

Honey in Nepal

Approach, Strategy and Intervention for Subsector Promotion

gtz Partner for the Future Worldwide

COOPERATION NEPAL GERMANY

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Foreword

Enhancing the competitiveness of Nepal's private sector in order to generate income and employment opportunities is the prime objective of the Private Sector Promotion (PSP) project of German Technical Cooperation (GTZ), Federal Ministry for Economic Cooperation and Development, Republic of Germany. The project applies a set of methodologies and tools to implement its impact oriented strategies. Activities are carried out, mainly with private sector partners, in order to transfer knowledge, strengthen capacities, improve structures and thus achieve high sustainability. PSP is working in seven selected subsectors using a value chain approach. Honey has been selected as one of the subsectors with good potential to generate cash income and employment opportunities.

Beekeeping has holistic benefits in relation to health, the economy, employment and the environment. In an agricultural country like Nepal, beekeeping is regarded as a very rewarding occupation for many people. Beekeeping is suitable for farmers, particularly under-privileged, landless, low-income groups as well as females, as it requires minimal start up investment and generally yields profits within the first year of operation. Beekeeping not only generates food and income for the rural poor, it also generates off-farm employment opportunities in many fields including the hive carpentry, honey trading, renting and hiring of bee colonies for pollination and bee-based micro-enterprises. Presently, over fifty thousand rural families are engaged in beekeeping. However, most of these small operations remain non-commercialised.

Because of the richness of floral resources and diverse climatic conditions, Nepal produces a wide variety of specialized honey. Nepal has a strong potential to be a provider of honey to growing niche markets. However, as honey is a food product of animal origin it needs to fulfil certain quality parameters and comply with various regulations. Currently, Nepal is not on the list of developing countries allowed to export honey to the European Union (EU) as the honey industry cannot comply with the regulatory requirements of the EU.

In this context, and within the overall framework of the GTZ/PSP project, the value chain approach has been adopted to map the subsector, identify appropriate areas of intervention and implement activities in close cooperation with other development organisations, government line agencies and business membership organisations. This publication presents an overview of the honey subsector, describes the approaches adopted to enhance the competitiveness of the subsector and shares the findings of the project interventions.

I appreciate the efforts made by the author in collating and analysing the information and bringing out this publication in this form. I do hope that this publication is useful for policy makers, development agencies, honey entrepreneurs and other stakeholders in designing and implementing interventions in the honey subsector.

Armin Hofmann
Programme Manager



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Surendra Raj Joshi



Acronyms

AEC	Agro Enterprise Centre
Api-Net	Apiculturists' Network
ATSP	Agricultural Technology and Support Project
BDS	Beekeeping Development Section
BETRESP	Beekeeping Training and the Extension Support Project
CAC	Codex Alimentarius Commission
CTEVT	Council for Technical Education and Vocational Training
DFID	Department for International Development
DFTQC	Department of Food Technology and Quality Control
DOA	Department of Agriculture
EC	European Council
EEC	European Economic Community
EU	European Union
FAO	Food and Agriculture Organization
FNBK	Federation of Nepal Bee-keepers
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
FtF	Farmer to Farmer
GoN	Government of Nepal
GTZ	German Technical Cooperation
HMF	hydroxy methyl furfural
ICIMOD	International Centre for Integrated Mountain Development
IDRC	International Development Research Centre
IEDI	Industrial Enterprise Development Institute
INGO	international non-governmental organization
IPPC	International Plant Protection Convention
LRED	Local and Regional Economic Development
MEDEP	Micro-Enterprise Development Programme
MOAC	Ministry of Agriculture and Cooperatives
MT	metric ton
NARC	Nepal Agricultural Research Council
NBA	Nepal Beekeepers' Association
NBSM	Nepal Bureau of Standards and Metrology
NPR	Nepali Rupees
OIE	World Organization for Animal Health
PAF	Poverty Alleviation Fund
PSP	Private Sector Promotion
PTB	Physikalisch-Technische Bundesanstalt
RUFIN	Rural Finance Nepal
SNV	Netherlands Development Organization
SWOT	strengths, weaknesses, opportunities, threats
ToT	training of trainers
TPC	Trade Promotion Centre
UNDP	United Nations Development Programme
USAID	United States Aid for International Development
VC	value chain
VMGO	vision, mission, goal, objectives
WI	Winrock International
WHO	World Health Organization
WTO	World Trade Organization



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1 General Overview of Honey Subsector

1.1 Introduction to Honey

1.1.1 History of Honey

Almost every society on earth has known and used honey. Cave paintings near Valencia in Spain from 15,000 years ago depict men gathering honey (Crane 1999). In language and literature, religion and folk beliefs, honey symbolizes sweetness of every kind. The Bible, the Veda and the Koran all extol the virtues of honey as a valuable and nourishing food. In Hinduism, honey is considered to be one of the five heavenly foods 'Panchamrit'. The Koran has devoted a special chapter on honey and its uses (Sura XVI-NAHL; c.f. Ali, 1989). Honey is also mentioned in the Bible. Solomon in his proverbs (24:13) advises, 'my son, eat thou honey for it is good'.

1.1.2 CAC Definition

The Codex Alimentarius Commission (CAC)[1] defines honey as 'the natural sweet substance produced by honeybees from the nectar of blossoms or from secretions of living parts of plants or excretions of plant sucking insects on the living parts of plants, which honeybees collect, transform and combine with specific substances of their own, store and leave in the honey comb to ripen and mature'.

While defining essential composition and quality factors, the CAC further states that honey shall not have any objectionable matter, flavour, aroma or taint absorbed from foreign matter during its production, harvesting, processing and storage. The honey shall not have begun to ferment or effervesce. No pollen or constituent particular to honey may be removed except where this is unavoidable in the removal of foreign inorganic or organic matter (CAC 2001).



Worker bee collecting nectar from a flower



Bees making honey

1 The Codex Alimentarius Commission was created in 1963 by FAO and WHO to develop food standards, guidelines and related texts such as codes of practice under the joint FAO/WHO Food Standards Programme. The main purposes of this Programme are to protect the health of consumers and ensuring fair trade practices in the food trade, and to promote the coordination of all food standards work undertaken by international governmental and non-governmental organizations.

1.1.3 Food and Medicinal Value

Honey is a popular health food said to facilitate better physical performance. It is widely used to cure coughs, colds, wounds, cuts, diarrhoea and many other diseases. It provides energy—as much as 3500 calories/kg—and requires no digestion, only a slight digestive action. Honey increases appetite, helps to control gastritis and can also provide relief for ailments like allergies, sinus, arthritis and asthma. Honey is an important ingredient in Ayurvedic medicine. In recent years, the antibiotic and wound healing properties of honey have been proven scientifically (Molan 1992).

However, not all honey available in the market has these qualities. The incorrect management of bee colonies (use of medicines and excessive sugar feeding, etc.) and mistakes made during honey processing can affect honey quality and cause honey to lose its original properties. To produce good quality honey (and fetch a high price) it is very important to understand the major constituents of honey and how these constituents influence quality.

1.1.4 Constituents of Honey

The major constituents of honey are sugars including fructose, glucose, sucrose, maltose and other di- and trisaccharide sugars. Besides sugars, honey contains a wide variety of chemical components such as proteins, fats, vitamins, minerals, enzymes, amino acids and volatile scented substances. Several of these chemical components are of great importance as they influence the keeping quality, granulation, texture, as well as the nutritional and medicinal efficacy, of honey.

1.1.5 Categorization

Honey can be categorized according to its floral origin or source, mode of processing, consistency and appearance, style of marketing and colour (Table 1).



Amber and White coloured honey

Table 1 Types of Honey

Method of Categorization	Type of Honey
Source	**Multifloral Honey**: Contains pollen from more than one plant species with no domination by any single plant species. **Unifloral Honey**: Produced mainly from a single plant species, has identifiable organoleptic characteristics (appearance, colour, flavour and taste) and more than 45% of the total pollen is from the same plant species. **Honeydew Honey**: Made from excretions of plant sucking insects on the living parts of plants or secretions of living parts of plants.
Mode of processing	**Squeezed Honey**: A traditional method of honey extraction, which involves squeezing the honey combs. **Drained Honey**: Honey is obtained by draining decapped, broodless[2] comb. **Extracted Honey**: Honey is obtained by centrifuging decapped honey combs. This type of honey is mainly produced by beekeepers who manage bees in moveable comb hives.
Consistency and appearance	**Liquid Honey**: Either thinner or thicker in consistency and free of visible crystals. **Crystallized Honey**: Completely granular or solidified.
Style of marketing	**Chunk Honey**: Obtained by cutting a piece of comb and consisting only of a sealed and undamaged honey comb. This type of honey is generally packed in transparent glass vessels. **Comb Honey**: Honey stored by bees in the cells of freshly built combs and sold in sealed whole combs or sections of such combs. **Comb Honey in Fluid Honey**: A cut comb inserted in fluid honey.
Colour	**White Honey**: White or opaque **Dark Brown (Amber)**: Dark brown to amber **Golden Honey**: Golden

2 Decapped comb is honey comb that has had the wax cap of each cell removed. Broodless means that the comb is free of honeybee eggs, larvae and pupae.

1.2 Honey in Nepal

1.2.1 Tradition of Honey Gathering

Nepal has a long and venerable tradition of beekeeping and honey hunting dating back thousands of years. Beekeeping with a native hive bee *Apis cerana* is an old tradition handed down from generations and it is still in a preliminary stage. *Apis cerana* colonies are generally kept in log and wall hives without any management except honey harvesting once or twice a year. *Apis cerana* beekeeping is a sideline activity for many farmers, who grow variety of crops, rear livestock and perform number of other activities to manage their livelihood. However, in some parts of the country, particularly in chiuri threshold areas, beekeepers earn substantial income from sale of honey and beeswax.

The Government of Nepal, together with national, bilateral agencies, has made various efforts to increase productivity of *Apis cerana* through the provision of supply inputs and embedded technical assistance and training. The Government took first initiative in 1968 to provide training on beekeeping through its Department of Cottage Industry and Remote Area Development Committee. In 1975, Vocational Entomology Section was established to look after beekeeping and sericulture and in 1980 a separate unit; Beekeeping Development Section (BDS) was created to provide training and extension support services in beekeeping. SNV supported Beekeeping Training and the Extension Support Project (BETRESP) made good efforts to strengthen institutional capacity of BDS. Similarly, with the support of Austrian Government, International Centre for Integrated Mountain Development (ICIMOD) has implemented various projects focusing on indigenous honeybee species with the objective to conserve and promote these honeybee species and improve the productivity of *Apis cerana*.

The Italian race of honeybee *Apis mellifera ligustica* was introduced in the country in 1990 and lots of efforts have been made by both government and non government agencies to promote this bee species for higher honey production. This species is performing well in terai parts of the country however it did not do well in the hills and mountain districts of the country. Later on, *Apis mellifera carnica* and buckfast bees have also been introduced to the country but they did not perform well in Nepal. At present, there are about 20,000 colonies of *Apis mellifera* distributed from east to western part of terai. The average honey yield is 20 kilogram per annum and total honey production from *Apis mellifera* colonies is estimated to be 500-750 MT.

Box 1
Traditional Beekeeping

I have been keeping bees in my house since many years. I have learnt the techniques of swarm collection and honey harvesting from my father. At present, I have 5 honeybee colonies in moveable frame hives, 2 in wall hives and 17 in log hives. I have dozens of Chiuri trees in my private lands, which provide enormous nectar for bees. I also grow mustard, maize, wheat and other crops in my farm land, and raise buffaloes and goats to manage part of my livelihoods.

