ICIMOD

Quality Assurance for the Honey Trade in the Hindu Kush Himalayan Region

FOR MOUNTAINS AND PEOPLE

About ICIMOD

The International Centre for Integrated Mountain Development, ICIMOD, is a regional knowledge development and learning centre serving the eight regional member countries of the Hindu Kush Himalayas – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and based in Kathmandu, Nepal. Globalization and climate change have an increasing influence on the stability of fragile mountain ecosystems and the livelihoods of mountain people. ICIMOD aims to assist mountain people to understand these changes, adapt to them, and make the most of new opportunities, while addressing upstream-downstream issues. We support regional transboundary programmes through partnership with regional partner institutions, facilitate the exchange of experience, and serve as a regional knowledge hub. We strengthen networking among regional and global centres of excellence. Overall, we are working to develop an economically and environmentally sound mountain ecosystem to improve the living standards of mountain populations and to sustain vital ecosystem services for the billions of people living downstream – now, and for the future.

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Quality Assurance for the Honey Trade in the Hindu Kush Himalayan Region

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Foreword

The Hindu Kush Himalayan (HKH) region has a diversity of honeybee species and apicultural practices. The beekeepers in the mountainous areas of the region produce honey from the indigenous honeybee *Apis cerana* and collect it from wild colonies of *Apis dorsata* and *Apis laboriosa*. In recent times the introduction of the European honeybee *Apis mellifera* has led to burgeoning commercial honey production and a search for new markets for honey. The countries of the HKH region now produce more than 20% of all honey sold worldwide.

The demand for honey is increasing in domestic, regional, and international markets while production is declining in the European Union (EU) and the Americas as a result of bee diseases and pests. The EU, Japan, and the United States are the major import markets for honey. However, the countries of the HKH region face large challenges in exporting their honey to these developed countries because of stringent food safety and hygiene regulations and other technical requirements. Among the eight HKH countries only China and India have adequate quality assurance systems in place that allow their honey to be sold to developed countries.

ICIMOD, with financial support from the Austrian Development Agency (ADA), has worked for more than two decades with regional partner organizations on indigenous Himalayan bees and beekeeping for biodiversity conservation and poverty alleviation. One of the key activities of the current phase of the project entitled 'Improving Livelihoods through Knowledge Partnerships and Value Chains of Bee Products and Services in the Himalayas' has been documenting and sharing information on the international honey trade and honey quality standards.

The current publication presents findings on honey markets and the honey trade, on quality assurance systems for honey, and on quality standards for organic honey. It is designed primarily to help government agencies, policy makers and planners, and ICIMOD's partner institutions in the HKH region to establish and implement quality assurance systems in the honey supply chain so they can gain access to the large and lucrative markets for honey in the EU, Japan, the United States, and other developed countries. This publication is especially focused on the needs of Afghanistan, Bangladesh, Bhutan, Myanmar, Nepal, and Pakistan, as India and China already have honey quality assurance systems in place.

The second-line audience is the actors of the honey supply chain in the region – the beekeepers, input suppliers, honey processors, traders, and support organizations (government and non-governmental and private sector organizations) that are responsible for maintaining the quality of honey at all stages of production, collection, processing, and distribution. This publication also presents useful information for academics, researchers, and other professionals.

We hope that this publication helps our regional member countries establish and implement quality assurance systems so they can benefit from the growing market for honey while developing the region's beekeeping industry and improving the livelihoods of the region's people.

David Molden
Director General, ICIMOD

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Acronyms and Abbreviations

AGMARK	Agricultural Marketing Information Network
APEDA	Agricultural and Processed Food Products Export Development Authority
APLAC	Asia Pacific Laboratory Accreditation Cooperation
BAFRA	Bhutan Agriculture and Food Regulatory Authority
CAC	Codex Alimentarius Commission
CBI	Centre for the Promotion of Imports from Developing Countries
CCP	Critical control point
DFTQC	Department of Food Technology and Quality Control, Nepal
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GAP	Good Agricultural Practices
HACCP	Hazard Analysis and Critical Control Point
HKH	Hindu Kush Himalayas
HMF	Hydroxymethylfurfural
ICIMOD	International Centre for Integrated Mountain Development
IFOAM	International Federation for Organic Agriculture Movements
ILAC	International Laboratory Accreditation Cooperation
ISO	International Organization for Standardization
MRA	Mutual recognition agreement
NABL	National Accreditation Board for Testing and Calibration Laboratories
NGO	Non-governmental organization
NOP	National Organic Programme
NPOP	National Programme for Organic Production (India)
OCN	Organic Certification Nepal
OGS	Organic Guarantee System
PDCB	Para-dichlorobenzene
PGS	Participatory guarantee system
ppb	Parts per billion
QSI	Quality Services International
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
WHO	World Health Organization
WTO	World Trade Organization

Executive Summary

The eight countries of the Hindu Kush Himalayan (HKH) region (Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan) produce large quantities of honey. This honey comes from the five indigenous honeybee species and the European honeybee *Apis mellifera* and is an important source of income, nutrition, and medicine for mountain communities. However, the growing amount of honey produced in the HKH region has only limited access to the lucrative markets in developed countries as it does not meet their stringent export requirements. This publication provides information on international standards and good practices needed to establish quality assurance schemes for honey in the HKH region, including information specific to the trade of organic honey.

Honey trade offers potentially large opportunities for HKH countries. Internationally, the demand for honey from developed countries is growing and prices are increasing. The HKH region produces large quantities of high quality uncontaminated honey which could fetch high prices if certified to meet international standards. Honey produced in the HKH region also has a large potential in the international niche markets for organic, fair trade, location-specific and halal honey which can be sold at relatively high prices. There is also good potential for increasing sales of honey in the domestic and regional markets of the HKH region, given the less stringent import requirements and increasing demand from the growing high income populations.

Of the eight HKH countries, only China and India have systems that enable them to export honey to developed countries. Of the other six countries in the region only Nepal has developed a honey quality assurance scheme. The main purpose of this publication is to provide guidance to these countries for putting such systems in place.

Standards and Import Requirements

For honey, quality generally refers to its authentic provenance and labelling and the absence of adulteration, residues, heat damage, and other unwanted qualities. Quality standards, good practice guidelines, and legislative requirements are needed to keep sub-standard honey out of the market, to safeguard consumer health, and to ensure that honey meets the requirements of importing countries.

The main environmental contaminants of honey are pesticides, fungicides, and heavy metals, while the main contaminants of honey from beekeeping practices are the pesticides and antibiotics used to control bee pests and diseases.

The main global standards that apply to the import and export of honey are the Codex Alimentarius, which define what honey is, set maximum levels for moisture content, sugars, and water soluble solids, list contaminants, and define hygiene and other standards. These standards for honey are applied through incorporation in country legislation or quality assurance standards.

The EU has stringent regulations relating to the production and trade of honey. Currently only 40 non-EU countries are eligible to export honey to the EU.

Both the Codex Alimentarius and the EU set strict limits on the residues of veterinary drugs, pesticides, and heavy metals in honey and demand that exporting countries have systems in place to monitor residues. The EU requires monitoring for the presence of residues throughout production, collection, and processing.

A crucial part of residue and contaminant monitoring is the ability to trace the point at which any residue or contamination may have entered into a foodstuff. Traceability demands that the origin of all inputs at every stage of the honey production process are documented from beehive to point of sale.

In recent years there has been a shift in foodstuff quality assurance from the monitoring of finished products to ensuring that quality is maintained and contamination avoided throughout production, processing, and packaging.

Systems and standards for promoting and monitoring production and handling include the Hazard Analysis and Critical Control Point guidelines and food safety standards of the International Organization for Standardization. Various systems of best practices are also described.

Organic Standards

Although much of the honey produced in the HKH region is organic or almost organic by default because of the low use of inputs, only small quantities are certified organic. The Codex Alimentarius and European Union standards for organic honey stipulate that bees must be raised without the use of pesticides and other unnatural or harmful substances. In the HKH region only India and Bhutan have standards for organic beekeeping.

Suppliers that want to export organic honey to the international market need to have their products certified as meeting organic production standards. The main purpose of organic certification is to assure quality and prevent fraud. Most organic certification is carried out by third party certifying agencies. Other less bureaucratic and less costly systems are participatory guarantee systems and local trust-based systems.

Challenges

Honey producers, processors, and exporters in the HKH, especially in Afghanistan, Bangladesh, Bhutan, Myanmar, Nepal, and Pakistan face many challenges in meeting the demands of consumers and the legislation of developed countries. Where food safety legislation and quality assurance measures exist in the HKH region, implementation is often lacking. One legislative requirement that blocks the sale of much HKH honey to the EU is its definition of honey as the product of the European honeybee.

Other challenges to the international honey trade are the lower standards applied to honey for sale in domestic markets; the significant amounts of honey that are sub-standard; the limited awareness of beekeepers about good beekeeping practices and quality requirements and legislation; difficulties faced by honey traders in buying sufficient quantities from scattered small producers in mountain areas; and competition from other countries.

The main challenges facing the organic honey trade are the expense and practicalities of getting organic certification and the relatively limited benefits. Although many producers can meet organic certification standards, the complex documentation requirements present a large obstacle. Also most beekeepers and honey entrepreneurs in the HKH region are small-scale operators and the limited premiums they receive for organic honey discourages them from investing in certification. The other main challenge is that the Indian organic standards only cover managed honey production (by *Apis mellifera* and *A. cerana*) and the European Union defines honey as that produced only by *Apis mellifera*, thus excluding wild honey from indigenous HKH bee species.

Recommendations

To enable the sale of domestically produced honey to the EU and other developed countries and to ensure that only safe, high quality honey reaches international and domestic consumers, national authorities need to set standards and develop and institute residue monitoring and quality control systems. This involves promoting good practices along the entire supply chain. Development agencies and governments of the HKH region should support honey producers and traders to maintain higher standards. It would be helpful if international and national authorities would establish and revise species-wise technical requirements and quality parameters for honey gathered from wild honeybees.

HKH honey producers could benefit from regional collaboration. For example, smaller countries could use well-equipped testing laboratories in India as an alternative to building their own costly facilities. The countries of the region could develop common standards, quality parameters, and a regional trademark for HKH organic produce.

In view of the challenges of setting up quality assurance systems that meet the requirements of developed countries, HKH countries could institute standards for domestic sales and for sale to other HKH countries, which could be less

rigorous. Especially for organic honey, the HKH presents fewer non-tariff barriers to honey trade, and demand for certified organic honey is growing locally while the volume produced in the HKH region is small. A series of steps is recommended for developing organic honey production and trade, from identifying areas for organic honey production to developing links between producers, traders, and retailers.

