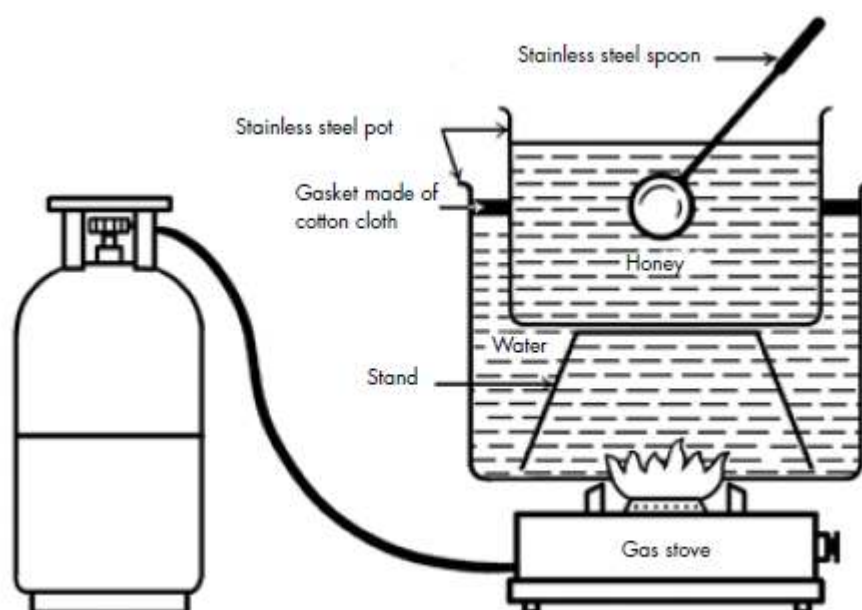


Figure 2: Heating honey to remove contaminants



4. Ensuring Production of Quality Honey

Production of large amounts of high quality honey can be achieved by paying attention to the following:

- Requeen the colony with a quality queen 2 months before the start of the honey flow season.
- Migrate the colony to an environmentally safe pasture. Pay attention to the carrying capacity of the local pasture and exploit different sources of pasture based on market demand. Do not migrate bee colonies to pasture areas sprayed with pesticides. If pesticide spraying is observed, pack up the colonies and migrate them 5 km away.
- Adopt biological or botanical control measures instead of chemical pesticides for crop protection. If chemical pesticides have to be used, then only use them before or after flowering. Do not use pesticides in the apiary area.
- Create awareness among neighbours' and growers of crops that they should give notice to beekeepers if they are going to use dangerous pesticides. Confine the bees inside the hive for 2–3 days with sugar feeding when pesticides are sprayed on crops used as bee pasture.
- For organic honey production, don't use chemicals or antibiotics to control bee diseases and pests and follow an organic certification procedure.
- Only harvest honey from supers, and avoid mixing wax, brood, and pollen while harvesting.
- Harvest honey from combs in which more than 70% of the cells are capped while leaving sufficient stores to meet the requirements of the colony.
- Use a pollution free environment and clean and safe equipment for harvesting and processing; never use utensils made of copper, iron, or brass like metals.
- Filter extracted honey through a clean stainless steel mesh and collect in a clean stainless steel pot.
- Use sedimentation after filtering to ensure the honey is pure.
- Avoid adulteration of the processed honey to protect the chemical properties.
- Only store honey after proper processing and packing. Store at room temperature in a dry place to maintain the physical quality.
- For longer periods, store honey in an air tight container.

The precise composition of the purified honey varies depending on the floral source of the honey and the bee species. The table below shows typical values:

Table 1: Typical values for the composition of honey

Substance	%
Levulose	41.0
Dextrose	35.0
Sucrose	1.9
Dextrin	1.5
Minerals (potassium, chlorine, sulphur, phosphorous, manganese, calcium)	0.2
Essential oils (flavonoids, tannins, resins, volatile substances)	3.4
Water	≤ 20.0

5. Producing higher-quality honey

In general, higher price can be charged for higher quality honey. Quality honey means that the honey has a natural essence, taste, and colour, is not adulterated, and is free from chemical residues. In order to produce quality honey, attention must be paid to the summary in table 2 and the following:

- Bee pasture
- Beekeeping equipment and use
- Honey harvesting, extraction, filtration, processing, packaging, and storage
- Personal hygiene of beekeeper and staff
- Record keeping

Table 2: Quality measures at each level of the honey value chain

Activity	Quality dimension	Potential advantages
Production level		
Grading of the pasture area	Good agricultural practices (GAP)	Can sell at organic price
Biological management of pests and diseases	Honey free from chemical residues	Can receive comparatively higher price in the international market
Use of good quality stainless steel utensils	Honey has better taste and medicinal value	Global market promoted
Harvesting of ripened honey		Sustainable market promoted

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Processing level Avoid direct heating of honey Maintain standard recommended temperature while filtering and evaporating honey	Can maintain the natural quality of the honey	Sustainable market promoted at national and international level
Storage level Store in airtight food grade containers	Can maintain the natural quality of the honey	Sustainable market promoted at national and international level
Marketing level Packaging Labelling Branding Certification	Market access promoted High volume market developed with a separate identity for honey	Market access promoted, higher price gained, competitive international market created

Different countries have laid down different standards for quality honey. For example, China has maximized moisture content (%) to 18%, while the maximum moisture limit has to be in the range of 20-23% in India and Nepal. Generally speaking, moisture limit is preferred at 18% in Bhutan and shouldn't go higher than 20-21% in any case. A simple refractometer, costing about Nu. 2,400 can be sourced from NH-RDC/ RLDCs or BeCoB to ensure moisture content is below the prescribed limit.

Mentioning adherence to moisture limits on the honey label will go a long way in communicating the honey quality to the customer.