Depending on the climatic conditions of the year and flora, I harvest from 65 to 200 kilograms of honey per annum. Market is not a problem in this district. The taste of my honey is not comparable with that of terai honey. My honey has unique taste and sweet soft aroma, as it is mostly produced from the nectar of Chiuri trees and other wild flora. I earn about 25,000 to 40,000 rupees from the sale of honey, which is more than one third of total cash income that I earn from my farm and off-farm activities. I have received training on beekeeping and am interested to increase the number of bee colonies in moveable frame hives.

Harka Oli, Apis cerana beekeeper, Rukum District, Nepal

Box 2 Commercial Beekeeping

My family started *Apis mellifera* beekeeping with 2 colonies in 1996 (2053 BS). At the beginning, we focused more on colony multiplication. After receiving training on colony management and getting recognition as Beekeeping Resource Centre from Beekeeping Development Section of Department of Agriculture, we intensified our beekeeping related activities. We have established hive carpentry workshops, a honey processing unit and training facilities.

Now, we manage over 200 bee colonies and have our own brand of honey "Sagar Honey" which is getting good recognition in the domestic market. We deal with 20–30 metric tonnes of honey in a year and supply over 1,500 bee hives to different development organizations that promote beekeeping as a part of income generation. We have been collaborating with GTZ, MEDEP, Winrock International and other government and non government organizations to promote beekeeping and honey market.

At present, marketing of honey seems to be a big problem since per capita consumption of honey in Nepal is very low. High cost of transportation and weaker institutional mechanism to assure quality also pose difficulty in exporting Nepali honey.

Daya Sagar Subedi, Commercial beekeeper, Nawalparasi District, Nepal

1.2.2 Types of Honey

Nepal produces a wide variety of specialized honey and other bee products noted for their purity and high medicinal value. The majority of the honey found in Nepal is of multi-floral origin. However, there are some unifloral honeys including chiuri (Indian butter tree), mustard, buckwheat, rudilo (*Pogostomone spp*), sunflower and litchi honey. Honeydew honey collected from pine and spruce trees (*Salle Maha*) and oak trees (*Dalle Maha*) is also produced in the mountain areas of Nepal.

Most honey in Nepal is extracted by squeezing the combs with hands. Squeezed honey is very common in the mountain areas of Nepal where *Apis cerana* beekeeping is practised in fixed-comb log and wall hives. Some honey is also extracted by centrifugal extraction, mainly honey produced by *Apis mellifera* beekeepers who keep bees in moveable frame hives.

Liquid honey is preferred by Nepali consumers who consider coarsely granulated honey as inferior in quality due to adulteration with table sugar. Contrary to this, the finely granulated chiuri and litchi honeys and cold pressed multifloral honeys are regarded as the best honeys. Chunk and comb honey is not very common in the Nepali market, although some Nepali entrepreneurs (Himalayan Honey Suppliers, Alital Multipurpose Cooperative) have started to sell this type of honey. In Nepal, honey is also classified according to bee species, harvesting season and geographical location.

1.2.3 Honeybee Species

Nepal's diverse climatic conditions and abundance of flora make it host to five species of honeybee. Among these, only the Asian hive bee (*Apis cerana*) and the European honeybee (*Apis mellifera*) can be



Asian hive bee (Apis cerana)



Himalayan cliff bee (*Apis laboriosa*)

kept in hives and managed for honey production and pollination. The other three species—the Himalayan cliff bee (*Apis laboriosa*), the giant honeybee (*Apis dorsata*) and the dwarf honeybee (*Apis florea*)—are wild. Specialized people and communities called 'honey hunters' collect honey and beeswax from the nests of these wild bees. Although there are no validated figures, it is estimated that, at present, there are about 90,000 *Apis cerana* hives and 20,000 *Apis mellifera* hives in Nepal. The latter species is suited to the southern lower areas of Nepal (the Terai and inner Terai), where there is access to resources and information, and where there is infrastructure for colony migration. *Apis cerana* is more suitable for rural farmers who practice stationary beekeeping with just a few colonies in their backyard.

In addition to the above five species of honeybee, there are also stingless bees (*Trigona/Melipona spp*), which also produce a small amount of honey. These stingless bees are found in the low hills and inner Terai areas of Nepal. Taxonomic identification of the various stingless bee species has not yet been clearly reported in Nepal.



The giant honeybee (*Apis dorsata*)



Dwarf honeybee (*Apis florea*)



European honeybee (*Apis mellifera*)

1.2.4 Processing of Honey

The extraction of honey from honey combs and its purification/filtration is called processing. Honey can be extracted by draining (letting the wax and honey mixture separate by dripping through a screen strainer), squeezing the honey combs by hand, or by using centrifugal extractors. Honey processing on a small-scale requires simple food preparation equipment such as bowls, a sieve or straining cloth and containers. However, commercial beekeepers may require special honey processing units specially designed to reduce the moisture content in honey and maintain its consistency, while saving both time and labour.

In Nepal, there is general misconception that honey extracted by centrifugal extractors and passed through a honey processing plant is of superior quality than that of squeezed honey. However, if honey is squeezed in a clean and hygienic way and packaged in airtight glass or food grade plastic jars, it can be of a very high quality. Processing plants remove all fine particles to delay crystallization, including some natural ingredients such as pollen. Such filtration requires high pressure filters that use a silica-based filtering material called diatomaceous earth. The process involves heating the honey to 77–78^{0}C. This honey is regarded as inferior in quality by many consumers and cannot be sold as table grade honey in EEC countries. However, honey processed in this way is preferred by supermarkets and other large marketing chains that want a product with a long shelf-life in a homogeneous liquid state (Krell 1996).

Some consumers believe that granulated honey is inferior in quality. However, granulation is a natural process and there is no difference in nutritional value between granulated and liquid honey. Generally, honey rich in glucose (e.g. mustard, clover and sunflower honey) granulates quickly; whereas honey low in glucose (e.g. acacia, chestnut and lime honey) stays runny for much longer. Almost all honey granulates if its temperature falls below 15–24°C. Granulated honey can always be made runny again by heating it carefully to avoid altering its natural qualities. Similarly, liquid honey can be made to granulate within a few days by stirring already granulated honey through it. The crystals of the granulated honey serve as nuclei for the formation of crystals in the liquid honey.



Fermented honey



Processing unit for filtration and moisture removal

Granulated honey is more susceptible to fermentation caused by yeasts that grow in the high sugar concentrations. Their rate of multiplication increases in proportion to the water content, up to a certain point. If the honey has less than 18 percent moisture content, there is little probability of fermentation (Dustmann, 1993). Fermented honey separates into two layers, has an alcoholic smell and releases brownish fumes after opening. Fermented honey cannot be directly consumed but it can be used to brew alcohol.

If honey is extracted mainly from the sealed honey combs, processed in a correct way using clean and dry equipment and stored in air-tight jars then it does not normally get fermented.

1.2.5 Product Categories

Honey available in Nepal can be categorized as one of five types:

1. Plant specific honey
2. Honeybee species specific honey
3. Location specific honey
4. Commercial honey
5. Honeydew honey



Honey comb ready for harvesting

Plant Specific Honey: Although the majority of the honey found in Nepal is of multi-floral origin, some specialized honey processors and traders have differentiated their products based on the honey's floral origin. Some plant specific honeys available in Nepal are:

- Multi-floral honey
- Buckwheat honey
- Mustard honey
- Rudilo honey
- Chiuri (Indian butter tree) honey
- Litchi honey

Honeybee Species Specific Honey: This type of honey is mainly obtained from *Apis dorsata, Apis laboriosa, Apis cerana* and *Apis mellifera* bee species. *Apis florea* and *Trigona/Melipona* honey is not easily available in Nepal. Each bee species produces honey with different characteristics. However, there is no system in place to trace the origin of honey in Nepal and, therefore, no way to confirm that honey sold as species specific honey is actually from the species claimed. For example, honey produced by the *Apis mellifera* bee from forest areas may be sold as *Apis dorsata* honey. Some bee species specific honeys available in Nepal are:

- Rock bee/cliff bee honey (claimed as a product of *Apis laboriosa*)
- Dorsata honey (claimed as a product of *Apis dorsata* bees)
- *Apis cerana* honey
- *Apis mellifera honey*

Location Specific Honey: Honey is also categorized according to the geographical area in which it is produced. However, it is difficult to determine whether or not these honeys are actually produced in the area claimed. Although the geographic origin of honey can be determined by analysing its pollen spectra, Nepal does not have the laboratory facilities to carry out such tests. Again, honey sold under location specific labels may not be from the area claimed. Some examples of honey brands sold according to geographic location are:

- Karnali honey
- Himalayan honey
- Annapurna honey
- Chitwan honey
- Rapti honey
- Mountain honey



A promising beekeeping village in Annapurna area

Commercial Honey: In Nepal, honey is mostly sold as a general, homogenous commodity regardless of its botanical or geographical origin. Honey processors and traders, especially big companies mix all types of honey and sell it under a uniform label. They generally do not mention the species of bee or the honey's flora origin. This type of honey is categorized as blended honey or commercial honey.

Wild (Organic) Honey: About 70 percent of total honey produced in Nepal comes from wild flora, which is by default organic. Most beekeepers do not use pesticides or medicines in their bee colonies and hence honey produced from wild flora is free from any inorganic residues. Honey made by the Himalayan cliff bee (*Apis laboriosa*), the giant honeybee (*Apis dorsata*) and the dwarf honeybee (*Apis florea*) is also referred as wild honey. These bees cannot be kept in hives. The infamous honey hunters of Nepal do the extraction and marketing of wild honey. The honey produced by these bees is variously referred to as jungle honey, red honey, rock honey and forest honey.

Jungle honey, produced by *Apis dorsata*, is considered a high-end premium product. It contains high amounts of enzymes and amino acids (mainly proline) and, if it is hygienically processed and packed, fetches a very good price in domestic and international markets. *Apis florea* honey is considered to have very high medicinal properties but its production is limited to certain pockets and it is not easily available in Nepali market.

Red honey is produced by *Apis laboriosa* during spring from the nectar of white rhododendrons (*Rhododendron spp*), and from two other plants locally known as bikh (*Aconitum spp*) and pangra (*Entada scandens*). It is considered to be intoxicating and to have relaxing properties (Ahmad *et al*. 2003). Red or intoxicating honey is much sought after in East Asia, particularly in Korea. However, there is limited information available on intoxicating honey, how it is used in medicines or why it is so expensive. It would be useful to know the medicinal, nutritional and commercial value of intoxicating honey. Recently, various Asian countries (in particular South Korea) have tried to prevent the import of intoxicating honey by requiring a grayanotoxin certificate. Grayanotoxin is an ingredient generally found in honey produced from the nectar of rhododendron flowers and is responsible for the intoxicating properties of red honey. If honey contains grayanotoxin it is not eligible for a grayanotoxin certificate.

Honeydew honey: In Nepal honey is also produced from honeydew (an excretion of plant sucking insects deposited in the living parts of plants or



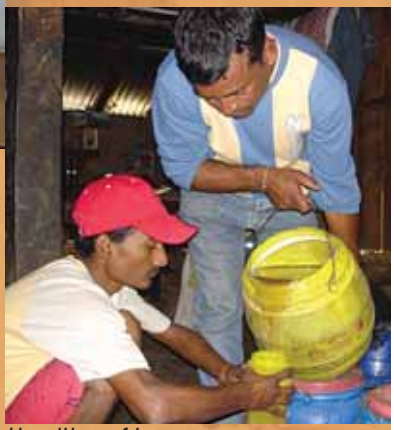
Insects producing honeydew

secretion of plants). Many plant species, which are reported as good source of honeydew honey in other parts of the world, are found in Nepal. Some of the examples are *Pinus* spp, *Picea* spp, *Tilia* spp, *Quercus* spp and *Ilex* spp. However, the species of insects that produce honeydew and extent to which they excrete honeydew is largely unexplored. A very little work has been done in Nepal's honeydew honey. So far, *Cinara eastopi* on *Pinus wallichiana*, *Cinara Camatar* on *Picea smithiana* and *Tinocalloides montanus* on *Prunus cerassoides* have bee found producing an enormous quantity of honeydew.