Other recommendations for developing the honey trade in general include:

- establishing forums of honey experts, professionals, and institutions to share knowledge on all aspects of honey production and trade and lobby for producer and trader interests;
- organizing beekeepers and honey hunters into groups to establish honey collection centres to make large volumes of honey available in one place;
- increasing the consumption of honey by raising consumer awareness about its benefits, developing market strategies for types of high value honey, and investigating niche markets such as organic and fair trade honey;
- building the capacity of honey value chain actors to manage their businesses and of apiculture extension agents to provide useful information; and
- introducing a market information system, a database of legislation related to honey export, and other means of providing information to stakeholders in the HKH honey trade.

1 Beekeeping and the Honey Trade in the HKH Region

The eight countries of the Hindu Kush Himalayan (HKH) region (Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan) have a diversity of honeybee species. Five of the nine known species of honeybee are indigenous to the HKH region (*Apis cerana*, *A. dorsata*, *A. laboriosa*, *A. florea*, and *A. andreniformis*). A sixth species, the European honeybee *A. mellifera*, has been introduced and promoted for beekeeping. Among the indigenous species only *A. cerana* can be managed in hives. These bees feed on the area's great diversity of flowering plants.

Honey is highly nutritious and a popular healthcare food (see definition in Box 1). It is said to facilitate better physical performance, is used to cure coughs, colds, wounds, cuts, diarrhoea, and other diseases, and is an important ingredient in many traditional medicines. In recent years, scientific evidence has confirmed the antibiotic and healing properties of honey (Molan 1992).

Box 1: **Definition of honey**

Honey is defined and described by the inter-governmental body for global food standards (the Codex Alimentarius Commission) as:

the natural sweet substance produced by honeybees from the nectar of plants or from secretions of living parts of plants or excretions of plant sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store, and leave in the honey comb to ripen and mature.

Honey consists essentially of different sugars, predominantly fructose and glucose as well as other substances such as organic acids, enzymes, and solid particles derived from honey collection. The colour of honey varies from nearly colourless to dark brown. The consistency can be fluid, viscous or partly to entirely crystallized. The flavour and aroma vary, but are derived from the plant origin.

Source: CAC 2001

Honeybees, both managed and in the wild, are an important source of income, nutrition, and medicine for mountain communities in the HKH region. Honey is a very suitable product for mountain communities to sell given its high value, low volume, and low perishability (Jodha 2002). Honeybees are also of crucial importance for pollinating crops and natural flora.

Apart from honey, beekeepers earn income from other bee-related products and services. They sell beeswax for making candles, beauty and healing products; royal jelly and propolis as health foods; and honeybee colonies to other beekeepers. Honey hunting tourism is also a promising source of income. This publication focuses solely on honey production and the trade in honey.

Types of Honey

Honey is derived from three main types of management regimes in the HKH region:

- **Wild honey.** Wild honey is gathered from the combs of *Apis andreniformis*, *A. cerana*, *A. dorsata*, *A. florea*, and *A. laboriosa* on cliffs, trees, buildings and elsewhere. Large amounts of honey are produced in this way. One estimate says that in India alone *A. dorsata* produces more than 22,000 tonnes of honey per year in 'the wild' – double the amount produced by all managed hive bees in the country (Wakhle and Pal 2000). The traditional honey hunters of Nepal gather honey from *A. laboriosa* nests on steep high cliffs in the mountains (Ahmad et al. 2003) and from *A. dorsata* colonies that nest on trees in the foothills and southern plains of Nepal (Valli 1998).
- **Traditional beekeeping.** Traditional beekeepers in the mountains of the HKH region produce small quantities of honey for home consumption and local sale from colonies of *Apis cerana*, which they keep around their houses in hollowed-out log hives.

- **Modern beekeeping.** Commercial beekeeping in the HKH region started in the 1970s with the introduction of the European honeybee *Apis mellifera* and movable frame hives. This made it possible for hives to be moved to sources of pollen and for honey production to be carried out commercially. *Apis cerana* bees are also farmed using modern beekeeping techniques. This form of beekeeping produces large quantities of honey.

Two other terms used to describe honey in the HKH region are 'mountain honey' and 'organic honey'. Mountain honey is honey produced in hilly and mountain areas and is usually seen as pure and untainted, while organic honey is honey produced without chemical inputs. Because of the low use of inputs, much of the honey produced in the HKH region is organic or almost organic by default. A detailed definition of organic honey is given in Chapter 6 of this publication. More information on beekeeping in the South Asian region is available in Verma (1990) and Matsuka et al. (2000).

Markets for Himalayan Honey

Honey produced in the HKH region is sold locally, within the country of origin, to other HKH countries, and in the international market.

- **Local markets.** Most wild honey and honey from traditional small-scale beekeepers is sold or bartered locally through informal channels.
- **Within HKH region markets.** Honey produced using modern methods is sold within the country of origin, to other countries in the HKH region, and to third countries. Much of the honey trade within and between HKH countries happens through informal channels. Considerable quantities are traded across borders outside official channels between Afghanistan and Pakistan, between Bangladesh and India, between Nepal and India, and between Nepal and China. Nepalese honey traders sell substantial amounts of honey from the wild nests of *Apis dorsata* and *Apis mellifera* hives to Indian buyers through informal channels. The same applies to much of the honey traded between Afghanistan and Pakistan. Honey is also traded through official channels; for example, Dabur Nepal Private Limited has purchased over 100 tonnes of honey per year in recent years from the Federation of Nepal Beekeepers for exporting to Bangladesh, Bhutan, India, and elsewhere.
- **Exports to third countries.** Afghanistan, Bangladesh, Nepal, and Pakistan export honey to the Middle East, particularly Saudi Arabia and the United Arab Emirates (UAE), and to Thailand and Singapore. Afghanistan, Bangladesh, and Pakistan export small quantities to Gulf countries while Myanmar exports to Japan and Korea. China and India export large quantities of honey to developed countries, although India was banned from exporting to the European Union from 2010 to October 2011.

Honey Production in the Hindu Kush Himalayan Region

The authors estimate that more than 86,000 tonnes of honey is produced each year in the HKH region from the region's more than 6 million colonies and honeybee nests. Production in the countries of the region ranges from an estimated 30 tonnes per year in Bhutan to 400,000 tonnes in China. It is estimated that China's production (the largest in the world, valued at almost US$ 1 billion) includes more than 60,000 tonnes from the three provinces in the Himalayan region (Yunnan, Sichuan, and the Tibet Autonomous Region). In 2010, India was the eleventh largest producer, producing almost 40,000 tonnes of honey worth US$ 100 million (FAO 2012).

Table 1: **Honey production in Hindu Kush Himalayan countries, 2000–2010 (tonnes)**

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Afghanistan	4,515	4,538	4,424	4,674	3,300	2,800	3,000	2,800	2,800	2,800	3,600
China	251,839	254,359	267,830	294,721	297,987	299,527	337,578	357,220	407,219	407,367	398,000
India	52,000	51,660	50,092	52,518	40,650	39,646	53,048	51,000	55,000	43,865	39,500
Myanmar	208	223	237	300	382	436	700	900	1,002	716	700
Nepal	–	–	–	–	577	600	650	650	1,000	850	1,100
Pakistan	1,500	1,701	1,710	2,000	3,000	4,000	4,000	4,000	4,000	4,000	4,800

Source: FAO 2012

Honey production has increased in most countries of the HKH region in recent years. There have been large increases in China, Myanmar, Nepal, and Pakistan, while production in India has fluctuated (Table 1). Production in Afghanistan decreased due to the war there. Data for Bangladesh and Bhutan are available only for 2009 when Bangladesh produced 1,450 tonnes (Bangladesh Institute of Apiculture, personal communication) and Bhutan produced 30 tonnes (SR Joshi, unpublished).

2 Opportunities for the Hindu Kush Himalayan Honey Trade

Only China and India currently export significant quantities of honey to developed countries. There is a large potential for the other six HKH countries to sell their honey in developed countries given the excellent quality of much of their honey and the large potential demand. This would greatly benefit the economies of these countries and the livelihoods of many people, including poor rural people.

High Quality Honey

Much of the estimated 86,000 tonnes of honey produced in the HKH region each year is produced by bees that forage a diversity of nectar sources in largely unpolluted natural environments and the crops of subsistence farmers, who use only limited amounts of agrochemicals. Much of the honey from beehives is also unlikely to have unwanted contaminants and residues as it is produced with little or no use of modern inputs such as antibiotics and pesticides.

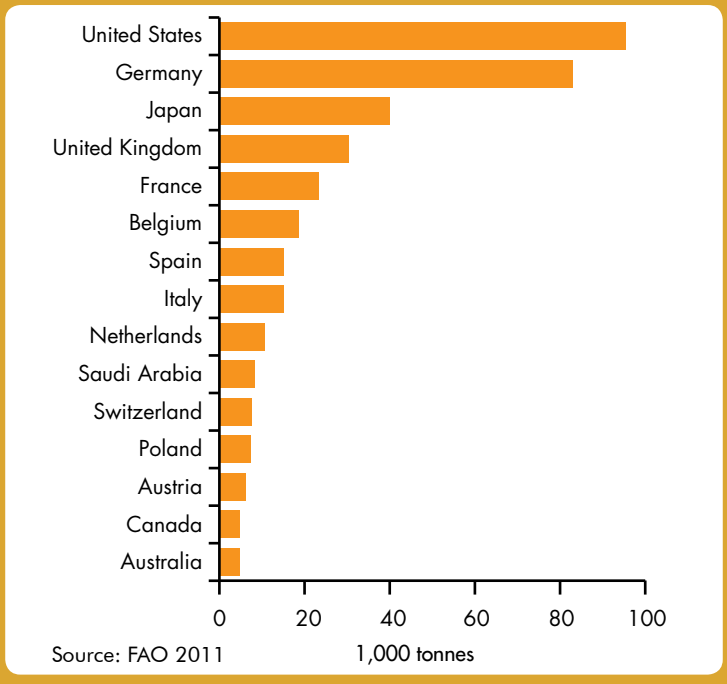
The large amounts of wild honey produced by *Apis dorsata*, *Apis laboriosa* and other indigenous bee species provides pure honey which, if handled properly, is unlikely to contain chemical or pesticide residues and could fetch high prices on the international market.

Increasing Demand from Developed Countries

There is a large potential market for honey from the HKH region in international markets due to the increasing demand for honey in the EU and other high value developed country markets, decreasing production in some parts of the world, and the increasing price of honey in international markets.

The global market for honey is growing and is expected to exceed 1.9 million tonnes by 2015 (GIA 2010). Demand is growing because of the increasing preference of consumers for honey and honey-based products, and for the use of honey in tonics, yogurts, drinks, and other products. Honey contains beneficial antioxidants, minerals, vitamins, and proteins, and is more appealing than artificial and sugar-based sweeteners. Many food manufacturers are replacing synthetic and less healthy ingredients with natural, healthier ingredients such as honey.