6. Storage:

The following points should be noted to ensure that honey doesn't deteriorate during storage:

- Honey should be stored in food grade glass or stainless steel containers.
- Honey should be stored in an airtight container. It is hygroscopic and will absorb water and odours if stored open in an atmosphere with more than 20% relative humidity. The colour and taste may also change.
- Care should be taken to ensure that stored honey is free from contaminants and has not absorbed moisture to avoid fermentation and changes in colour.
- The room used to store honey should be dry, clean, and closed.

- The ideal room temperature for storing honey is 20°C.
- Always label the stored containers and include details of the harvesting date, treatment, and expected storage life.

7. Marketing:

Marketing is the exchange or sale of goods or services between a seller and the buyers. Market management means the competitive process of marketing goods and services according to market demand. Managing a honey market is about selling honey according to the interest and demand of end users while obtaining a competitive price for the seller. In order to market the beekeepers' product better, following needs to understood and analysed:

Product: While 1 kg of *cerana* honey in re-used whiskey bottle sells for an average of Nu. 650-790 when sold to processors and wholesalers, the value of same honey is doubled when processed and packaged well. In case of honey, two factors can help upgrade the product value –

- Quality:** The quality of honey depends on how well the honey has been extracted, processed and stored, which has all been described above.
- Packaging:** Packaging plays a very important role in honey pricing. Packaging comprises of bottling and labelling.

8. Bottling –

Always choose a clear/ transparent container. Consumers want to see what they are getting, and it's advisable to show off the beautiful golden colour of honey.

Glass is preferred to plastic for honey bottling purposes in Bhutan. As low quality plastic can leach chemicals and odour into honey. And since Bhutanese honey is very raw it tends to crystalize fast, so having it in glass means it can be heated right in its container without the mess of transferring it into something heat-safe. (Heating up plastic honey bottles may expose the honey to even more chemicals.)

Glass bottles provided by National Post Harvest Centre (NPHC) for pickles packaging work well for honey bottling in Bhutan as exhibited in the figure below. Extension officers/ RLDCs can help procure such bottles for the farmer group (FG) or individual, commercial beekeepers from NPHC, BeCoB and/ or NH-RDC.

Figure 3: Honey bottling examples in Bhutan



9. Labelling –

Developing a label is not difficult. Most people use Kuensel for printing although they may require for some minimum quantity. Hence it is advisable to use the same labels for a farmer group (FG) from the same community/ location. It is valuable to communicate the following information to the consumers through a simple label –

Honey brand name and logo, if available: If a brand name has not been assigned to the honey, it is imperative the word ‘honey’ must be visible on the label. The name of a plant or blossom may be used if it is the primary floral source for the honey.

Net Weight: The net weight of honey (excluding packaging) in grams must be included in the label (at an easy-to-read place).

Ingredients: Single-ingredient products such as honey do not have to name that single ingredient when already used in the common or usual name on the front panel. However, if there are ingredients other than honey, you must list them in an ingredient statement.

Species of bee: It is useful to specify whether the honey is produced by *cerana* or *mellifera* or *trigona* in rare cases.

Geographic or topological source: The country, dzongkhag and/ or geog with corresponding must be mentioned in the honey brand or along with the contact information below.

Contact Information: The label must let consumers know who put the product on the market and how to contact that person. The name and the address of the manufacturer, packer or distributor of the product should appear on the label. If space permits, one may consider including full address and telephone number.

Organic/ raw/ natural: Since all honey produced in Bhutan is natural, this information is optional when selling in domestic market. However it should be noted that to label as organic honey, one must go through organic production and certification procedures. Generally unheated honey is considered raw honey and requires production and storage at or under maximum hive temperature.

Moisture content: Most honey packaging in Bhutan do not mention moisture content. However, if a beekeeper or a FG has undergone the moisture check and their moisture content is below 20-18%, mentioning it on the label provides a competitive advantage.

Price: If you have incurred additional expenses on the packaging and labelling, the corresponding prices should reflect the same. The resultant price would be higher not only because of the additional expenses but the premium of the value added. This is most relevant when honey is sold directly to the consumers.

Beekeepers and FGs who have managed to produce consistent quality and quantity of honey must also consider revising their arrangement with the processor. If the prices are revised upwards to reflect competitive prices, beekeepers have lesser incentive to break out of their agreement with the processors and sell directly to other consumers.

Place: Analysing the quality and quantity of honey produced, the beekeeper or the FG must consider the place of sale, identifying the most appropriate market location/ channel. The available options in Bhutan are farmers market in bigger towns, marketing sheds along the busy roads, processors and retail and processor outlets.

10. Uses of Honey:

Pure natural honey contains more than hundred kinds of rare and useful vitamins, minerals, and other ingredients. Honey has a long history of human consumption. It is mentioned as a perfect food in many religious and spiritual scripts, and is used in both Ayurvedic and modern medicine. Honey can provide a rapid source of energy and strengthens resistance to disease. Regular honey consumption supplies essential nutrients to the human body. The following benefits are attributed to honey:

- Keeps the body active and restores energy
- Increases digestive ability and cures digestive diseases
- Bactericidal properties in general; helps to cure illnesses such as coughs and colds, hiccups, and diarrhoea
- Reduces the effects of diseases related to the liver, veins, and blood
- Reduces the symptoms of tonsillitis, sore throats, and similar diseases
- Helps to cure menstrual pain

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- Increases memory power, helps in semen production and increasing sexual appetite
- Cures urinary infections
- Helps in the physical and mental development of growing children
- Makes the body, skin, and hair shiny, clean, and attractive, and counteracts skin wrinkles

Honey can be used as a food and a substitute for sugar and other sweeteners. It can be taken with cold water in summer, hot water in winter, and in warm milk. Honey is useful to all people more than a year old.