The measurements of electrical conductivity indicates that about 30-40 percent of honey harvested from high altitude areas (above 1,500 metre above sea level) is produced all or partly from honeydew. Data obtained for electrical conductivity of Chitwan honey suggest that the native bees *Apis dorsata* and *Apis cerana* collect more honeydew than *Apis mellifera* bees. As reported in other parts of the world, Nepal's honeydew honey samples have high electrical conductivity and contain high number of fungal spores and di-trisaccharide sugars such as raffinose, oligosaccharides, etc. Honeydew honey produced from seabuckthorn, pine, spruce and oak tree is reportedly produced in the Karnali zone but there is a need to explore niche markets for such honey.



Honey should not be stored in pre-used utensils having chemical contamination



Handling of honey influence the quality



Inspection of honeybee colony

1.2.6 Determinants of Quality

The sweetness, flavour, aroma, taste, texture, granulation, keeping quality, antibiotic efficacy and nutritional value of honey generally depends on the botanical resources from which the honey was made. Honey's aspect (whether runny or crystallized), its colour (light or dark), taste and flavour depend entirely on the source of nectar, plant sap or honeydew from which the honey was made.

Different methods and techniques used in honey harvesting, processing, storage and marketing also greatly influence the quality of honey. Beekeeping methods that enhance quality include good seasonal management practices, ensuring the full ripening of the honey and the absence of foreign substances or contaminating agents. The length of time that the honey remains in the hive can affect colour and taste. Excessive sugar feeding, use of antibiotics and insecticides, heating or boiling the honey, and the placement of colonies in highly polluted areas, all deteriorate the quality of the honey. There are also certain malpractices that affect quality, such as the adulteration of honey with table sugar, cane sugar syrup or molasses. Therefore, quality assessment, which is generally done by chemical analysis, is now becoming a major concern for honey consumers.

1.2.7 Analysis of Honey

The number and combination of various components such as moisture content, HMF, sugar content, enzymes, proline content, etc. are of great importance in honey industry. These components influence the keeping quality, granulation, texture as well as the nutritional and medicinal efficiency of honey. The physico-chemical analysis of honey is therefore very important to get knowledge on chemical composition of particular honey types and to check the genuineness, adulteration or heat and storage damage of honey. However in Nepal, the system of traceability and quality control is in the preliminary stage and laboratories facilities are yet to be established to make detail investigation of different honey types.



Honey stored and sealed in the comb is always of good quality

Joshi (1999) has made a comprehensive study on physico-chemical and melissopalynological properties of Nepalese honey samples. Some of the results have been published in international peer-reviewed journals. The author's data on moisture content, pH, EC, invertase, proline, glucose oxidase, carbohydrate composition of honey (the amount of specific sugars, fructose-glucose ratio and the total of all identified sugars) are presented in table 2.

In cooperation with Tamagawa University, Tokyo, Japan *Apis laboriosa* and *Apis cerana* honey samples collected from different bee hives located in different villages of Kaski district have also been analysed to identify the physico-chemical and sensory characteristics. All of these samples had typical sensory characteristics. These honey samples had highly preferable odour, aroma and taste. The results

Table 2 Analysis of *Apis dorsata*, *Apis cerana* and *Apis mellifera* Honey Samples Collected from Chitwan District, Nepal (Ref. Joshi et al, 2000)

Parameters	*Apis dorsata* (n=28)		*Apis cerana* (n=26)		*Apis mellifera* (n=27)	
	Mean	±SD	Mean	±SD	Mean	±SD
Moisture (%)	21.51	2.38	20.12	2.66	17.14	2.56
pH	3.68	0.36	3.62	0.4	3.52	0.32
EC (mS/cm)	0.96	0.75	0.65	0.45	0.31	0.14
Invertase (U/kg)	373.37	269.64	218.23	135.34	110.93	58.27
Proline (ppm)	875.82	497.07	323.0	169.52	610.19	220.11
Glucose Oxidase (mg H_2O_2 .g–.min–1)	8.51	10.96	5.51	4.78	6.92	3.58
Fructose	48.01	2.35	48.25	1.62	45.93	1.8
Glucose	42.23	4.94	44.02	4.54	41.95	2.53
Sucrose	0.33	0.29	1.39	1.71	1.96	1.93
Turanose	1.42	0.49	0.97	0.7	1.66	0.5
Maltose	2.22	0.73	2.09	0.86	3.26	0.61
Oligosacchaide L2	2.16	3.29	0.45	0.89	0.31	0.75
* Others	3.63		2.83		4.93	
Sum of all sugars per g/100 g honey	73.46	3.87	75.42	6.58	82.0	4.22
Fructose: glucose ratio	1.15	0.13	1.11	0.13	1.1	0.05



of chemical analysis are presented in the table 3. The honey samples that were produced wholly or partly from honeydew are also analysed in the Beekeeping Institute, Celle, Germany. The results of the honey analysis are presented in the table 4.

Gautam (2004) studied the antibacterial activity of Nepalese honey samples. The results showed that honey from different bee species have both peroxide and non peroxide antibacterial activities which may be from honeybee species and botanical origin. His study further reveals that the honey from *Apis cerana -A. mellifera* (P=0.0009) and *A. dorsata -A. mellifera* (P=0.0010) showed significant difference in peroxide activity, whereas honey produced by two native bee species *A. dorsata* and *A. cerana* did not show significant difference in peroxide activity.

Based on the analysis so far made on sensory characteristics, physico-chemical and melissopalynological characteristics and antibiotic activity, it is safe to conclude that Nepalese honey can easily meet the international parameters — except the moisture content in wild bees' honey and can fetch very good price in the international market.

Parameters	*Apis laboriosa* (n=8)		*Apis cerana* (n=14)	
	Mean	±SD	Mean	±SD
Moisture (%)	20.16	2.94	18.78	1.85
Fructose and Glucose (g/100g)	67.76	6.49	69.54	1.35
Fructose (g/100g)	37.06	3.55	37.88	0.81
Glucose (g/100g)	30.72	2.97	31.64	1.74
Sucrose (g/100g)	2.79	0.76	3.57	0.69
Maltose (g/100g)	0.74	0.63	0.76	0.51
EC (mS/cm)	0.43	0.39	1.13	0.30
HMF (mg/kg)	5.65	12.55	6.99	20.03
Acidity (meq/kg)	14.59	4.826	9.03	4.57
pH	3.96	0.22	5.13	0.70
Fructose: glucose ratio	1.20	0.4	1.19	0.6

Table 3
Analysis of *Apis laboriosa* and *Apis cerana* Honey Samples Collected from Kaski District, Nepal

Table 4 Analysis of Honey Produced Partly or Wholly from Honeydew

Parameters	Samples Origin/Code				
	A. laboriosa honey from Annapurna region	*A. laboriosa* honey from Solukhumbu	*A. cerana* honey from HBC	LCBKC-5 from Chitwan	CBK-4 from Chitwan
Moisture (%)	22.80	23.40	17.40	20.40	17.80
EC (mS/cm)	1.16	1.22	0.72	1.47	0.84
Invertase (U/kg)	715.20	364.70	13.70	145.70	164.20
Fructose	36.10	34.70	35.70	45.60	45.50
Glucose	32.30	30.10	28.50	22.30	27.80
Fructose: glucose ratio	1.12	1.15	1.25	2.00	1.64
Sucrose	0	0	0	0	0.10
Turanose	1.40	1.50	3.40	2.20	1.80
Maltose	1.50	1.90	4.40	2.50	2.20
Trehalose	1.10	1.20	2.50	1.40	1.00
Isomaltose	0.60	0.70	16	0.90	0.40
Melebiose	0	0	0	0	0
Erlose	0	0	0	0	0.10
Melezitose	0	0	0	0.30	0.20
Raffinose	0	0	0	0	0
Oligosacch L1	0	0	0	0	0
Oligosacch L2	0	0	0	0.60	0

1.2.8 Quality Standards

Department of Food Technology and Quality Control (DFTQC), Nepal, has set some technical regulations for honey (Nepal Gazette Notification 5 February 2001) in relation to the genuineness of honey, its natural qualities, heat and storage damage and to detect adulteration. Similarly, Nepal Bureau of Standards and Metrology (NBSM) has also set some quality standards. However, it is interesting to mention here that the technical regulations allow the level of HMF up to 40mg/kg where as NBSM standards allow up to 80mg/kg. Notionally, the NBSM standards should have been on top of the mandatory technical standard but it is another way round. Also the quality standards set by DFTQC and NBSM contain fewer specific details than the Codex Standards[3] set by the CAC (Table 5). Some of the



Packing and labelling affect price

3 The Codex Standards are world wide standards set by the Codex Alimentarius Commission under the joint FAO/WHO Food Standards Programme.



Quality testing by assessing solubility of honey in cold water (Honey adulterated with sugarcane products (gur) dissolves quickly as in the glass on the right.)

quality criteria set by the CAC (such as diastase unit and electrical conductivity) are not considered mandatory in Nepal. In addition, Nepal requires honey to have a certain fructose-glucose ratio, which is not required by the CAC. The minimum fructose-glucose ratio required for honey in Nepal is 0.95, which means that chiuri honey (considered a very high quality honey) may not meet the standards as it can have a ratio of only 0.88 (Joshi et al. 1999). In Nepal, the maximum value of moisture content allowed is 23 percent. Such a high amount of moisture content is not good for the keeping quality of honey. It has been well reported that honey with high moisture content (more than 21%) has tendency to ferment or spoil and separate into two layers during storage. Of course, there are some types of honey that have a maximum moisture content of 23 percent, but these are exceptions and need to be spelt out as the CAC did for specific honey such as heather and clover honey.

The DFTQC standards categorize Nepali honey into two types: honey produced purely from blossoms and other honey. However, the meaning of 'other honey' is not clearly defined.

While defining honey, the Government of Nepal stresses that 'honey should be clean and free from inorganic or organic matters foreign to its composition' however, the government lack quality infrastructure to assure that the said honey is free from inorganic or organic matters foreign to its composition.

Although honey produced on farms in Nepal is generally of good quality with a unique floral composition, the honey sold in the market is sometimes overheated or adulterated with table sugar (Kerkvliet et al. 1995; Grandits 1996; Joshi 1999). In addition, there is no system in place to monitor residues or for certification and quality control (Lund et al. 2004). Most honey traders and consumers assess the quality of honey based on sensorial characteristics such as cleanliness, taste, flavour etc. Some traditional methods, such as solubility of honey in cold water, are used to assess quality. For example, if a droplet of honey poured into cold water stays together without dissolving rapidly it is most likely pure honey. This can be



Traditional method of testing

Table 5 Comparison between Nepal and Codex Standards

Parameters	Nepal			Codex	
	Technical Regulations of DFTQC		NBSM Standards		
	Pure Nectar Honey	Other Honey	General	General	Specific
Moisture content (%)	Max 23	Max 23	Max 20	Max 21	Max 23 (heather and clover honey)
Sucrose content (g/100g)	Max 5	Max 10	Max 6	Max 5	Max 10.0 (honeydew honey, blends of honeydew and blossom, robinia, lavandula, citrus, alfalfa, acacia, red gum, sweet clover, leatherwood)
Reducing sugars (g/100g)	Min 65	Min 60	Min 65	Min 65	Min 60 (honeydew honey)
Fructose/glucose ratio	Min 0.95	Min 0.95	Min 1		
Ash or mineral content (g/100g)	Max 0.5	Max 0.5	—	Max 0.6	Max 0.4 (honeydew, blends of honeydew and blossom)
Acidity as formic acid (%)	Max 0.2	Max 0.2	Max 0.2	Max 0.4	
Water insoluble content (g/100g)	Max 0.5	Max 0.5	—	Max 0.1	Max 0.5 (squeezed honey)
HMF content (mg/kg)	Max 40	Max 40	Max 80	Max 40	Max 80
Electrical conductivity (mS/cm)				Max 0.8	Min 0.8 (honeydew and chestnut honey)
Diastase unit (Schade Scale)				Min 8	Min 8 (honey with natural low enzyme content)

Note: HMF = hydroxy methyl furfural; mS/cm = milli siemens per centimetre

observed best against the light with a dark background. If the edges of the droplet or the thread start dissolving during pouring, the honey is likely to have been adulterated or has very high water content. Similarly, while lifting a finger or spoon from honey, it should produce a thread that must be of optimal (i.e., it should not be too long or too short and it should not remain stretched for a long time).