Figure 1: **Major honey importing countries and quantity imported, 2009**



Source: FAO 2011

The countries of the EU, the United States, Japan, Saudi Arabia, Canada, Australia, and other developed countries import large quantities of honey (Figure 1). The EU, the United States, and Japan import the most honey accounting for over 70% of all honey imports.

The countries of the EU are the largest market for honey. They imported 148,000 tonnes of honey worth US$ 385 million from non-EU countries in 2010 (EU Export Helpdesk 2012). The largest EU markets for honey from other countries are Germany, the UK, Spain, Italy, Belgium, and France.

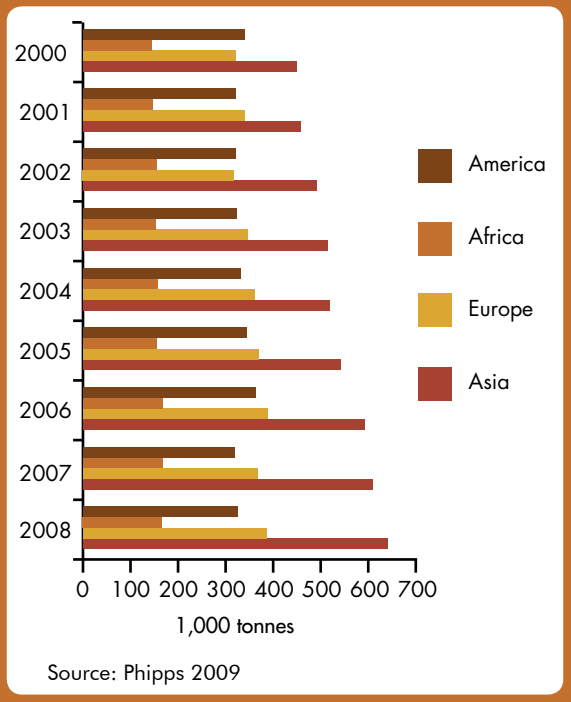
Between 2003 and 2007 the amount of honey imported into the European Union increased by

an average of 1.7% a year (CBI 2009). Most of the growing demand for honey has been met from increasing production in Asia as production has remained largely unchanged in Africa and Europe and has declined in the Americas (see Figure 2) due to colony collapse disorder. In 2008 worldwide honey production was estimated at 1.5 million tonnes, with Asia producing 42% of this amount.

Argentina is the leading honey supplier to the EU although the amount it supplies decreased significantly between 2003 and 2009 due to colony collapse disorder. Developing countries have profited from the reductions in Argentinean supplies. In 2010, EU countries also imported large amounts of honey from China and India – 50,000 tonnes worth US$ 79 million from China and 3,400 tonnes worth US$ 8.4 million from India (EU Export Helpdesk 2012).

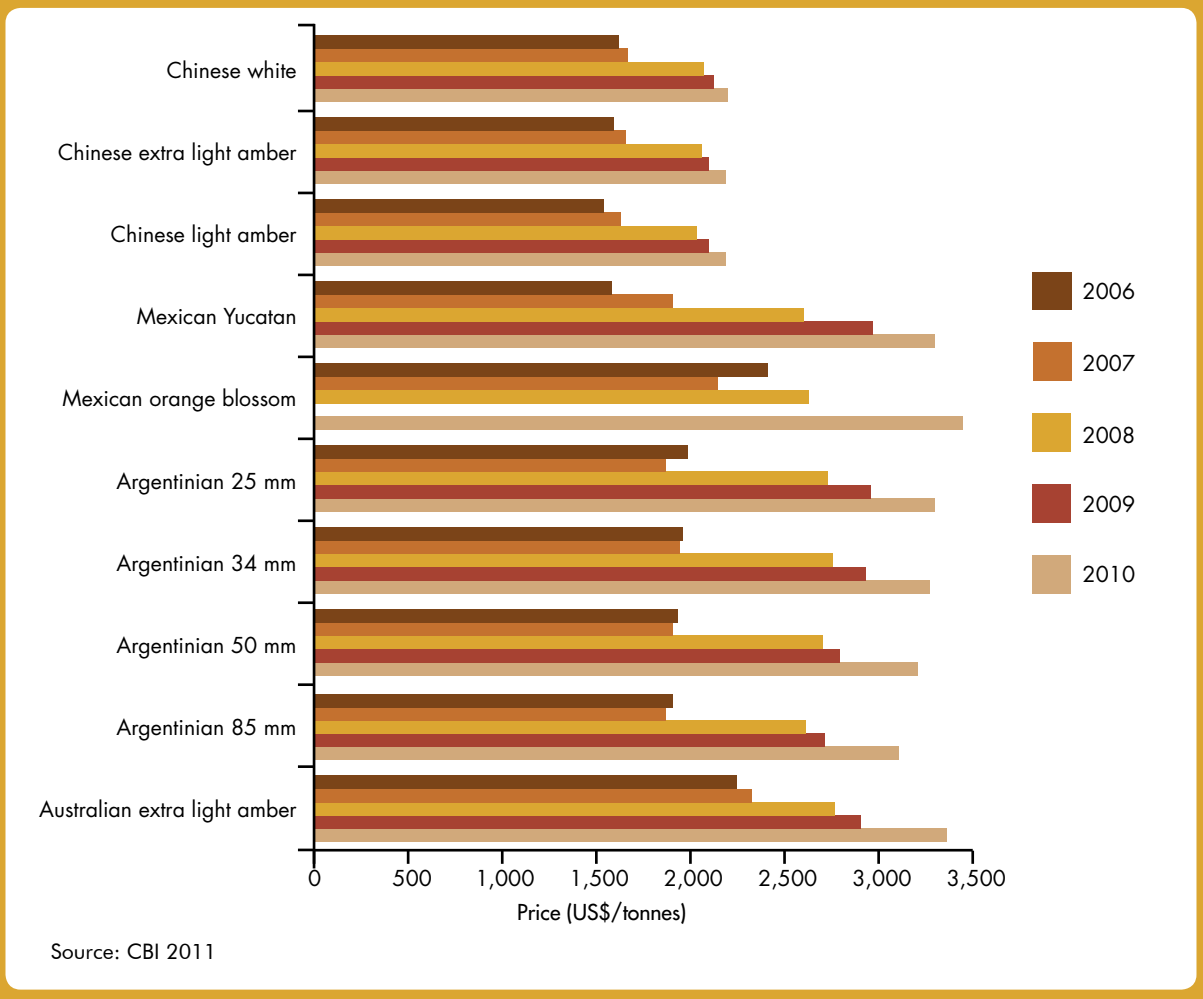
The increasing demand has been matched by increasing prices. The average import prices of ten types of honey increased by an average of 57% between 2006 and 2010 (Figure 3).

Figure 2: **Trends in global honey production, 2000–2008**



Source: Phipps 2009

Figure 3: **Average import prices for 10 major types of honey, 2006–2010**
(cost, freight, and insurance, main European port)



Source: CBI 2011

Niche Markets for a High Value Product

Honey produced in the HKH region has a large potential in niche markets that have emerged in developed countries. Organic, fair trade, location-specific, and halal honey fetch premium prices. The great potential of organic honey production is explained in the next section.

Fair trade

The growing market for fair trade products in Western countries offers a potential market for honey produced by smallholder farmers and beekeepers in the HKH region. Fair trade is defined as:

> *"a trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in the South. Fair Trade Organizations, backed by consumers, are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade."*
> (WFTO and FLO 2009)

The fair trade market consists of socially conscious consumers who pay a higher price for products certified as produced and traded in ways that economically and socially empower producers and workers. The fair trade global honey market is a large, growing market. The organization Fairtrade International develops and sets standards and assists producers and traders to gain and maintain certification and capitalize on fair trade market opportunities. FLO-CERT, the main independent international certification agency for fair trade production, certifies whether producers and traders are entitled to apply the official Fairtrade label to their products.

Switzerland is the most developed market for Fairtrade-certified products with Fairtrade honey accounting for more than 14% of Swiss retail honey sales. The largest market for fair trade honey in the EU is Germany. The standards for Fairtrade honey identify two grades of quality (A and B) based on moisture and hydroxymethylfurfural (HMF) content.

Geographical and species indication

Honey produced from a particular area or a particular source of nectar can attract higher prices for being associated with higher quality or particular characteristics. In developed countries the geographical indication of a foodstuff can be registered by producer groups or local authorities through the national administration in charge of intellectual property. These indications differentiate products according to distinctive characteristics attributable to their origin. Geographical indication is a marketing tool for regional and international trade in local products and could be used to market honey from the HKH region.

Halal honey

Halal foods, drinks, and products are prepared according to Islamic law and are thus suitable for observant Muslims to eat, drink, or use. The opposite of halal is haram, meaning prohibited. The implications of this kind of certification are that none of the inputs along the product chain have come into contact with anything haram. Halal certificates are given by approved Islamic centres to facilities inspected, registered, and supervised to verify that its products are halal. This kind of certification is increasing in importance and the value of trade in halal products globally is about US$ 150 billion. In some Islamic countries, halal certification is mandatory for agrifood products including honey, cosmetics, and medicine. Good air transport links mean that the halal markets of the Gulf and other west Asian countries offer a potential market for halal certified honey from the HKH region.

Large Potential Markets for Organic Honey

The growing demand and production potential of organic honey can benefit national economies and many poor communities in remote mountain areas while safeguarding the environment.

The demand for organic foods is growing and it is estimated that the retail sales of organic products in Europe alone are worth about US$ 8 billion per year. Global sales of organic products were estimated at US$ 59 billion in 2010 (Ruitenberg 2012). The organic food industry has grown at an annual rate of about 20% during the past ten years, compared to about 3% for conventional foods. The biggest markets for organic foods are the United States, Germany, the United Kingdom, France, and Japan. Organic markets are also growing in upper-income developing countries and among higher income populations in India and China.

The higher income populations of South Asia prefer to buy honey from mountain areas as it has a cleaner image (and is usually more organic and purer) than honey produced in plains areas. Of the eight HKH countries Bhutan has the most environmentally benign and green image.

Apis cerana bees traditionally managed amid traditional low input farming systems – producing honey that is organic by default

The increasing demand for organic products in the HKH region offers great potential for the sale of organic honey and the certification of existing production as organic. China and India have large amounts of farmland under organic production and well-established national organic programmes. In 2010, China had the sixth largest area in the world under organic food production (Willer and Kilcher 2011). The amount of Chinese arable land that is certified organic has grown from only 4,000 ha in the year 2000 to 1.4 million hectares in 2010 (0.27% of all its farmland). China is the largest producer of honey in the world, and with the emerging interest in organic products it is expected to also lead the global organic honey market. As of 2010 India had a proportionately larger area of its farmland under organic production – 780,000 ha or 0.43% of its farmland.

There is a great potential in the HKH region for organic honey production because of the diversity and richness of honeybee species and floral resources and the fact that much of the area's honey is mostly or entirely organic by default as:

- substantial quantities of wild honey are gathered from the nests of wild honeybees and this honey is by definition organic;
- in Nepal, over half (about 500 tonnes) of all honey produced comes from wild floral resources; and
- the many small-scale backyard beekeepers use hardly any chemicals on their bees and on the crops from which their bees gather nectar.

Organic honey production offers a good opportunity for people in remote mountain communities to earn income in a way that does not harm the environment and helps pollinate crops and wild vegetation. As noted at the beginning, honey is a very suitable product for mountain communities in the HKH region to sell given its high value, low volume, and low perishability (Jodha 2002). This especially applies to organic honey given that it commands a higher price. Beekeepers who can go a step further and supply certified organic honey can command even higher prices.

In the HKH region the price of honey produced by indigenous bees is higher than that of honey from the European honeybee *Apis mellifera*. In Bhutan, the retail price of *A. cerana* honey is around Nu 300 (US$ 7) per kg, while *A. mellifera* honey sells for Nu 200 (US$ 5) per kg. In Pakistan, *A. florea* honey fetches double the price of *A. mellifera* honey. In the international market, however, there is little recognition of honeybees other than *A. mellifera*. Hence, most traders in the HKH region mix all types of honey and supply it to the international market without mentioning the bee species that produced it.

Although the costs of gaining organic certification are often high due to the high travelling costs of inspectors, the returns on such investments can make this worthwhile.

Roadside marketing of honey near Salang Pass, Afghanistan

Large quantities of honey are used in herbal medicines, beauty products, and foodstuffs in the HKH region

Although organic standards share many common aspects, they vary from country to country and between certifying agencies. The Global Organic Market Access (GOMA) project of FAO, IFOAM, and the United Nations Conference on Trade and Development (UNCTAD) is working to harmonize organic standards and certification performance requirements. This project supported the production of an Asia Regional Organic Standard (AROS) in 2010, which was approved in February 2012. This should make it easier for Asian organic beekeepers and traders to sell their honey to developed country markets.

Increasing Demand in HKH Markets

There is good potential for increasing the sale of honey in the domestic and regional markets of the HKH countries given the less stringent import requirements and the increasing demand especially among the growing middle classes and for inclusion in ayurvedic medicines, other health products, and cosmetics. Beekeepers and wild honey collectors face fewer challenges marketing their products in domestic and other HKH markets due to the lower marketing and transaction costs, less stringent quality criteria, and the fact that smaller quantities can be marketed easily.

There is a good demand for honey in local markets as, in many parts of the HKH region, fresh local honey is highly valued and many beekeepers sell their product direct to consumers with the associated lower marketing and transaction costs. The direct sale of wild honey from *Apis cerana* and other indigenous species usually realizes a higher profit than selling to other countries.

3 The Need for Quality Assurance

In recent years the demand for quality assurance along the entire honey supply chain, from production through processing and distribution to the consumers' table, has increased. National systems for meeting international standards, monitoring the entire value chain, and furnishing required proof have become a prerequisite for exporting honey to developed countries.

The following chapters (Chapters 4, 5, 6, and 7) describe legislative requirements, quality standards, and codes of good practice established by importing and exporting countries for the production, processing, and trade of honey. This chapter explains the rationale behind these measures.

Why Quality Standards?

Quality standards for honey are needed to:

- produce better quality honey and to keep sub-standard and harmful honey out of the market;
- safeguard consumers' health and gain consumers' trust that they are purchasing a high quality and safe product; and
- ensure that honey and the way it is produced and packaged meets the legislative, policy, and ethical requirements of importing countries for food safety, consumer protection, environmental protection, and workers' welfare.

From the point of view of developing countries such as the countries of the HKH, the observation of quality standards for honey is mostly needed to meet the standards required to be allowed to export honey to developed country markets. The legislation of importing countries is designed to ensure food safety and hygiene and prevent contamination in foodstuffs. Honey that is not accredited as meeting these standards cannot be sold into these large high value markets. Among the eight HKH countries only China and India currently have adequate quality assurance systems that allow them to export honey to the EU.

For honey, quality generally refers to its genuineness and natural quality and the absence of adulteration, residues, damage from heat and storage, and other unwanted qualities. Quality control measures in honey limit or ban the presence of residues from antibiotics and pesticides; minimize the levels of hydroxymethylfurfural (HMF – the high presence of which indicates that honey has been heated); set limits for moisture content, diastase, pollen, sugars, acidity, and the amino acid proline; and define required sensory values (taste, odour, and appearance) and handling processes.

Adulteration, the authentic provenance of honey and the presence of residues and contaminants are major concerns of honey importers and consumers.

Food control is a mandatory regulatory activity enforced by national and local authorities during production, handling, storage, processing, and distribution to ensure that food is safe and fit for human consumption, conforms to safety and quality requirements, and is honestly and accurately labelled. Regulations vary country by country with some based on international food standards and others developed by individual countries. For food products in international trade, non-compliance may lead to a product being placed in quarantine or rejected at point of entry (FAO 2007).

Fake honey being made by mixing sugar syrup with beeswax

From the point of view of exporting countries, the often stringent quality requirements of developed countries are seen as non-tariff barriers to trade, while importing countries view such measures as necessary for consumer protection and other reasons. Importing countries impose sanitary and phytosanitary measures for environmental and health concerns and impose technical rules on product definitions, essential composition, packaging, labelling, and other factors in line with standards such as the Codex Alimentarius. The enforcement of these rules and standards causes entry barriers to foreign products. An example of a technical barrier to trade is where the European Union defines honey as a product only of the European honeybee, *Apis mellifera*, thus preventing the sale to the EU of honey produced by Asian honeybee species.

Some technical specifications, such as the European Union's definition of honey, are viewed by exporting countries as violating World Trade Organization (WTO) provisions that require countries to treat imports and domestic products equivalently and not to favour products from one source over another. In this regard the WTO's Agreement on the Application of Sanitary and Phytosanitary Measures (WTO 1995a) and its Agreement on Technical Barriers to Trade (WTO 1995b) recognize the right of all countries to prevent the importation of unsafe products; however, importing countries must give solid scientific justification that a rejected product is unsafe. Note that six of the HKH countries are members of the WTO; Afghanistan and Bhutan are not.

Residues and Contaminants in Honey

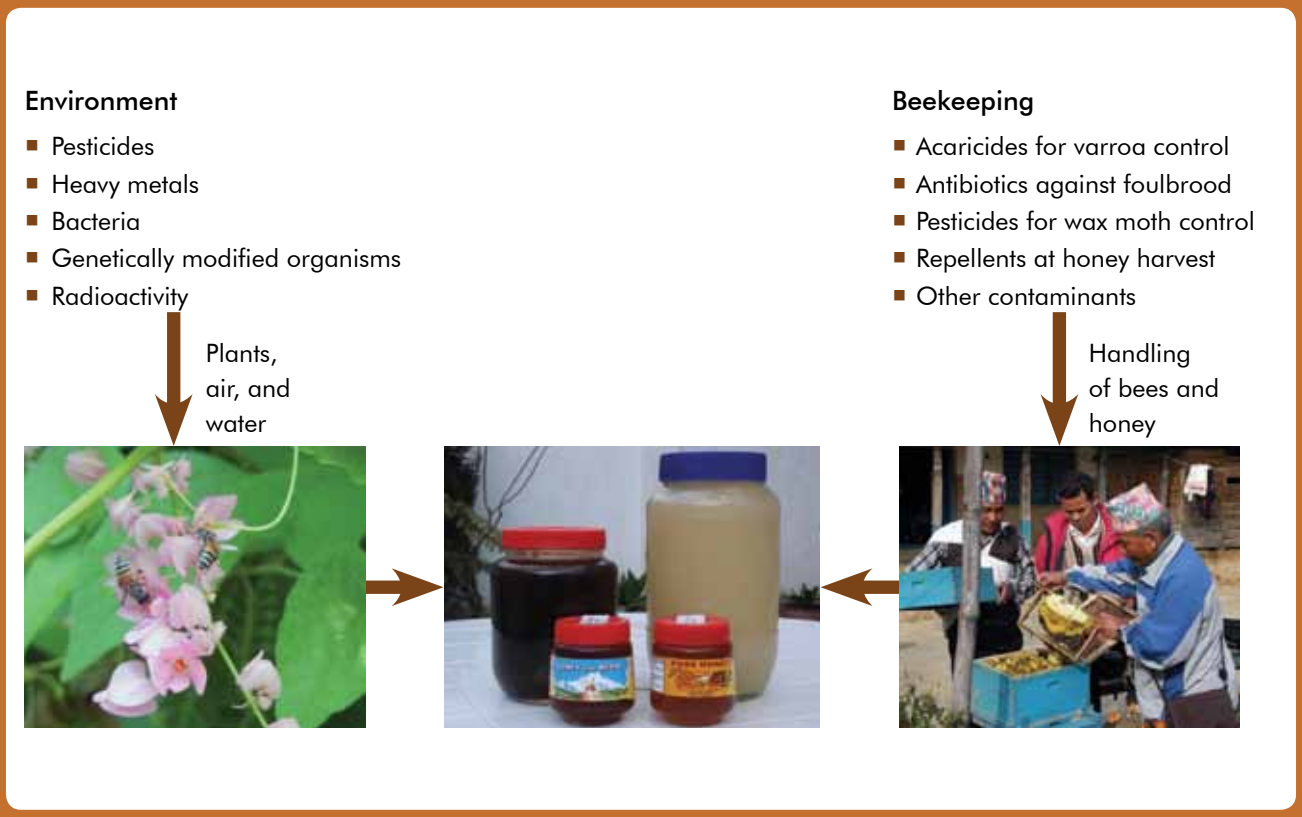
In recent years, governments have increased control over food production, processing, and distribution to protect consumers against the biological, chemical, and environmental contamination of food. There have been a number of cases where contaminated honey has been found on sale, including in India and from China (see Box 2). Such cases have demonstrated that systems were inadequate to prevent contamination and led to demands for more stringent systems to prevent contamination in honey.

Honey can be contaminated from the environment and from beekeeping practices (Figure 4).