1.2.9 Uses of Honey

Honey is used as nourishing health food in varied forms and said to facilitate better physical performance. It provides energy as much as 3.5 kilo-cal/kg and requires no digestion, but only a slight digestive action. Honey can be consumed directly or used in cakes, pastries, candies, chewing gum, toffees, etc. It also has laxative properties; it increases appetite and helps to control gastritis. Honey can give relief to allergies, sinus, arthritis and asthma, and is one of the most effective agents in treating burns and cuts. It is therefore considered as one of the most effective and inexpensive home remedies.

In many areas of Nepal where sugar is not easily



Honey with toast: the most popular use



Wound being treated by use of honey

available honey is used as a substitute of sugar. It is also used as an energy food in preparing special dishes such as pancake, laddu and sel roti. These dishes are prepared for special ceremonies for example wedding and rice feeding ceremony. These items are also prepared for consumption by household members and farm labourers who take part in labour sharing activities during peak farming season. Some common uses of honey and method of application is given in table 6.



Table 6
Some Uses of Honey

Uses of honey	Method of application
Dressing for burns, cuts and wounds	• Clean the cuts and wounds with lukewarm water and then apply pure unheated honey on affected area.
Colds, coughs and ticklish throat	• Add two tablespoons of honey, a lemon and ginger juice in a cup of hot milk and drink it before going to bed or • Add two tablespoons of honey, a lemon and peg of whisky in hot water and drink it as nightcap or • Add two tablespoons of honey, one of lemon, a tablespoon of glycerine and if possible 2–3 drops of menthol and eucalyptus oil to a glass of hot water and drink it
Sore and irritated throats	• Mix one quart of water, 125 gm honey and 25 gm alum and gargle. Try it for 2–3 days.
Hay fever, breathing problems, nasal and sinus complaints	• Eat raw honey daily. During infection chew honeycomb for fifteen minutes like chewing gum and throw away whatever remains in your mouth.
Eye infection	• Wash your hands and eyes with boiled clean water and then put a drop of pure filtered diluted honey into your eyes.
Mouth thrush and other infection	• Use paste made of 1 part of borax, ½ part of glycerine and 8 parts of honey.
Diarrhoea and gastroenteritis	• Take two tablespoons of honey a day regularly.
Liver disorder	• Drink honey and lemon tea regularly
Rough skin and chaps on hands and face	• Apply equal parts of honey and glycerine mixed together.
Dry hands	• Apply the paste made of the white of an egg, a teaspoonful of glycerine and an ounce of honey.
Face cream	• Make a paste of two parts of honey and one part of gram flour and apply it in your face.
Weak digestion	• Eat honey with raw fruits. Honey promotes the correct working of the digestive organs and acts as a natural laxative.
Stomach ulcer	• Take two spoonfuls of honey daily with your breakfast or before having breakfast.
Child birthing	• To ease child birthing eat 2–3 spoonful of honey. It gives fast energy required for that time.
Refreshing	• If you are tired drink a glass of cold water mixed with one of lemon and two tablespoons of honey.
Urinary problems	• Eat 3 tablespoons of honey everyday and drink as much water as you can.
High blood pressure	• Before having breakfast drink a glass of luke warm water mixed with 2 tablespoons of honey and one of lemon daily. Honey helps to dissolve cholesterol and increases the amount of haemoglobin in the blood.

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Dr. Hermann Pechhacker is one of the world's best specialists on honeydew honey, bee flora, melissopalinology, bee breeding and selection. He visited Nepal more than ten times and supervised four PhD students from Asia (two from Nepal and two from Thailand). He shares his observations about Nepali honey and beekeeping.

Nepal is the only country in the world, where honey is produced between the ranges of 70 metres to 4,200 metres above the sea level. Owing to the wide variations in altitude and climatic conditions, Nepal has very broad ranges of plant diversity. As such Nepal produces wide variety of specialized honey. Particularly the honey produced in the mountainous regions of the country has an excellent sensory quality. The physico-chemical quality of this honey is also of very high level, when it is produced, harvested and stored in a good way.

Nepal has four species of indigenous honeybees – *Apis laboriosa* (The Himalayan cliff bee), *Apis dorsata* (the giant honeybee of the subtropic), *Apis florea* (dwarf honeybee) and *Apis cerana* (the Asian hive bee) and one exotic bee species – the European honeybee *Apis mellifera*. The indigenous honeybee species (especially the wild honeybee species) are already endangered because of the import of the exotic *Apis mellifera* and their imported deceases and the unsustainable management of the bee species.

In the future beekeeping interventions, focus especially on these indigenous honeybees is desirable because of the following reasons:

- The indigenous honeybee species are better pollinators for the native flora
- The indigenous honeybee species don't need any medication against the Asian bee mites. This means that the honey produced by the indigenous honeybee species is free of pesticides used against the mites.

Production of quality honey to assure food safety and hygiene will be increasingly important in the future as honey and other bee products are used as health food and in naturopathy. For this reason, Nepali beekeepers with the support of government start a conservation programme for the two giant honeybee species (*Apis laboriosa* and *Apis dorsata*) and *Apis florea* on one side and create a bee breeding and selection programme for *Apis cerana*.



2 Value Chain Promotion in Nepal by GTZ

2.1 Definition of Value Chain Promotion

A value chain can be defined as a sequence of productive processes from the provision of specific inputs for a particular product to primary production, transformation, marketing and distribution and final consumption.

According to Kaplinski and Morris (2003) 'value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers and final disposal after use'.

Value chain systematically takes all steps of a production process into account. It analyses the links and information flows within the chain and reveals the strengths and weaknesses (and even losses) in the process. It also analyses the boundaries between the national and the international chains, takes into account buyer's requirements, international standards and allows international benchmarking (Richter, 2005). The value chain approach addresses the so-called critical success factors that determine if a product meets market requirements. The determining factors for improving competitiveness include quality, price, dependability, volume, design and speed of delivery.

Value chains generally include three or more of the following actors: producers, processors, distributors, brokers, wholesalers, retailers and consumers. The partners in the value chain work together to identify objectives. They share risks and benefits; and invest time, energy and resources to make the relationship work. The value chain approach is an actor oriented approach and is very effective in tracing product flows, showing the value adding stages and identifying key actors in the chain and the relationships among them (Schmitz, 2005).

Value chain promotion is the development of each stage in the value chain to enhance the competitiveness of the industry. For example, the introduction of new processing technologies can ensure quality production. However working at the production end of the chain is not enough. This must be coupled with efforts to market and distribute products. Value chain promotion works with all stages of the value chain, thereby having a greater impact on development of the industry as a whole.

2.2 Value Chain Promotion in Nepal

The underlining objective of development cooperation is to alleviate poverty and contribute to the development of a country. Nepal has a predominantly rural population (85%) and a fast growing but small urban population (15%). Poverty is a rural phenomenon in Nepal. In order to uplift the economic situation of the rural poor, the Government of Nepal and many international organisations are supporting rural producers to make use of locally available resources to produce commodities for income generation. However, producing commodities alone will not help rural producers if they cannot sell their products and if there is little value added at their end of the value chain. It is equally important to link rural producers with markets and sustain and grow these links so that they form a perpetual growth cycle of production and consumption.

Connecting rural producers with markets on a sustainable basis is a very challenging task. Value chain promotion helps to build sustained links between rural producers and urban markets.

Globalization has brought with it unique opportunities for developing countries in terms of access to markets for their products. However, in order to be able to benefit from these opportunities, these products must be competitive on global markets. Value chain promotion helps to develop systemic competitiveness by looking at the whole chain of production activities and strengthening the overall production chain.

GTZ has long been involved in economic promotion in Nepal. During the 1980s and early 1990s GTZ initiated the Small Business Promotion Programme, popularly known as the SBPP project. The focus of this project was the development of entrepreneurship in urban centres. The project selected potential entrepreneurs, trained them through entrepreneurship development training programmes and encouraged them to create enterprises.

Between 1998 and 2003, GTZ shifted its attention to the development of the enterprise service market using a business development services (BDS) approach. The main lessons learned in this phase were: (i) in very weak markets such as Nepal, the service market itself is highly dependent on the capacity of enterprises to pay for and benefit from, business development services; and (ii) some of the constraints in certain value chains were outside the scope of the BDS approach and could not be effectively addressed with service interventions alone. To address these issues, the project refocused its priorities from services alone to commodities or value chains.

Nepal became a full member of the World Trade Organisation in 2003. Following this development, in June 2004 GTZ focused its attention on the value chain promotion of selected commodities. GTZ initially focused on two sectors, orthodox tea and hand knotted carpets, as part of GTZ's Private Sector Promotion (PSP) programme. GTZ/PSP has now expanded this programme to include five other subsectors, namely bamboo, handmade paper, honey, mandarin oranges and medicinal and aromatic plants.

Value chain promoted by GTZ/PSP focuses on two areas: 1) market orientation meaning the greater volume sold and/or better end price gained, 2) income distribution- the poor benefit at least equally or above average from the income generated (poor get their "share of the cake"). GTZ interventions are targeted to strengthening the relationship between actors at different level of value chain (production, processing, trading). GTZ believes that the stronger the relationship between the actors of value chain assures the actors to have fair distribution of increased income and to put more efforts and economies on a dynamic path of growth and development.

2.3 GTZ's Approach to Value Chain Promotion

GTZ/PSP's approach to value chain promotion consists of the following five key steps:

1. Selection of subsectors

In order to identify subsectors suitable for value chain promotion, selection criteria were developed. Based on this criteria and a series of internal meetings of project professionals, as well as external meetings with subsector stakeholders (including industry associations, government officials and lead entrepreneurs in each subsector), subsectors were selected for value chain promotion.

2. Mapping and analysis of value chains

After the selection of the subsectors, a detailed value chain map was developed for each subsector. This was done using participatory approach in a series of joint workshops with the main stakeholders in each subsector. Based on the value chain maps, a detailed analysis of each subsector was then conducted to identify the constraints hindering the growth of each subsector and the opportunities.

3. Development of intervention strategies

After the value chain mapping and analysis phase, GTZ/PSP again worked with industry stakeholders to identify a common vision for each subsector, to set goals and develop intervention strategies to reach these goals.

4. Interventions and implementation of activities

Based on the agreed intervention strategies, activities were planned and implemented with the various industry stakeholders. These activities range from improving the production process; ensuring product quality through development of industry codes of conduct and labelling; the development of new markets/products; facilitation of vertical and horizontal business linkages; strengthening the provision of business development services; institutional capacity building; and easing of policy level constraints. Strategic linkages with other donors and supporting institutions working in the various subsectors were actively pursued during this phase.

5. Monitoring and evaluation

Baselines were created in each subsector to measure two important indicators chosen for evaluation: (1) competitiveness (i.e., at least 15% of enterprises in at least five of the seven subsectors say that competitiveness in the subsector has improved compared to February 2005) and (2) value addition (local value addition in at least five subsectors increased, compared to February 2005). Impact chains were developed to align activities with strategies and expected impacts. A separate advisor was appointed for the monitoring and evaluation of activities in all subsectors. This has helped the project to achieve transparency, as well as objectivity, in the monitoring of interventions and evaluation of results.