Box 2: **Contaminated honey**

- A study in France found pesticide residues in 108 of the 615 honey samples analysed between 1986 and 1996 (Bogdanov 2006).
- An Indian study (Anju et al. 1997) found that all of 27 market samples examined were contaminated with at least one of the following pesticides: organochlorine, synthetic pyrethroids, organophosphates, and carbamate insecticides.
- In 2002, Chinese honey was banned from the European Union after samples were found to be contaminated with chloramphenicol – an antibiotic used for sick bees, but which can cause the fatal blood condition aplastic anaemia in susceptible humans. Chinese honey was allowed into the European Union again from 2004 after China put adequate safeguards in place.
- In 2010, India was removed from the list of countries allowed to export honey to the European Union because of its failure to comply with European Union regulations for residue monitoring as residues of the antibiotics ciprofloxacin and erythromycin were found in Indian honey. However, it was reinstated in October 2011 after corrective measures were taken to address the shortcomings in its residue monitoring plan. A study of 12 brands of honey found 10 contaminated with residues of antibiotics used to treat bees and which are harmful to human health (*Hindustan Times* 2010). Two of the contaminated brands were foreign brands (from Australia and Switzerland).

Figure 4: **Sources of contamination and residues in honey**



The following environmental contaminants can reach the raw materials of bee products (nectar, honeydew, pollen, plant exudates) through the air, water, plants, and the soil for transport to beehives and honey by bees.

- **Pesticides.** Pesticides, insecticides, herbicides, bactericides, and fungicides are used in agriculture to control diseases and pests. In the HKH region higher amounts of these substances are used in the plains areas where more intensive farming practices occur. Studies in France and India have found pesticide residues in honey (Box 2). The insecticides found most often in European honeys are (Bogdanov 2006):
  - organochlorines such as lindane, hexachlorocyclohexane, aldrin, dieldrin, endrin, DDT (dichlorodiphenyltrichloroethane) isomers, heptachlor, heptachlor epoxide, methoxychlor and endosulfan (note that although many organochlorines are no longer used in agriculture, they are still present in the environment);
  - organophosphorus pesticides including dialiphos and trichlorophon; and
  - carbamate insecticides.
- **Fungicides.** Fungicides used against fruit tree and rape pests have also been found in honey. Studies that applied five types of fungicides to cherry trees found significant residues of all of them in honey produced nearby (Kubik et al. 1999).
- **Heavy metals.** Lead (Pb) and cadmium (Cd) are the principal toxic heavy metals that affect honey. Lead, originating from vehicle engines, is released in to the air and directly on to nectar and honeydew and it is not usually transported by plants from the soil and on to the nectar. However, cadmium from metal industries and incinerators is transported from the soil to plants to contaminate nectar and honeydew. Only a small proportion of cadmium reaches honey by air, mainly from nearby incinerators.
- **Radioactive substances.** The main radioactive isotopes found in honey are 40K and 137Cs, the first being of natural origin, the latter from the Chernobyl atomic power station accident in Ukraine in 1986. High levels of 137Cs were found in honey harvested in Ukraine after the accident (Alexenitser and Bodnarchuk 1999).

The main contaminants of honey from beekeeping practices are substances used to control the bee pest varroa and the disease foulbrood.

- **Varroacides.** Varroacides applied to control the bee pest *Varroa destructor* are a major potential source of contamination in honey. It has residues of synthetic persistent substances such as cymiazol, fluvalinate, amitraz, flumethrin and coumaphos that can be harmful to human health.
- **Antibiotics.** Residual amounts of antibiotics used to treat the bee diseases American and European foulbrood and Thai sac brood have been found in honey. These treatments are not allowed in the EU, but are widely used elsewhere. EU standards allow no trace whatsoever of these antibiotics in honey. In HKH countries beekeepers often use antibiotics and other banned substances to treat and prevent diseases.
- **Other substances.** Residues of para-dichlorobenzene (PDCB) and other more toxic substances, such as naphthalene, which is used by beekeepers to control wax moths, have been found in honey (Bogdanov et al. 2004; EC 2001). The treatment of beehives with wood protectants and paints containing insecticides or fungicides, preparations containing metal-organic substances and the preservative pentachlorophenol can lead to residues in honey.
- **Storage vessels.** Honey can be contaminated with heavy metals from inappropriate storage containers as inorganic or organic components can diffuse from the inner surface of paraffinated, corrosive and painted vessels into honey. Increased iron concentration caused by storing honey in metal containers is a common problem.

4 International Market Access Requirements

All countries have legislation to regulate the import of foodstuffs. This chapter describes the standards that exporting countries, including countries of the HKH region, must meet to be able to export honey to developed countries.

The standards of the Codex Alimentarius Commission are the reference international standards for foodstuffs, and most national and regional food quality standards are based on these standards. Within this framework individual countries have their own specific quality requirements for honey. The European Union has among the most stringent standards for honey.

Shipments of honey from one country to another must be accompanied by proof that all legal requirements of the importing country have been met. The European Union has a food safety system that automatically alerts its member countries about rejected shipments to prevent such shipments from re-entering the EU through another port. In the United States, customs officials can only authorize the entry of products after inspection by the Animal and Plant Health Inspection Service (APHIS) and the Food and Drug Administration (FDA).

Market access requirements are mainly concerned with consumer health and safety, environmental protection, and product quality:

- Access requirements for protecting consumer health and safety are concerned with hygiene, bans or restrictions on the use of certain substances and phytosanitary and veterinary residues, traceability and withdrawal, packaging and labelling, and testing and certification.
- Environmental requirements relate to products (e.g., the use of pollutants and product labels) and processes (e.g., process labels, codes of conduct, and management systems).
- Acceptable and consistent product quality is necessary for selling to developed country markets. Requirements relate to the product and the production process and concern the nature of a product, its ingredients, and consumer-related issues. They also relate to product specifications (e.g., pest-free, size, weight, classification, marking), the traceability of products, compliance with industry standards, adequate labelling and packaging, complaint procedures, and related environmental, social, health, and safety concerns.

Note that the standards of many developed countries, including the United States and Japan, are mostly concerned with the quality and safety of the final product (the honey), while European Union standards are also concerned about meeting standards related to the production process.

Codex Alimentarius Standard for Honey

The main international guidelines for honey quality assurance are the Codex Alimentarius Standard for Honey (CAC 2001). These guidelines are produced by the Codex Alimentarius Commission, which was established in 1963 to develop international food standards, guidelines, and codes of practice.

The Codex Standard for Honey is applied by either being incorporated in country legislation or by forming the basis of legislation and quality assurance standards. Governments form Codex committees to decide on these matters.

The Codex Standard for Honey was introduced in 1981 and revised in 1987 and 2011. The main part of the Codex is for application by governments (see excerpts in Box 3) and defines in general terms:

- what honey is (see Box 1 above);
- the essential composition and quality of honey with maximum levels set for the content of moisture, sugars, and water soluble solids;
- types of contaminants;
- hygiene standards for preparation and handling;

- labelling requirements; and
- methods of sampling and analysis.

Annex 1 of the Codex honey standard is for voluntary application by commercial partners and specifies additional composition and quality factors and methods of sampling and analysis.

Note that alongside the CAC, the Commission on Phytosanitary Measures (CPM) sets international standards for phytosanitary measures while the World Organisation for Animal Health (OIE) develops health standards for the international trade in animals and animal products. Honey is considered an animal product.

European Union Requirements

The EU is a potential major market for honey from the HKH region, but has among the most stringent food safety and hygiene regulations in the world. Most of these apply across all 27 countries and are referred to as harmonized requirements. In some cases, individual EU countries have additional stringent requirements. The main EU directives and regulations relating to the production and trade of honey (see Box 4) regulate the presence of contaminants and residues, hygiene practices, and labelling. Annex 2 lists the nine steps that the EU follows for approving the import of products of animal origin, including honey, into the EU.

Countries certified as meeting all the EU's requirements are eligible to export honey to the EU and are referred to as 'third countries'. Forty coutries are on the October 2011 version of this list (see Box 5). Of the eight HKH countries only China and India are on the list.

Box 3: **Example specifications from the Codex Standard for Honey**

3. Essential composition and quality factors

3.1 Honey sold as such shall not have added to it any food ingredient, including food additives, nor shall any other additions be made other than honey. Honey shall not have any objectionable matter, flavour, aroma, or taint absorbed from foreign matter during its 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.

3.5.1 Fructose and glucose content (sum of both)

- Honey not listed below – not less than 60g/100g
- Honeydew honey, blends of honeydew honey with blossom honey – not less than 45g/100g.

4. Contaminants

4.1 Heavy metals: Honey shall be free from heavy metals in amounts which may represent a hazard to human health. The products covered by this Standard shall comply with those maximum levels for heavy metals established by the Codex Alimentarius Commission.

4.2 Residues of pesticides and veterinary drugs: The products covered by this standard shall comply with those maximum residue limits for honey established by the Codex Alimentarius Commission.

5. Hygiene

5.1 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice – General Principles of Food Hygiene recommended by the Codex Alimentarius Commission (CAC/RCP 1-1969), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

6. Labelling

6.1.5 Honey may be designated by the name of the geographical or topographical region if the honey was produced exclusively within the area referred to in the designation.

Note: See full eight-page version of the standard at www.codexalimentarius.org.

Source: CAC 2001

Box 4: **Main European Union instruments for regulating food safety in honey**

- Directive 96/23/EC (Monitoring substances and residues in live animals and animal products)
- Directive 2001/110/EC (Honey including composition criteria)
- Regulation 2377/1990 (Pharmaceutical substance residues)
- Regulation 178/2002 (Food safety)
- Regulations 852/2004, 853/2004, and 854/2004 (Hygiene)
- Regulation 396/2005 (Pesticide residues) amended by 149/2008

Box 5: **Countries eligible to export honey to the European Union ('third countries')**

As per European Union Decision 2011/690/EU of 14 October 2011.

Argentina
Australia
Brazil
Belize
Canada
Cameroon
China
Chile
Croatia
Cuba
El Salvador
Ethiopia
French Polynesia
Ghana
Guatemala
India
Israel
Jamaica
Kyrgyzstan
Mexico
Moldova
Montenegro
New Caledonia
Nicaragua
New Zealand
Pitcairn Islands
Russia
San Marino
Serbia
Switzerland
Thailand
Taiwan
Tanzania
The Former Yugoslav Republic of Macedonia
Turkey
Ukraine
Uganda
United States
Uruguay
Zambia

The European Union requires the following:

- All honey consumed within the EU must have been monitored for the presence of drugs, pesticides, and heavy metals throughout the whole process of production, collection, and processing with a system in place to trace any source of contamination.
- Importing countries must comply with EU phytosanitary regulations to prevent the entry and spread of plant diseases and pests in the EU, with some EU countries requiring phytosanitary certificates for imported honey.
- Drums used to import honey into the EU must be clean, free from residual tastes or smells and have a rubber seal around the closure, are not lined with paraffin wax, and have not been used for holding chemicals. (Most honey is imported into the EU in bulk in standard specification drums.)

The general EU directive on honey (2001/110/EC) is controversial in that it defines honey as "the natural sweet substance produced by *Apis mellifera* bees", thus excluding the products of the five Asian honeybee species found in the HKH region.

5 Residue Monitoring and Traceability

The presence of residues of veterinary drugs, pesticides, and heavy metals in foodstuffs is a major concern of food regulators. Systematic monitoring is essential to ensure there are no residues of potentially harmful substances in excess of prescribed levels. This is a prescribed activity for honey to be allowed into the EU and other developed country markets.

Residue Monitoring Schemes

Part 4.2 of the Codex Standard for Honey (CAC 2001) says that "The products covered by this standard shall comply with maximum residue limits for honey established by the Codex Alimentarius Commission." The Commission recommends that countries establish programmes with the following components to control residues and contaminants in food products:

- a regulatory authority responsible for inspection and laboratory analysis with the authority to take steps to control products when residues exceed maximum limits;
- a register of veterinary drugs and/or pure chemicals used in the country;
- regulations governing the distribution of veterinary drugs and procedures for the sale, manufacture, distribution, and use of such products;
- procedures for determining the safety and efficacy of veterinary drugs in animals and residues in food;
- procedures for sampling and methods of analysis;
- quality assurance programmes for reliable results; and
- an educational programme on the proper use of veterinary drugs and pesticides and the handling of food products.

National residue monitoring plans serve as the foundation for certifying the safety of a country's food products including those produced for export. Such plans for honey specify the means and the framework for monitoring residues of drugs, pesticides, and heavy metals from production through to sale and consumption.

Residue monitoring plans specify the types of substances to be sampled, official sampling procedures, frequencies of sampling, the status of testing laboratories, and measures to be taken in case of non-adherence to legislation. These plans must also delineate the role of governmental agencies and value chain operators, and identify mechanisms for cooperation and the means of dealing with new or emerging challenges for human health and food safety. Plans should be applied along the entire value chain and their proper implementation entails the cooperation of all actors including beekeepers, honey traders, industry, government agencies, and scientists. Residue monitoring plans are usually implemented by national coordinating authorities such as the Agricultural and Processed Food Products Export Development Authority (APEDA) in India and the Department of Food Technology and Quality Control (DFTQC) in Nepal.

The monitoring of residues in honey needs enabling legislation, agencies to carry out and oversee monitoring, laboratories to test samples, and awareness among all stakeholders about the importance of monitoring for residues;

- Countries need comprehensive, international standard food laws, quality standards, food safety policies and regulations for food safety in general and for the monitoring of residues and contamination in foodstuffs, such as honey in particular.
- Food control services are made up of food inspectorates, laboratories and analytical staff, and managerial and supervisory staff. FAO and the World Health Organization (WHO) recommend that each country sets up a national Codex committee to address international food trade standards and protect the interests of domestic consumers.

- Quality control and residue monitoring needs well-equipped laboratories run by accredited bodies with trained personnel. Note that national bodies must be recognized by the International Laboratory Accreditation Cooperation (ILAC) forum (see www.ilac.org) and the International Accreditation Forum (IAF).
- Education and awareness raising campaigns need to be run for value chain actors to understand the importance of residue control and quality control.

European Union Requirements for Residue Monitoring

The European Union has a set of legislation related to monitoring residues in foodstuffs (see Annex 3). European Union Decision 2001/159/EC (modified in Decision 2001/487/EC) stipulates that honey (and all products of animal origin) must be checked for residues of drugs, organochlorine compounds (including PCBs – polychlorinated biphenyls), organophosphorus compounds, pyrethroids, carbamates, heavy metals, and other miscellaneous substances that are listed in Annex 4 of this publication. The EU's directives for residues of veterinary medicinal products (EC 2377/90) and pesticides (EC 396/05) specify the maximum amounts of these substances that can be present in foodstuffs of animal origin (also detailed in Annex 4). Note that the EU bans the import of honey above permissible levels and honey with any trace whatsoever of heavy metals or antibiotics.

European Union Directive 96/23/EC requires countries that want to export products of animal origin, including honey to the EU, to submit and implement residue monitoring plans. The types of residues and substances to be monitored are given in Annex I of the Directive under 'Substances having anabolic effect and unauthorized substances' and 'Veterinary drugs and contaminants'.

The requirements for residue monitoring plans for honey (and all products of animal origin) to be imported into the EU are listed in Box 6 and include a statement of the national legislation governing the use of veterinary medicinal products, lists of official laboratories, and the types of substances to be monitored.

The EU allows samples of honey to be taken at any point in the honey production chain provided it is possible to trace the honey back to the original producer. The number of samples to be taken each year must be at least 10 per 300 tonnes of annual production of honey for the first 3,000 tonnes and one sample for every additional 300 tonnes. The breakdown in Table 2 must be respected for honey residue monitoring.

Table 2: **European Union sampling requirements for honey residue monitoring**

Proportion for testing	Samples to be tested for
50% of total number of samples	Group B 1 (antibacterial substances) Group B 2-c (carbamates, pyrethroids)
40% of total number of samples	Group B 3-a (organochlorine compounds including PCBs [polychlorinated biphenyls]) Group B 3-b (organophosphorus compounds) Group B 3-c (chemical elements)
10% of total number of samples	To be allocated according to experience of countries, giving particular consideration to mycotoxins.

Tracing Contamination

A crucially important part of monitoring residues and contaminants in foodstuffs, such as honey, is the ability to trace the point at which any residues or contamination could have entered into a foodstuff. This is referred to as 'traceability' or:

> *The ability to trace the history of a product through the supply chain to or from the place and time of production, including the identification of the inputs used and production operations undertaken (BSI 2000)*

Traceability is a tool that allows for remedial action to be taken if food becomes contaminated. Standard 22005:2007 of the International Organization for Standardization (ISO) gives the principles and specifies the basic requirements for designing and implementing traceability systems at any step in the feed and food chain.

Box 6: **European Union requirements of residue monitoring plans of third countries**

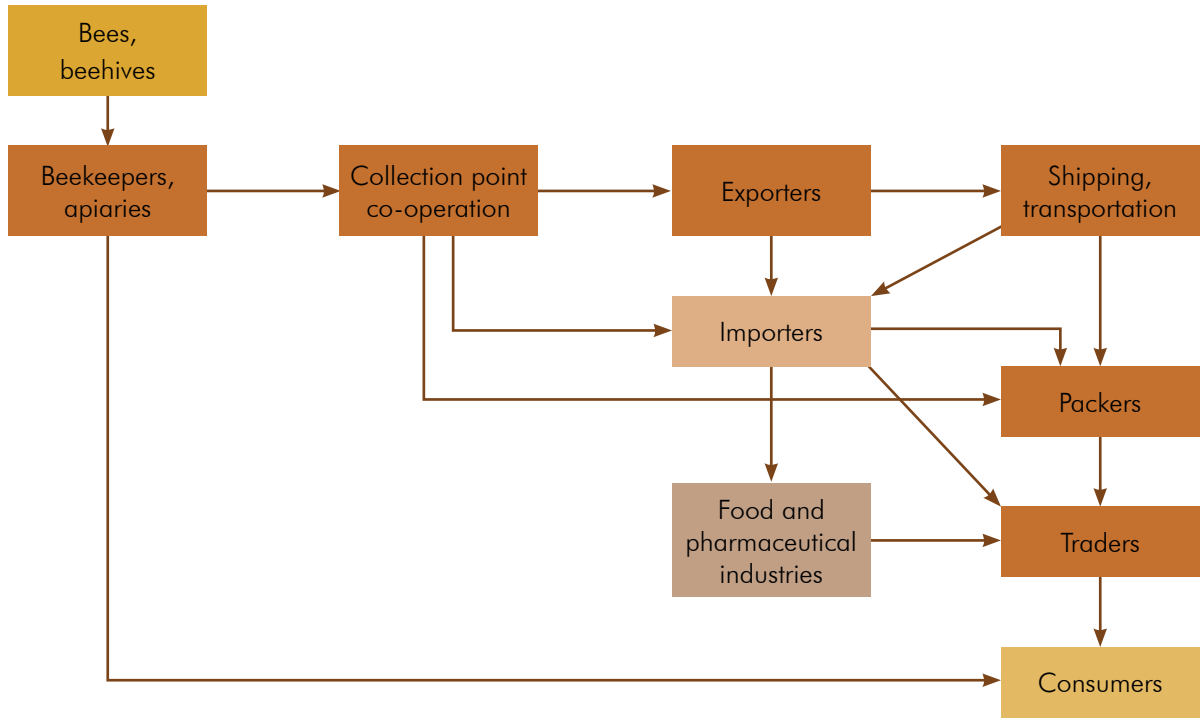
- The country's legislation concerning the use of substances as listed in Annex I of Directive 96/23/EC (Article 7.1 of Directive 96/23/EC)
- Infrastructure of official services and co-ordination of activities of central and regional departments (Articles 7.2 and 4 of Directive 96/23/EC)
- List of official laboratories (Article 7.3 of Directive 96/23/EC)
- Level of competence of national reference and routine laboratories, particularly regarding the implementation of quality assurance and good laboratory practices
- National tolerance limits for authorized substances and environmental contaminants (Article 7.4 of Directive 96/23/EC)
- Official sampling procedures in the field, including information on how samples are secured after collection (using flow charts)
- Production planned to be exported to the European Union (Decision 97/747/EC)
- Groups of substances to be monitored under the plan (As listed in Annex I of Directive 96/23/EC)
- Breakdown of substances to be monitored under the plan (Article 7.5 of Directive 96/23/EC)
- Details of analysis methods specifying screening routines and confirmation, with action levels and detection limits
- Number of samples to be taken for each sub-group of substances. (Decision 97/747/EC). For third countries, the figures should only refer to exports to the European Union; in which case, guarantees for appropriate segregation and control must be stated (Article 7.6 of Directive 96/23/EC)
- Results from previous years
- Changes from previous residue plans particularly related to problems identified (Article 8.2 of Directive 96/23/EC)
- Measures to be taken by competent authorities if residues are detected (Article 7.7-8 of Directive 96/23/EC)

For honey, traceability begins with the conformation of each beehive and its identification through the stages of harvesting and processing and through the supply chain until the honey reaches the final consumer. To track the flow of honey from beehive to point of sale needs good collaboration between the actors at each stage of the production and distribution chain (Figure 5). The actors in the honey supply chain need to record information at each step to track the flow of the honey so that targeted and accurate withdrawals can happen if contamination or other food safety problems are identified. The actors include beehives and beekeeping equipment suppliers, beekeepers, honey processors, storage container suppliers, distributors, storage holders, wholesalers, and retailers.