2.4 Selection of Subsectors

In early 2004, GTZ/PSP undertook comprehensive research to identify subsectors suitable for value chain promotion in Nepal. GTZ/PSP was already working in two subsectors, orthodox tea and hand knotted carpets. Other subsectors were selected in consultation with various stakeholders including the Trade Promotion Centre, the Ministry of Industry Supplies and Commerce, Ministry of Agriculture and Cooperatives, INGOs and experts from different subsectors.

The following criteria were identified and used to select subsectors suitable for value chain promotion:

- Market demand/growth potential
- Unmet market demand
- Potential to increase income at rural level
- Opportunities for market linkages
- Potential for employment generation
- Number of small enterprises (outreach)
- Potential for value addition
- Trade potential/competitiveness
- External environment (e.g. government policies, taxes, etc.)

A SWOT analysis was also done for each sector to determine its strengths, weaknesses, opportunities and threats. The subsectors were then mapped in an attractiveness matrix.

From the analysis, five new subsectors were chosen for value chain promotion to make a total of seven subsectors (along with orthodox tea and hand knotted carpets) for implementation:

- Bamboo
- Hand knotted carpets
- Handmade paper
- Honey
- Mandarin oranges
- Medicinal and aromatic plants
- Orthodox tea



3 Value Chain Upgrading Strategy

3.1 Mapping and Analysis of Value Chain

After the selection of the subsectors, a detailed value chain map is developed using participatory approach in a series of joint workshops with the main stakeholders. While mapping the chain a detailed analysis is conducted to identify the constraints hindering the growth of the subsector and the opportunities.

The key issue during the analysis stage is to find the most pressing bottlenecks first and address them in a systemic manner. These bottlenecks can be either issues related to functions, actors, linkages among them or even external factors such as policy and infrastructure.

3.1.1 Value Chain Map

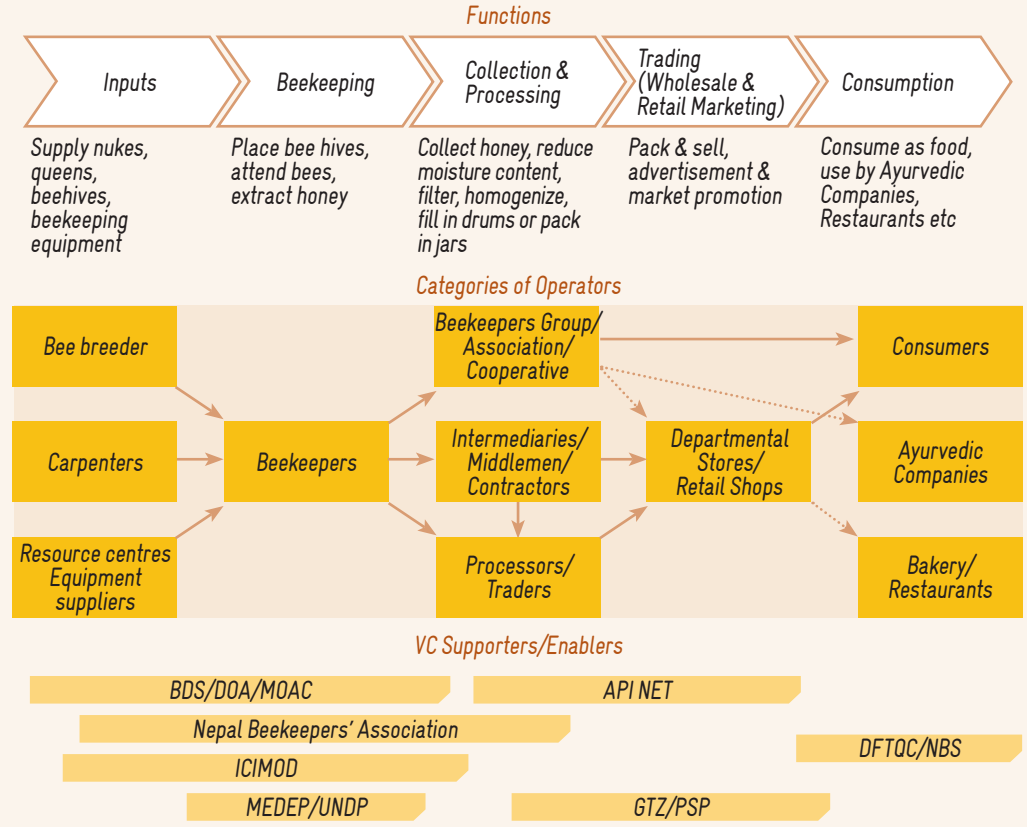
Trade of honeybee products is a complex and dynamic process. It involves various linkages among the beekeepers, hive carpentry workshops, bee breeders, equipment suppliers, honey processors and traders. The core problem for this sector is the lack of effective value chain linkages among input providers, beekeepers, processors, traders and service providers.

About 50 percent of total honey produced in Nepal is distributed straight from the beekeepers/honey hunters to the consumer. Traditionally, beekeepers work as integrated actor and perform 2 or more functions of value chain. They make their hives out of available local materials, catch and hive swarms, manage bees, harvest and process honey, package and sell to the consumers. The market survey conducted in Kathmandu Valley by Blitz Media for GTZ/PSP project revealed that most of the consumers prefer loose pack unbranded honey from the producers they know personally. However with the increase in honey production and change in market dynamics, these days the beekeepers reach the consumers through middlemen or cooperative, who collect honey from small producers and supply to large companies. These large companies process and pack honey into jars and deliver to the consumers.

The major portion of honey distributed in local market is directly consumed as table honey with bread, hot beverages, fruit salad, breakfast cereals or as a key ingredient in many Ayurvedic tonics, cough syrups and other energy food/bars. Only a small portion of honey is used by industry, mostly in the making of confectionery, candy bars, body lotions and face creams or by winery/brewery for producing

alcoholic drinks. The flow of honey and other bee products in the market and distribution of income from consumers to beekeepers/input suppliers is depicted in the value chain map (Figure 1). This map consists of three elements: functions, operators and supporters. The enterprises performing the basic functions of a value chain are operators. At one stage in the value chain, they become owners of the (raw, semi-processed or finished) product.. Thus, there is a difference between operators and "value chain supporters/enablers", the latter provide support services and represent the common interests of the VC operators. They remain outsiders to the regular business process and restrict themselves to temporarily facilitating a chain upgrading strategy. Typical facilitation tasks include creating awareness, facilitating joint strategy building and action and the coordination of support activities.

Figure 1
Value Chain Map of Honey in Nepal



This map shows general trend that prevails in Nepal. More detailed location and product specific map can be developed and function at each level of value chain can be spread over different firms/companies. However in many cases, it is difficult to find clear vertical lines between each level in the chain. Many beekeeping entrepreneurs and honey traders act as integrated value chain operators and perform two or more functions in the chain. The same company, cooperative, or organisation acts as a service provider (training and technical inputs), beekeeper (maintains apiaries), honey processor and trader. The value chain map can be simplified and made more location/area/country specific. The sub chains can also be developed if the honey is sold according to its botanical origin or honeybee species. For example, *Apis laboriosa* honey in Kaski may not follow the same routes that *Apis cerana* honey pass through. Similarly, *Apis dorsata* honey collected in Chitwan District may not reach the consumers as in the case of *Apis mellifera* honey. Each type of product can be targeted to specific class of consumers, which needs to be reflected in value chain map. Therefore, the map presented here can be used as a sample but there is a need to provide more details such as identifying the processing companies and the number of beekeepers' cooperatives.

The price of honey varies depending on the area and routes taken by the honey from the beekeepers to the consumers.. For example, the beekeepers in Chitwan District earn approximately NPR 95 per kilo of honey where as the consumers in Kathmandu pay NPR 250/kg honey on an average. In this case more than 50 percent of the total money paid by the consumers goes to the actors who collect honey from the small beekeepers and then add and capture value while processing, packaging and trading honey. The cost of transportation, services, innovations, designs, advertisements incurred at different steps add value to the product. However in Nepal, there is a general perception that the big companies (integrated actors) make the bulk of the profit. Small producers get lesser share of the benefit due to a number of problems including inadequate storage and transport facilities and their inability to meet the volume and quality requirements.

In the past, most of the honey and bee related projects in Nepal were involved in a particular level of the value chain. They mainly focused on the promotion of beekeeping and the production of honey, rather than on the delivery of a product in a competitive market. The concept of a value chain approach dealing with the whole process is fairly new and there are only a few organisations engaged in product delivery.

3.1.2 Market Analysis

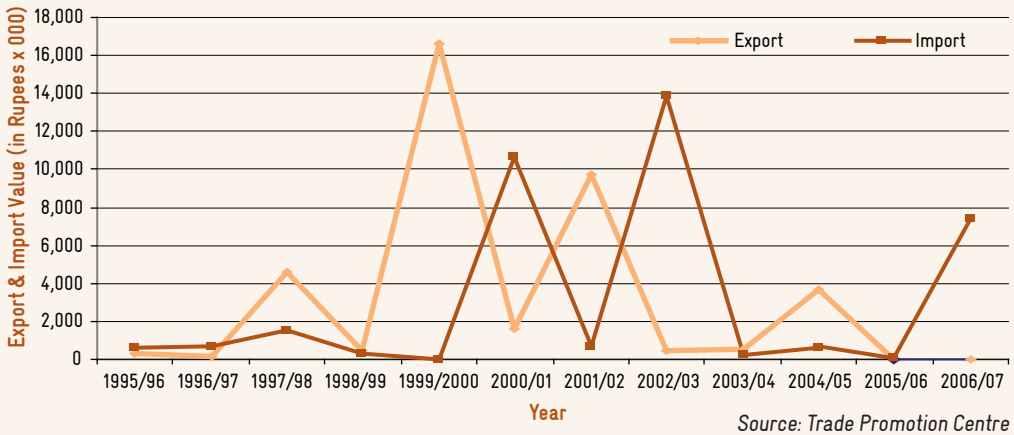
Honey Production and Potentials

Estimates of production in Nepal vary according to the source, but a conservative estimate would be approximately 1000 to 1500 metric tons per annum, out of which about 500 tons is marketed commercially (exported or sold on the urban market) and rest is consumed locally (at the village or district level). Nepal produces only about 0.05 percent of the world's total honey. The amount of honey produced in Nepal is about 0.25 percent of the amount produced in its neighbouring countries. China is the largest producer of honey in the world. It produces over 250,000MT of honey whereas India produces about 70,000MT of honey.

Nepal is endowed with favorable environment for production of honey, beeswax and other bee products. The country has about 40 percent forests and woodlands of which 25 percent is managed by the Community Forest User Groups providing ideal conditions for developing beekeeping industry. High potential for beekeeping is also found in agricultural land where substantial bee products can be harvested from agricultural crops e.g. mustard, buckwheat, niger. The floral resources in the country can support over five hundred thousand colonies of hive bees as against one hundred and twenty five thousand with production potential of 10,000 tons of honey. Strong potential also exists for the development of organic beekeeping as the use of agro chemical is very low in the country and is restricted to few pocket areas. The presence of both wild and domesticated honeybees strengthened by existing indigenous knowledge in beekeeping and honey hunting ensures potential for developing bee-watch eco-tourism.

Exports and Imports

The data available on the import and export of raw honey to and from Nepal is inconsistent and incomplete. Neither the Ministry of Finance (Department of Customs) nor the Trade Promotion Centre (TPC) records the type of honey imported/ exported (i.e., raw, branded, wild, domesticated).