In most developed countries the documentation requirements for traceability in honey are given in their national beekeeping guidelines. The different actors have the responsibility for collecting different kinds of information. Box 7 shows the types of information that need to be logged by beekeepers, honey processors, traders, and distributers on stocks of honey they handle. Examples of the types of formats they need to maintain are given in Figure 6. Importantly they need to keep proper records on each container of honey supplied to collection centres. Figure 7 demonstrates how 'mixing reports' must be prepared when mixing honey from different beekeepers by recording the specifications of each sub-lot.

European Union regulations on traceability came into force in January 2005 and importers must identify the origin of their products.

Figure 5: **Stages of the honey supply chain**



Source: QSI 2005

Figure 6: **Formats to be maintained by beekeepers and other honey supply chain actors for traceability purposes**

A. Disease control

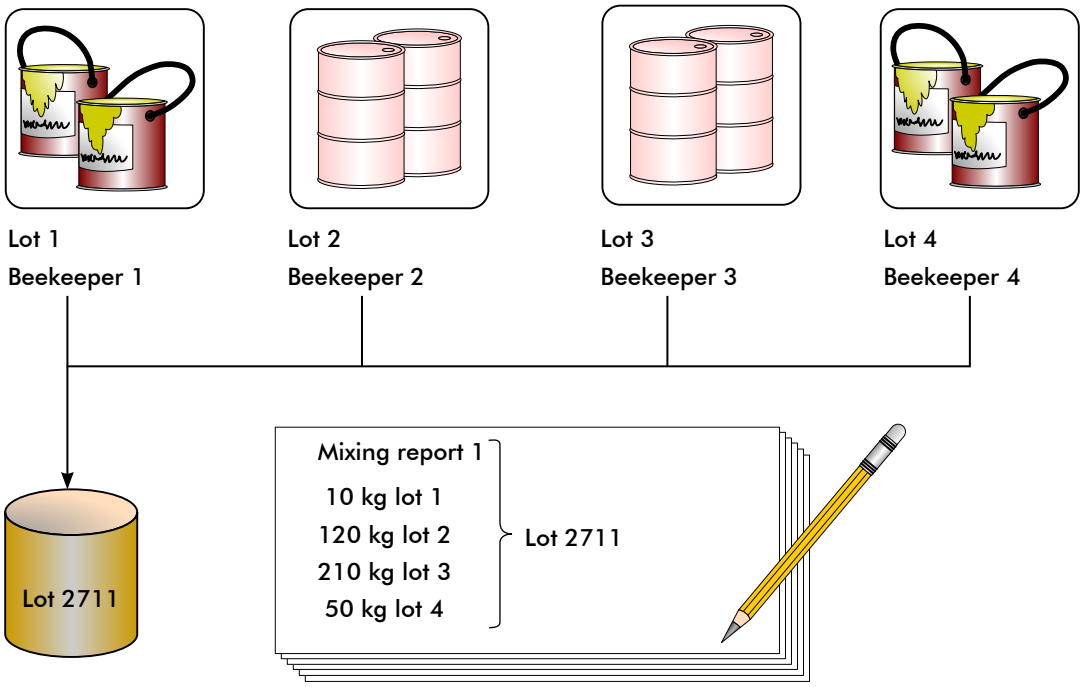
Date	Colony number	Disease	Measures	Remarks

B. Delivery of honey

Date	Customer charge number	Complaints	Measures	Remarks

Source: QSI 2005

Figure 7: **Example of information to be recorded at honey collection points**



Source: QSI 2005

Box 7: **Main traceability information collection responsibilities**

Beekeepers

- Labelling of hives and position of colonies
- Origin of honeybee queens
- Feed (sugar syrup, pollen substitute, etc.)
- Wax origin, date of exchange
- Disease control measures, drugs used
- Date of honey extraction
- Honey treatment, processing, and storage
- Delivery of honey.

Honey processors, traders, and distributers:

- Supplier of honey (name of company, operator, or legal entity)
- Volume or quantity
- Batch number
- Other details (pre-packed bulk product, variety of honey, raw or processed product, floral source, etc.)

6 Organic Honey Standards

Organic Beekeeping

Although much of the honey produced in the HKH region is organic or almost organic by default, only small amounts are certified as organic. The large and growing market for organic honey in developed countries and among higher income consumers elsewhere offers a large opportunity for mountain beekeepers and wild honey collectors in the HKH region. This section describes the quality parameters and developed country import requirements for organic honey.

Apis cerana beekeepers in mountain areas use traditional beekeeping methods with no feeding or treatment of colonies. Hives are provided for nesting but there is 'zero management' of the hives. This is partly because *Apis cerana* bees are well adapted and resistant to indigenous pests and disease.

Organic beekeeping is raising bees without using pesticides or other unnatural or harmful substances. It uses traditional and scientific knowledge to enhance the health of the bees and the agro-ecosystems in which they are kept. Bees are raised using natural materials and methods with care taken to support bee health and ensure low stress levels. Organic beekeeping is similar to traditional beekeeping except that its production, processing, and distribution are governed by standards monitored by certifying agencies.

In the HKH region large amounts of honey come from wild honeybees such as *Apis laboriosa*; this honey is mostly free of residues.

Himalayan cliff bee (*Apis laboriosa*) colonies on a rocky cliff face

Standards and Regulations for Organic Production

Organic beekeeping is closely linked with good beekeeping practices including the biological control of pests and diseases and practices that benefit natural flora and fauna. Organic beekeeping standards are derived from the general standards that apply to organic food production (Thimmaiah 2007):

- avoiding the use of synthetic chemicals such as pesticides and antibiotics;
- using farmland or pastures that have been free from chemicals for a certain period (often three years);
- maintaining detailed written production and sales records;
- physically separating certified organic products and uncertified products; and
- carrying out periodic on-site inspections.

Most generic standards for organic farming have been developed by private certification bodies, although some countries have national organic standards and regulations. The EU, the United States, and Japan require that organic products for export are labelled in a particular way. A number of HKH countries have national organic farming programmes, standards and regulations, and non-government initiatives promoting organic production.

As well as meeting the general standards for honey, honey sold as organic must also meet proof that it has been produced organically. The two main international standards for organic beekeeping and honey production are the Codex and European Union standards that stipulate that bees must be raised without the use of pesticides and other unnatural or harmful substances.

- The Codex Guidelines for the Production, Processing, Labelling, and Marketing of Organically Produced Foods (CAC 1999) have specific requirements for organic beekeeping and organic bee products. These are the overall worldwide standard for organic beekeeping and honey production. See Box 8 for some of the main points including specifications for siting hives, feeding bees, conversion to organic production, and bee health.
- The European Union is the biggest buyer of organic honey worldwide. Within the European Union, honey may be labelled and sold as organic only if it is produced, inspected, and certified in accordance with European Union Regulation 2092/91 (EEC 1991). This also applies to organic honey imported from outside the European Union. Part C of these regulations gives the European Union standards and specifications for organic beekeeping and beekeeping products (see major points in Box 9). Production methods must comply with the regulations at all stages of production, preparation, and distribution (EC 834/2007). Note that Part 3.1 of the regulation says that "Preference shall be given to the use of European breeds of *Apis mellifera* and their local ecotypes."

Specific Standards for Organic Honey

The Codex Alimentarius and European Union organic beekeeping and honey production standards are similar with the European Union regulations being more detailed and having a number of derogations (exceptions). Note that Box 9 does not include these derogations. The main specifications of the two standards are as follows:

- The health of bees should be based on the adequate selection of breeds, a favourable environment, balanced diet, and appropriate husbandry practices.
- Beehives should be placed in areas where bees can forage on vegetation untainted with chemicals including from pollution, pesticides, and other agricultural chemicals.
- Supplementary feed of organic origin may be given under certain circumstances.
- Non-organic certified beehives and colonies can be converted to organic production over a minimum of one year.
- Specified organic substances should be used for pest and disease control, although certain veterinary medicinal products may be used where the former fail.
- Prohibited practices include destroying bees in combs and using synthetic repellents to harvest bee products. Also, beehives should be made from natural materials with no risk of contamination to honey.
- Bulk stores for organic products should be separated from conventional product stores.

Box 8: **Points from Codex guidelines for organic beekeeping and bee products**

General principles

55. The treatment and management of hives should respect the principles of organic farming.
57. The sources of natural nectar, honeydew, and pollen shall consist essentially of organically produced plants and/or spontaneous (wild) vegetation.

Siting of hives

61. Hives for beekeeping shall be placed in areas where cultivated and/or spontaneous vegetation comply with the rules of production as set out in Section 4 of these Guidelines.
62. The official certification body or authority shall approve the areas which ensure appropriate sources of honeydew, nectar, and pollen based on information provided by the operators and/or through the process of inspection.
64. The certification body or authority must identify zones where hives [...] should not be placed due to potential sources of contamination with prohibited substances, genetically modified organisms, or environmental contaminants.

Feed

65. At the end of the production season hives must be left with reserves of honey and pollen sufficiently abundant for the colony to survive the dormancy period.
66. The feeding of colonies can be undertaken to overcome temporary feed shortages due to climatic or other exceptional circumstances. In such cases, organically produced honey or sugars should be used if available. [...]

Conversion period

67. Bee products can be sold as organically produced when these Guidelines have been complied with for at least one year. [...]

Origin of bees

69. Bee colonies can be converted to organic production. Introduced bees should come from organic production units when available.

Health of the bees

71. The health of bee colonies should be maintained by good agricultural practice, with emphasis on disease prevention through breed selection and hive management. [...]
72. For pest and disease control the following are allowed: lactic, oxalic, acetic acid, formic acid, sulphur, natural etheric oils (e.g., menthol, eucalyptol, camphor), *Bacillus thuringiensis*, steam and direct flame.
73. Where preventative measures fail, veterinary medicinal products may be used. [...]

Management

75. The foundation comb shall be made from organically produced wax.
78. The use of chemical synthetic repellents is prohibited during honey extraction operations.
79. Smoking should be kept to a minimum. Acceptable smoking materials should be natural or from materials that meet the requirements of these Guidelines.

Note: See the full version of the guidelines at www.codexalimentarius.org and see parts 54 to 88 for the specific requirements for organic beekeeping and organic bee products.

Source: CAC 1999

Box 9: **Excerpts from European Union requirements for organic beekeeping and beekeeping products (Regulation 2092/91)**

1. General principles

1.2 The qualification of beekeeping products as being from organic production is closely bound up both with the characteristic of the hives' treatments and the quality of the environment... [and] on the conditions for extraction, processing and storage of beekeeping products.

1.3 When an operator runs several beekeeping units in the same area all the units must comply with the requirements of this Regulation. [...]