Source: Trade Promotion Centre

Figure 2
Export and Import of Honey

The TPC only records the rupee value of imported/exported honey. Furthermore, the import data in relation to honey from China and India, both of which bring in large amounts of honey through formal and informal (illegal) channels, is not reliably documented, if at all.

Interestingly in year 2000/2001, Nepal imported honey worth of NPR 10,549,826 from China while in year 2001/2002 Nepal exported honey worth of NPR 9,447,943 to Norway. Again in 2002/2003 Nepal imported honey worth of NPR 9,920,923 and in 2006/07 of NPR 7,051,570 from China. This has raised some questions as to why Nepal is importing such a quantity of honey from China? Do Nepalese people prefer the taste of Chinese honey? Is Chinese honey cheaper than Nepalese honey? Where does the Chinese honey go within Nepal?

One assumption is that during the period the EU banned import of Chinese honey from 2002-2004 for allegedly being contaminated with chloramphenicol, large quantity of honey was smuggled through Nepal into India. The honey was then repackaged and sold abroad (Durham 2005).

Stakeholders in the bee industry are concerned that the origin of honey imported from China for repackaging and selling purposes must be clearly identified.

Brands and Prices

At least 16 brands of imported honey are available in Nepal (7 American, 3 Australian, 3 Indian, 1 Chinese, 1 Danish and 1 from New Zealand). The most common of these are Sue Bee Orange Honey from the USA, Sunshine Honey from Australia, China Pure Honey, Mexican Honey, Dabur Honey, Bajaj Savoury Honey, Nawaras Pure Honey and Lee Bee Honey from India. In addition, more than thirty local/national brands are also found in the market. The word 'pure' is used as a prefix in almost all of the brands, regardless of whether the honey is natural, produced from sugar fed colonies or adulterated with cane sugar products.

The market research commissioned by GTZ/PSP reveals that the market share of branded honey at household level was 48 percent. Among the different brands of honey that the retailers stock, Dabur honey was the clear leader. About 80 percent of the respondents stated that there has been a positive growth in the honey market. Much of the credit goes to Dabur for using a variety of advertisement tactics (Blitz Media, 2006).

The price of honey varies greatly. On average, the farm gate price of honey is NPR 90-105/kg, the collector/middleman gets NPR 110-140/kg and the retail price is NPR 200-250/kg. The price offered in Nepal is reasonably good but relatively high when compared to the bulk import price of Chinese honey, which is US $1.25/kg, and the price of Indian amber honey in the USA, which is US $1.75/kg (equivalent to NPR 130/kg).

In recent years, the consumption of honey in Nepal has increased, particularly in the Kathmandu Valley and other urban areas. Many consumers, mostly high-middle class families and expatriates, prefer imported honey because of their established brand names, eye catching labels and professional packaging. However, for poor people in Nepal honey is still a luxury item and considered very expensive. Most people in Nepal use honey as a medicine or for religious ceremonies, rather than as a dietary supplement. The per capita consumption of honey in Nepal is about 36g per year, which is 50 times lower than in Germany, which consumes 1.8 kg/year.

Market Segments

Figure 3 shows how honey is distributed to the Nepali market. Most Nepali honey is distributed straight from the beekeepers/honey hunters to the consumer, or through village level middlemen. Only a small amount of honey goes through the formal marketing system to processors/wholesalers and retailers.

The domestic consumption of honey is increasing with the rise in the number of farmers involved in beekeeping. At present only a negligible amount of honey is exported from Nepal to Bangladesh, Korea, UAE and some other countries. Nepal cannot presently export honey to European countries, as it is not on the list of developing countries from which the EU allows the import of honey (Council Directive 2004/432/EC). Furthermore, the cost of honey production in Nepal is very high, which makes it difficult for Nepal to compete in the world honey market. To strengthen the competitiveness of the honey subsector, the public and private sector need to work together to bring down the cost of production.

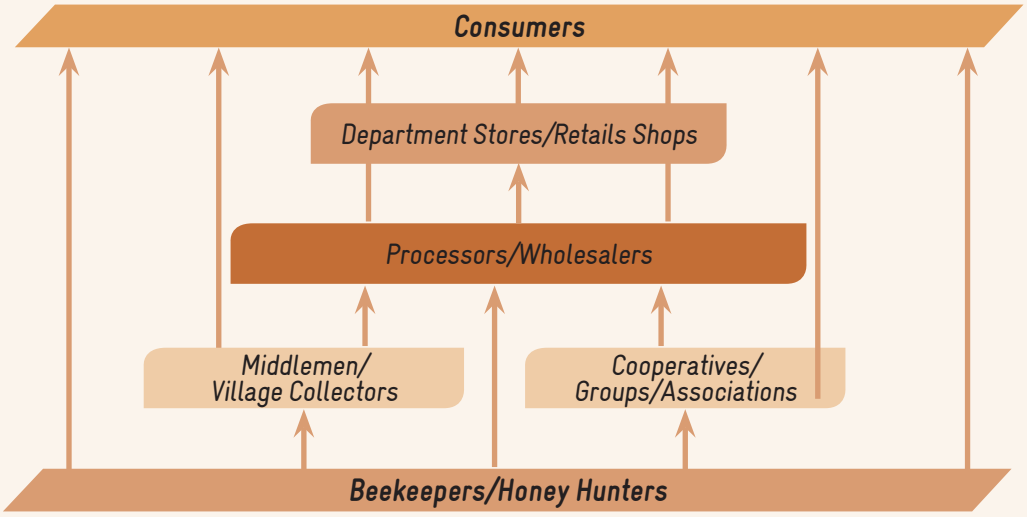


Figure 3
Distribution of Honey to Nepali Market

3.1.3 SWOT Analysis

Table 7 analyses the strengths, weaknesses, opportunities and threats facing the honey subsector in Nepal. This analysis is the result of a stakeholders' workshop organised by GTZ/PSP in Kathmandu.

The major constraints that hinder beekeeping development in Nepal can be grouped in to the following categories:

- Stringent rules and conditions set by honey importing countries. Presently, Nepal is not on the list of developing countries from which the EU allows the import of honey (Council Directive 2004/432/EC).
- Domestic market is very limited. Honey is used more as a medicine or for religious ceremonies, rather than as a dietary supplement. The total availability of honey per head per annum comes to be about 36 gm (if total production is divided by the whole population of the country), which is 50 times lower than in Germany, which consumes 1.8 kg/year.
- Many beekeepers in Nepal have only basic knowledge of honey production and limited access to information and technology. Too many brands dealing with very small quantity of honey are unable to launch market promotional activities and to assure quality.

Strengths	Weaknesses
• Unique taste because of the climatic conditions and flora. • More than 50,000 households are involved in beekeeping and farmers recognize beekeeping as a viable economic activity • Government programmes are available to promote the sector and give technical assistance • Extensive ground work has been done by various organizations • Many processors and entrepreneurs are involved in the sector	• Domestic market is more or less saturated; entrepreneurs have not been able to find new markets • Nepal is not on the list of countries authorised to export honey to the EU • Absence of proper equipment and laboratory facilities to assure quality • Cost of honey production is high, which makes it difficult to compete with Chinese and other honey for mass marketing
Opportunities	**Threats**
• Huge international market exists if necessary preparatory steps are taken • Richness of bees and floral resources offer good potential for niche market	• Cheap Indian and Chinese honey

Table 7
SWOT Analysis–Honey Subsector

- The price and volume of Nepali honey is not competitive compared to honey from its neighbouring countries. India produces about 40,000MT and China produces over 200,000MT of honey per year. These two countries offer honey at lower price than that of Nepali honey while ensuring the continuous supply of required quantity. This makes Nepali honey non-competitive for mass market.
- Inadequate policies and poor implementation of existing laws and regulations in relation to the pesticide monitoring and control, veterinary drug administration, import and export of honey (assurance of safety and hygiene, import duties, VAT and local taxes, insurance, etc.)
- Inaccessibility to markets, unreliable transport and inadequate joint efforts in marketing make it difficult for timely delivery of the required volume
- Poor storage of products, lack of quality monitoring and control plan in place and inadequate laboratory facilities and poor institutional set-up for assuring quality. This makes it difficult to tap specialist market, where better price is offered for niche product.

The actors of honey value chain and the government need to address the above mentioned critical areas to strengthen the competitiveness of the honey subsector in Nepal. A strong collaboration and resource sharing among the subsector supporting agencies is also required to address these issues.





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Dr. Nicola Bradbear, Editor of Bees for Development Journal, is well known beekeeping development specialist. She is a well wisher of indigenous honeybees and beekeepers of Nepal. She has already visited different districts of Nepal and shares her thoughts as below:

What could be the unique opportunities for Nepali beekeepers?

Nepal benefits from extensive and unique natural resources, while Nepal's indigenous honey bees represent some of the earth's last remaining honey bee populations that have not been spoiled by exotic diseases and predators. Nepal's beekeepers therefore have the possibility to harvest organic, natural, ecologically and ethically sound produce that is in strong demand on the world market.

What are the challenges to be faced by Nepal in the international market?

Industrialised countries such as China and Argentina are able to produce large volumes of honey at low unit cost, and export thousands of tonnes of this honey on to the world market. Nepali beekeepers are unlikely to produce honey at prices that can compete with these major producing countries. Therefore for the international market, Nepali honey traders must focus on smart marketing of their honey as niche products, sold according to their unique selling points, such as 'Himalayan honey', 'Rain forest honey', and if possible with value enhancing certifications such as organic or fair trade. However, the quality of the honey must be consistently high and at least equal to prescribed standards: in particular, the world market does not want honey containing residues of medicines used to control bee diseases.

What should be the focus of development intervention?

Beekeepers and honey hunters are typically poor, remote and disconnected from the market. Many of these people do not have the assets to diversify into other cash crops, and are practising beekeeping as a feasible livelihood choice for which the necessary resources are freely available. Their beekeeping activities are extensive and sustainable, yet often dismissed as 'backward' or 'primitive' by foreign-trained beekeepers. Interventions should focus on supporting this majority of 'traditional' beekeepers and honey hunters. This target group include the poorest and most remote rural people, and are not among the emerging entrepreneurial farmers who are well placed to take up new cash crop initiatives introduced by government and donor programmes. Furthermore, when a new cash crop programme (e.g. coffee, floriculture, vegetable seeds) is introduced to a community, it is often supported by services and structures to enable farmers to market their produce. Yet for traditional beekeepers, few support services and structures exist. The focus of support should always be to ensure a steady and reliable, yet non-subsidised market for their produce.

3.2 Development of Vision, Goal and Strategy

GTZ's value chain promotion strategy focuses on two areas: 1) market orientation meaning the greater volume sold and/or better end price gained and 2) income distribution - the poor benefit at least equally or above average from the income generated (poor get their "share of the cake"). Being 'not for profit' development agency, GTZ provides support services for the common interests of the VC operators but it remains an outsider to the regular business process. GTZ aims at strengthening the vertical and horizontal linkages by providing a common platform to the various actors (beekeepers, honey collectors, processors and traders) and firms and enterprises, performing different functions within the value chain. GTZ plays the role of a facilitator among these stakeholders for raising issues and challenges, identifying a common vision, goals and areas of intervention to reach these goals.

Vision: Domestic market for honey expanded and Nepali honey positioned in the international market.

Goal: To be able to lower the cost of production and produce quality honey, working through associations and cooperatives, to be price and quality competitive in the national and international market within three years.

Areas of Interventions

In order to achieve this goal the following areas of interventions have been identified:

1. Domestic market promotion
2. Improvement of quality through awareness raising and capacity building
3. Institutional development
4. Branding and marketing
5. Policy and advocacy

The areas of intervention, objectives and indicators are given in Table 8. Greater collaboration amongst donors and subsector participants is recommended to ensure the provision of shared goals, objectives and strategic directions to enhance the competitiveness of the subsector and increase rural livelihoods. This will also contribute to avoiding duplication of services and activities.

Table 8 Strategy for Value Chain Promotion of Honey

Area of Intervention	Objective	Indicators
Domestic market promotion	To increase local consumption through familiarization with Nepali honey by organizing a honey expo, trade fairs, exhibitions and other promotion activities, in the domestic market	• An increase in per capita consumption of honey by 15% by December 2007 • An increase in the total sale of honey by 20% by August 2007 (base year 2005)
Awareness raising and capacity building for quality production	To raise awareness and build capacity of honey producers and traders so that they will be able to produce quality honey and fetch a good price in the market	• An increase of 15% in the number of honey producers and traders producing good quality honey and fetching better prices
Institutional development of district level and national associations	To empower and enable district level and national associations to develop and implement strategies for the honey sector at the local level; to lobby policy issues with the government; provide services to beekeepers in relation to information and knowledge about new and improved beekeeping technologies; and to help in the marketing and promotion of honey	• Active participation of district level associations in the development of the sector • Organization of at least one activity by district level associations in selected districts by August 2007
Branding and marketing of Nepali honey in both national and international markets	To improve the image of Nepali honey; do the ground work required for exporting honey in the international market; and create brand image and marketing activities for Nepali honey	• Development of a brand identity for Nepali honey • Marketing activities for honey performed (measured by increase in sales)
Policy and advocacy	To identify conducive policies for the honey subsector by carrying out surveys/studies and to recommend policy guidelines to the Government of Nepal	• Government considers the policy guidelines and implements subsector friendly policies

3.3 Cooperation partners in Subsector

The lead organisations that provide services and technical inputs in the honey subsector are:

1. Agro Enterprise Centre (AEC)
2. Beekeeping Development Section (BDS)
3. Council for Technical Education and Vocational Training (CTEVT)
4. International Centre for Integrated Mountain Development (ICIMOD)
5. Micro-Enterprise Development Programme (MEDEP)
6. Winrock International (WI)
7. Apiculturists' Network (Api-Net) Nepal
8. Federation of Nepal Bee-keepers (FNBK)
9. Nepal Beekeepers' Central Cooperative Union Limited (NBCCU Ltd.)

The **Agro Enterprise Centre (AEC)** is a technical wing of the Federation of Nepalese Chambers of Commerce and Industry (FNCCI) focused on agro business development and promotion in Nepal. The AEC was established in September 1991 with support from USAID as a part of the Government of Nepal's NARC/ATSP (Agricultural Technology and Support Project). It was the first initiative taken by the government and donor community towards institutionalizing the public-private partnership in agricultural development in Nepal. The major activities of AEC include:

- policy advocacy
- market and demand analysis
- support for the strengthening of commodity associations
- trade development and expansion
- market information service

The **Beekeeping Development Section (BDS)** is a government body under the Department of Agriculture, Ministry of Agriculture and Cooperatives. The BDS conducts apiculture activities at the grassroots level in coordination with the various District Agriculture Development Offices. The BDS organises various types of training for lead farmers and senior and junior level agri-technicians. It develops training manuals, leaflets and posters. It also provides technical support and services to beekeepers and honey producing farmers' groups. These services include: lab services for honey quality analysis, diagnosis of bee diseases and their control. In addition, it distributes beekeeping equipment to beekeeping farmers' groups by way of subsidies.

Council for Technical Education and Vocational Training (CTEVT) has been providing technical education and vocational training through its technical schools located in different part of the country. CTEVT provides short and long duration courses in agriculture to produce well trained technical human resources in the field of agriculture. CTEVT has chosen beekeeping as one of the subjects with 78 credit hours for its agriculture students.

The **International Centre for Integrated Mountain Development (ICIMOD)** has been involved in the honey subsector for a long time. It focuses on conservation and management of indigenous honeybees. ICIMOD, in collaboration with its partners, provides different types of training, arranges exposure visits, facilitates the transfer of technologies and strengthens networks.

UNDP's **Micro-Enterprise Development Programme (MEDEP)** is involved in the development of beekeeping as a micro enterprise. MEDEP provides various types of training (e.g. in relation to entrepreneurship development and skill enhancement) and supports technology transfer, marketing, group formation and institutional development.

Winrock International through its **Farmer-to-Farmer Project** is working in beekeeping (among other sectors) in Dhankuta, Terhathum, Kavrepalanchok, Dolakha, Chitwan, Sarlahi, Syangja, Parbat, Rupandehi, Nawalparasi, Surkhet, Dailekh and Dang. The project brings in experts on specific topics and subjects from the United States of America to support technology transfer in private enterprises in Nepal (called host organisations) on a request basis.

Api-Net, Nepal is a networking apex body dedicated to facilitating all round development of beekeeping and honey business in Nepal. The development objective of Api-Net is "national poverty alleviation through beekeeping". Api-Net Nepal organises workshops and meetings for

disseminating information, conducts studies and carries out lobby and advocacy.

Federation of Nepal Bee-Keepers (FNBK) is a national federation that provides beekeeping services to its members through groups, resource centres and the district branch. The federation was established to organise the scattered grassroots level beekeepers under an umbrella to advocate on existing beekeeping policies and lobbying further for improvements on behalf of the beekeepers. Its lobby advocacy strategy also includes enhancing beekeepers' capacity in the area of entrepreneurs' development, income generation and self employment opportunity at grassroots level.

Nepal Beekeepers Central Cooperative Union Limited (NBCCU Ltd.) is formed by the spontaneously evolved beekeepers' primary cooperatives to facilitate collective marketing of honey. NBCCU aims at organising various programs and promotes primary cooperative by developing its business and institution for profitable results for its member/share holders.

GTZ/PSP project initiated series of discussions with these organisations through email, meetings and visits in order to garner collective effort and co-financing mechanism for implementing the activities. Project was able to develop memorandum of understanding (MOU) with MEDEP, CTEVT and ICIMOD. It also formulated the bought in service contract with Apiculturists' Network (Api-Net) and Federation of Nepal Beekeepers (previously known as Nepal Beekeepers Association). Besides this, project also initiated discussions and communications with relevant government departments such as Department of Food Technology and Quality Control (DFTQC), Nepal Bureau of Standards and Meteorology (NBSM) and other stakeholders through virtual and face to face interactions.





4 Interventions, Key Findings and Recommendations

4.1 GTZ/PSP Interventions

As a matter of principle and in order to achieve long term sustainability, GTZ ensures the implementation of activities through local organisations. The main principles of GTZ intervention in the sub sector were as follows:

- **Cost sharing approach:** Cost sharing from the implementing partner is a must as GTZ does not bear the full cost of activity. Funds from the third party are also actively pursued whenever possible.
- **Collaboration with stakeholders:** Developing the value chain is a joint effort of many stakeholders. Efforts of one single organisation will not be enough. In order to optimize the limited resources of the project and also ensure a higher level of impact, project seeks active collaboration with other stakeholders such as other projects, supporting institutions, donors and the government agencies.

The facilitation tasks of GTZ/PSP focus in and around the following areas of interventions:

- Bringing VC operators in a common platform
- Enabling small producers to participate in the mainstream market
- Formation of strategic alliance with subsector supporting agencies

As of June 2008, GTZ/PSP has facilitated the intermediary partners for the implementation of various programme activities in the following areas:

1. Domestic market promotion
2. Quality production
3. Institutional development
4. Branding and marketing
5. Policy and advocacy

4.1.1 Domestic Market Promotion

The market is the biggest constraint faced by the honey subsector. In Nepal, honey is considered more as a medicine rather than normal dietary supplement. The per capita consumption of honey in Nepal is very low. Furthermore, due to the stringent rules and conditions set by honey importing countries, Nepali entrepreneurs have not been able to export honey to the EU. After the adoption of the Council Directive 96/23/EC, the EU placed a ban on the import of Nepali honey because Nepal was unable to submit residue monitoring reports and control plans as per requirements. This has resulted in a glut of honey on the market and a certain level of frustration among honey entrepreneurs. Keeping this in view, GTZ/PSP has engaged in expanding domestic market through implementing the following activities:



First National Honey Fair sponsored by GTZ/PSP

- **National Honey Fair:** GTZ/PSP supported the Federation of Nepal Beekeepers (formerly known as Nepal Beekeepers Association) in organizing the National Honey Fair in Ratnanagar, Chitwan in January 2006 and in 2008. The objective of the Fair was to facilitate linkages between producers, traders and consumers by exhibiting honey, other bee products, accessories and equipment related to beekeeping. Both the fairs received over one hundred thousand visitors and were considered as milestone events in promoting the domestic market for honey and other bee products. According to the report of FNBK, in the 2nd Honey Fair a total of 36 stalls were organised, which were able to sale honey and other bee products worth NPR 2.5 million (approx. US $40,000).
- **Honey Pavilion:** GTZ/PSP provided technical inputs and financial support to Api-Net Nepal to set up the Honey Pavilion at the Agro Expo 2006 in order to raise awareness about the benefits of honey and the role of honeybees in maintaining biodiversity and increasing farm productivity. In the pavilion, a total of 15 honey stalls were set up to market different varieties of honey. The pavilion provided an opportunity for buyers and sellers to interact. It also helped to expand the domestic market for Nepali honey.
- **Trade Fairs and Exhibition:** GTZ/PSP also supported a number of honey entrepreneurs to put up honey stalls at fairs and exhibitions organised by local chambers of commerce and industries and entrepreneurs' associations at local and regional levels.
- **Posters/Leaflets:** With the support of GTZ/PSP, Api-Net Nepal produced 2 sets of posters and a set of leaflet, and FNBK produced stickers, flex charts and display boards for raising awareness about the multiple uses of honey.
- **Training:** GTZ/PSP believes that at more affordable prices, local honey consumption rate will increase. The GTZ/PSP has therefore supported industry partners with training on post harvest management, queen bee rearing and disease and quality control. These activities are aimed at lowering the cost of production.

4.1.2 Improvement of Quality

As honey is the food of animal origin, there are stringent rules and regulations that need to be fulfilled for assuring food safety and hygiene. Furthermore, the quality parameters set by importing countries are sometimes difficult for the Nepali honey industry to maintain. For example, the moisture content in honey obtained from some native bee species and from certain floral sources is high compared to the limit stipulated by importing countries. In addition, the quality parameters set by the CAC and the EU are based on *Apis mellifera* honey and, in some cases, it is difficult for honey


Bee colonies and honey displayed at National Honey Fair



Honey Pavilion at the Agro Expo 2006, sponsored by GTZ/PSP



Honey for sale at the Agro Expo 2006



Training supported by GTZ

produced by other species to comply. Moreover, the definition and composition of honey laid down by the EU does not recognise honey produced by non *Apis mellifera* bees (Council Directive 2001/110/EC).

Another constraint on the export of honey is the requirement of a laboratory certificate from an accredited laboratory for antibiotics, pesticides and heavy metal residues by importing countries. South Korea, which has been a good market for Nepali honey, now requires a grayanotoxin[4] certificate for honey. At present there is no residue monitoring and control plan in place, nor are laboratory facilities available in Nepal to test these parameters (Lund et al, 2004).

Many beekeepers in Nepal have only basic knowledge of honey production and use basic technology. Many issues in honey production such as management; disease and pest management; winter management; migration and particularly, post harvest management, harvesting and handling techniques are very technical and specific. As a result, Nepali farmers are sometimes unable to produce honey of the quality specified by buyers. To address the issue of quality, GTZ/PSP has engaged in the following activities to strengthen the capacity of the subsector:

- **Code of Conduct:** GTZ/PSP has developed informal alliance with different stakeholders and provided technical assistance to the Api-Net Nepal and FNBK to develop a code of conduct for quality honey production.
- **Training of Trainers:** GTZ/PSP entered into a service contract with the FNBK to organise a training of trainers for lead beekeepers from at least 12 districts of Nepal and a total of five district based training courses for farmers on post harvest management.
- Training: GTZ/PSP entered into another contract with the Lekhnath Chamber of Commerce and Industries to conduct training on queen bee rearing. The project also provided technical support for a training on 'Honeybee disease and quality control of honey' jointly organised by the Lekhnath Chamber of Commerce and Industries and Lekhnath Municipality.
- **Dissemination of Information:** GTZ/PSP has been working with Api-Net to disseminate information on honey quality and its control.
- **Support to Quality Infrastructure:** GTZ/PSP has been collaborating with Physikalisch Technische Bundesanstalt (PTB) to facilitate the implementation of a project "Support to Nepal in the Field of Quality Infrastructure". This project looks at the issues relating to national quality infrastructure, accreditation, standardization

[4] Grayanotoxins are generally found in honey produced from the nectar of rhododendron flowers and is responsible for the intoxicating properties of red honey.

and meteorology system. To identify quality related issues in honey value chain, GTZ/PSP helped organise a national workshop inviting relevant stakeholders including honey entrepreneurs working at different level of value chain (production, processing, and marketing), representatives of government departments and private laboratories. The participants of the workshop identified quality related issues and suggested future action to be undertaken by different actors to address these issues.

4.1.3 Institutional Development

The link between beekeepers/honey gatherers, processors and traders is very weak. There is a lack of trust and transparency. The traders blame beekeepers for providing inconsistent quality whereas beekeepers blame traders for offering low price and capturing higher value. Grassroots beekeepers are generally scattered, unorganised and lack access to information and resources. On the other hand, most of the honey traders deal with small quantity of honey, their distribution network is weak and infrastructural set up is poor resulting in high cost of honey collection and transportation. There is a need to organise small producers into groups/cooperatives so that they can provide a good quantity of honey to the traders. There is also a need provide common platform where the actors working at different level of value chain can come together and discuss the issues. GTZ/PSP has engaged in the following activities to facilitate business linkages in the honey subsector:

- **Stakeholders' Workshop:** GTZ/PSP organised a workshop for the various stakeholders involved in different levels of the value chain including beekeepers, honey traders and consumers, and representatives of service providing agencies. The objective of the workshop was to understand the challenges and opportunities facing the subsector and facilitate linkages among service providing organisations for the input of supply in a coordinated manner.
- **Stakeholder Meetings/Honey Alliance:** GTZ/PSP also organised a series of meetings with major stakeholders to discuss the issues, identify potential areas for collaboration and develop a work strategy. All the lead institutions including MEDEP-UNDP, AEC-FNCCI, ICIMOD, FtF-WI, Api-Net and FNBK attended the meetings and have principally agreed to form a strategic alliance for the promotion of the honey subsector in Nepal. However, the alliance is yet to become functional.
- **Strategic Planning Workshop:** A workshop for strategic planning of the NBA was supported by GTZ/PSP. A total of 33 participants took part in the workshop. The objective of the workshop was to review the working strategy of NBA and find practical strategic solutions to meet organisational goals.
- **Formation of Cooperatives:** GTZ/PSP facilitated the process for formation of primary and central level beekeeping cooperatives, and the enhancement of skills in packaging, labelling and marketing. As a result of GTZ/PSP intervention, Nepal Beekeepers' Central Cooperative Union Ltd. at national level and a total of 27 Beekeepers' Cooperative Ltd. at district level got registered.



Stakeholders workshop

4.1.4 Branding and Marketing

GTZ/PSP has engaged in the following activities to understand the existing marketing structure in the honey subsector, familiarise consumers with national brands and assure consumers of quality:

- **Market Research:** GTZ/PSP commissioned a market research to understand consumer preferences, perceptions and the status of honey brands in Kathmandu Valley. This study will form the basis for the development of future marketing strategies.
- **Honey Buyers-Sellers Meet, Delhi:** GTZ/PSP supported the NBA and Api-Net to participate in the 'Honey: buyers-sellers meet' in New Delhi. This forum provided an opportunity to develop business relations with Indian honey traders/ processors.
- **Branding:** GTZ/PSP is working towards creation of an umbrella brand under which the diversity of Nepali honey can be maintained, emphasising its distinct identity due to Nepal's rich floral resources and diverse climatic conditions. In this regard, a logo for "Nepal Honey" has been designed. A code of conduct has been drafted for honey traders who wish to use the logo.
- **Exploring Markets:** Nepal has a unique topography and is blessed with great diversity of honeybees and floral resources. Quantitatively, Nepal may not be able to compete with China, Mexico, Argentina or other major honey producing countries. However, if it focuses on producing specific types of honey and explores niche markets it can easily compete on the world market. As most Nepali honeys have their own special characteristics and uniqueness, there is great potential for the marketing of such honey at a higher price. To tap the niche market, GTZ/PSP is reviewing the quality requirements of honey importing countries and sharing information with relevant stakeholders in the honey subsector in Nepal. GTZ/PSP has also been maintaining communication with the honey traders in Japan, Bangladesh, USA and EU to explore market for Nepalese honey.



Meeting with Tokyo Honey Club to explore market for Nepali honey

Box 3
Technical Cooperation for Subsector Promotion

Beekeeping is the most feasible activity to reduce poverty and manage biodiversity. It gives an opportunity for poor and disadvantaged people to manage their livelihoods by using locally available resources. Nepal's diverse climatic conditions and richness of floral resources have made it host to five species of honeybee, which produce different types of honey and other bee products that can have international quality and value. However, to tap the international markets the quality needs to be assured and collective efforts have to be made.

The government departments and development agencies need to promote appropriate technologies for improving productivity and quality. Efforts are also required to maintain harmony between commercial *Apis mellifera* beekeeper, honey hunters and traditional *Apis cerana* beekeepers.

GTZ has been playing crucial role in strengthening linkages between the actors of honey value chain and promoting market of Nepali honey. It provided support to organise various training courses, workshops and national level honey fairs. These events provided good impetus in raising awareness and upgrading technologies. With the support of GTZ, Federation of Nepal Beekeepers was able to develop strategic plan and collective vision for promoting honey market and to improve institutional linkages with other development agencies.

Mr. Sanjeeb Pokhrel, Chairperson, Federation of Nepal Beekeepers

4.1.5 Policy Advocacy

Inadequate policies and poor implementation of existing laws and regulations are hindering the development of the honey subsector in Nepal. To enhance the competitiveness of the subsector, favourable policies and legislation are required in relation to the following:

- pesticide monitoring and control
- veterinary drug administration
- zonations for *Apis cerana* and *Apis mellifera* species
- standard curriculum for training
- laboratory testing for antibiotics and pesticides
- inter-coordination among the private sector and government departments
- import and export of honey (assurance of safety and hygiene, import duties, VAT and local taxes, insurance, etc.)

GTZ/PSP has been working to review existing government policies and develop policy guidelines:

- **Policy Issues Study:** Api-Net Nepal, MEDEP-UNDP and GTZ/PSP agreed to carry out a study on policy issues. As per the agreement, Api-Net conducted field studies, organised workshops and developed policy guidelines.
- **Policy Guidelines:** The policy guidelines have been handed over to the Secretary, Ministry of Agriculture and Cooperatives. The Ministry will refer to these guidelines when formulating legislation. The overall goal of formulating the policy guidelines is to enhance the contribution of the beekeeping sector to the sustainable development of Nepal and the conservation and management of its natural resources for the benefit of present and future generations. The guidelines will encourage active participation of all stakeholders in establishment and sustainable management of bee reserves and apiaries, promoting beekeeping-based industries and products. It will also highlight sustainable management of beekeeping in cross sectoral areas for ecosystem conservation and management.



Then Secretary, Ministry of Agriculture and Cooperatives addresses the meeting upon receiving policy guidelines.

4.2 Key Findings and Recommendations

In agro-based Nepal, beekeeping can become a rewarding occupation for many people, particularly for under-privileged, landless and low-income groups. It requires minimal start up investment and generally yields profits within the first year of operation. A large number of people are already involved in beekeeping, honey collection, processing and marketing of honey and other bee products. These products offer great potential for value addition and product diversification.

The issues relating to honey production, processing, packaging, labelling and marketing of honey vary from place to place depending on the floral diversity of the areas, honeybee species and scale of beekeeping. In rural areas such as Rolpa and Rukum, honey is sold locally, directly from beekeepers to consumers, drastically reducing the role of processors, packers, wholesalers and retailers. In Chitwan, Dang and Sarlahi, where the commercial beekeeping with *Apis mellifera* is practiced, the route from the beekeeper to the consumer lengthens with space for collectors, processors, packers, wholesalers and retailers. This difference has implications on the approach and strategy that have to be applied for promoting *Apis mellifera* beekeeping in Chitwan which will differ from the one adopted for promoting *Apis cerana* in Rolpa and Rukum.

There is significant use of honey in Ayurvedic medicines and religious ceremonies, and a strong demand for specific type of honey in international

markets, but honey entrepreneurs in Nepal cannot harness that niche market due to Nepal's inability to meet legal requirements for export. Assurance of quality is the first prerequisite for enhancing export opportunities and improving access to international markets. For this it is necessary to raise awareness about quality and strengthen capacity through training, demonstrations and exposure visits. In order to maintain quality at every step in the production process, from colony management to honey harvesting, processing, packaging and storage, there is need to develop quality infrastructure in line with national and international (i.e. Codex Alimentarius) regulatory frameworks.

Owing to the richness of honeybee species and floral diversity, there is tremendous scope and opportunity to develop honey subsector in Nepal at all levels. However, most of the development projects approach the subsector either from an environmental/ biodiversity perspective or from a livelihood perspective. In the past, many organisations have focused more on strengthening capacities of stakeholders at lower level of value chain (beekeeping training for farmers and promotion of moveable frame hives), which has resulted in better beekeeping skills and increased honey production. However, they still require support in delivering their product and strengthening their linkages with the actors working at the upper level of the value chain. There is limited support for addressing market and quality related issues and value-adding activities. The interventions of GTZ/PSP-RUFIN is targeted towards creating a network of development organisations, private and public sector of Nepal for strengthening value chain link.

Nepal offers strong potential for the development of organic beekeeping as the use of agro chemical is very low in the country and is restricted to very few pocket areas. Most of the country is relatively free of the use of these poisonous chemicals. Fortunately, the American Foul Brood Disease has not been reported and the mites (*Acarapis woodi, Varroa jacobsonii, V. destructor* and *Tropilaelaps clarae*) have not yet posed serious threat to beekeeping industry of Nepal. That means most honey produced in Nepal has very little possibility of having residues of pesticides and harmful drugs. However, the institutional set up, human resources and government laws and regulations for control of residues in Nepal are not sufficient to provide the necessary guarantees that the honey to be sold in domestic market or exported do not contain residues of drugs and heavy metals.



To be able to assure quality, quantity and consistent supply of honey and other bee products, much work needs to be done. In the first instance, quality infrastructures (standardization, measurement, testing and certification facilities) have to be in place, and the stipulated regulations need to be effectively implemented. This requires continuous efforts as well as the commitment from the government departments. GTZ/PSP-RUFIN can facilitate the process but cannot solely overcome the problems. In the future, more interactions with existing partners is required and new partnerships need to be developed to address the issue of quality. Similarly, to assure consistent supply of the said quantity of honey, it would be necessary to strengthen spontaneously evolved functional groups of beekeepers and beekeeping cooperatives.

Based on the findings of the current phase of the project, it is recommended that the work on honey subsector should be continued. Under the Local and Regional Economic Development (LRED) component, the upcoming project phase (Inclusive Development of the Economy) is expected to focus more on capacity building of beekeepers, strengthening value chain linkages through partnering with concerned government line agencies and development organisations.



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