2. Conversion period

2.1 Beekeeping products can be sold with references to the organic production method only when the provisions laid down in this Regulation have been complied with for at least one year. [...]

3. Origin of the bees

3.1 In the choice of breeds, account must be taken of the capacity of animals to adapt to local conditions, their vitality, and their resistance to disease. Preference shall be given to the use of European breeds of *Apis mellifera* and their local ecotypes.

4. Siting of the apiaries

4.2 The siting of the apiaries must:

a) ensure enough natural nectar, honeydew, and pollen sources for bees and access to water;
b) be such that, within a radius of 3 km from the apiary site, nectar and pollen sources consist essentially of organically produced crops and/or spontaneous vegetation [...];
c) maintain enough distance from any non-agricultural production sources possibly leading to contamination [...]

5. Feed

5.1 At the end of the production season hives must be left with reserves of honey and pollen sufficiently abundant to survive the winter.

5.7 Artificial feeding may be carried out only between the last honey harvest and 15 days before the start of the next nectar or honeydew flow period.

6. Disease prevention and veterinary treatments

6.1 Disease prevention in beekeeping shall be based on the following principles:

a) the selection of appropriate hardy breeds;
b) the application of certain practices encouraging strong resistance to disease and the prevention of infections, such as: [...]

6.2 If despite all the above preventive measures, the colonies become sick or infested, they must be treated immediately and, if necessary, the colonies can be placed in isolation apiaries.

6.3 The use of veterinary medicinal products in beekeeping which complies with this Regulation shall respect the following principles: [...]

6.5 If a treatment is applied with chemically synthesised allopathic products, during such a period, the colonies treated must be placed in isolation apiaries and all the wax must be replaced with wax complying with the conditions laid down in this Regulation. [...]

7. Husbandry management practices and identification

7.3 The replacement of the queen bees involving the killing of the old queen is permitted.

7.4 The practice of destroying the male brood is permitted only to contain the infestation with Varroa jacobsoni.

7.5 The use of chemical synthetic repellents is prohibited during honey extraction operations.

8. Characteristics of hives and materials used in beekeeping

8.1 The hives must be made basically of natural materials presenting no risk of contamination to the environment or the apiculture products.

8.3 The beeswax for new foundations must come from organic production units. [...]

8.7 For cleaning and disinfecting materials, buildings, equipment, utensils, or products used in beekeeping only the appropriate substances listed in Annex II Part E are permitted.

Note: See full version of European Union Regulation 2092/91 at:
http://eur-lex.europa.eu/LexUriServ/site/en/consleg/1991/R/01991R2092-20070101-en.pdf

Source: EEC 1991

Organic Certification

Suppliers who want to export honey to the international market need to have their products certified as meeting standards for organic production. The main purpose of organic certification is to assure quality and prevent fraud.

Standards of certification for organic honey are found in the Codex Organic Standards, in European Union Regulation 834/2007 on organic production and the labelling of organic products, and in other documents including those of the International Federation for Organic Agriculture Movements (IFOAM). IFOAM's Organic Guarantee System (OGS) facilitates the development of organic standards and third-party certification worldwide, and provides an international guarantee of standards and organic certification.

The three main types of organic certification are as follows:

- Third party certification is the formal documented procedure by which a third party assures that organic standards are being followed. This is a precondition for access to regulated markets and an important way of building consumer trust in organic products. Most third party certification is carried out by private agencies that work individually or as networks. Such agencies include the Certification Alliance and OneCert (see Box 10), and Quality Assurance International and Concert-QSI Japan Ltd.
- Participatory guarantee systems (PGSs) are local quality assurance systems built on foundations of trust, social networks, and knowledge exchange. The standards used are often the same as for third-party certification. These systems are low cost, convenient and empower producers:

  "Participatory guarantee systems, just like third-party certification systems, aim to provide a credible guarantee for consumers seeking organic produce. The difference is in approach: direct participation of farmers, consumers, and other stakeholders in the verification process is not only encouraged in PGS, but may be required. Such involvement is realistic and achievable given that PGS is likely to serve small farms and local, direct markets. Costs of participation are low and mostly take the form of voluntary time involvement rather than financial expenses. Moreover, paperwork is reduced, making it more accessible to small operators." (IFOAM 2011)

Some sellers put combs manipulated to look like wild *Apis florea* combs in *A. mellifera* honey to make it appear to be *A. florea* honey, which fetches higher prices

Box 10: **Two international organic certification agencies**

OneCert Inc. is based in the United States and operates in Asia through OneCert Asia, which is based in India. Its certification is recognized by the Indian National Programme for Organic Production (NPOP), USDA's National Organic Programme (NOP), the European Union, Switzerland, Japanese Agricultural Standards, and the ISO food safety management standard 22000:2005.

The Certification Alliance is a partnership between local and international organic certification bodies, inspectors, and supporting organizations. Its members include organic certification bodies in Thailand, the Philippines, Sri Lanka, Malaysia, Nepal, China, and Lao PDR.

Figure 8: **Labels of international organic certification bodies**

- Local trust-based systems can be used in local markets where there is direct contact between farmers and consumers. Here trust can often be maintained by self-declaration as producers' groups and cooperatives adopt standards or codes of conduct and put in place measures to verify that all members comply.

Organic foods can be certified as organic, organic in conversion, and/or 'organic in transition' by certifying agencies. Other designations such as 'organic by default' or 'natural' are used on food products, but are not officially recognized. The EU, the United States, Japan, India, and other countries have national regulations for labelling organic products. Some examples of the labels applied to organically certified food are given in Figure 8.

Organic certification with an attractive label and story of origin commands a premium price in the market

7 Good Practices

Increased awareness about the importance of avoiding pesticide and other contaminants has led to more consumers choosing honey that is produced, processed, and distributed as per fixed good management practices. This chapter explains these good practices in general and how adherence to the Hazard Analysis and Critical Control Point (HACCP) guidelines and the standards of the International Organization for Standardization (ISO) contribute to food quality and safety.

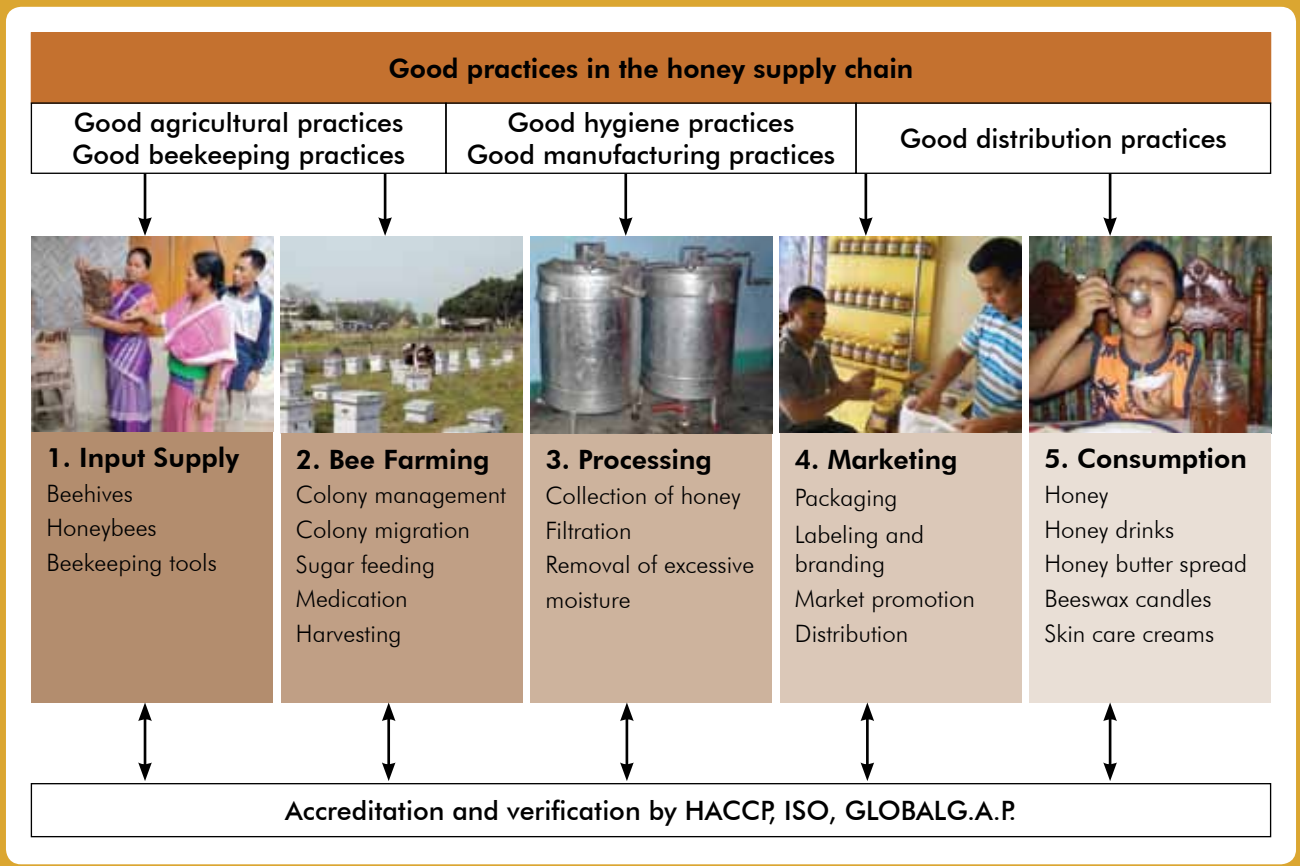
Good agricultural practices, good beekeeping practices, good hygiene practices, and good manufacturing practices all apply to honey production. The use of these good practices from the supply of inputs through to product distribution promotes quality during production, processing, and packaging and provides quality assurance and accreditation to verify honey quality (see Figure 9). Some countries, such as Australia, Canada, New Zealand, the United States, and Japan, have adopted national best practice guidelines for the production and distribution of honey. An example is the 19-point national guidelines for Australian beekeepers (AHBIC 2007).

Good Agricultural Practices

The appropriate adoption and monitoring of good agricultural practices (GAP) helps:

- improve the safety and quality of food and other agricultural products;
- reduce the risk of non-compliance with national and international regulations, standards, and guidelines; and
- promote sustainable agriculture and contribute to meeting national and international environmental and social objectives.

Figure 9: **Stages and means of quality assurance in honey from bee to bottle**



One of the key good agricultural practices is the proper location of beehives – in areas with low levels of pesticide use and other contaminants. Other key good practices are to only use authorized and acceptable chemical inputs (fertilizers, pesticides) according to approved directions (e.g., concentration, frequency, timing of use), and to only use appropriate harvesting and on-farm storage and handling techniques.

Good Beekeeping Practices

Good beekeeping practices help assure consumers that honey meets acceptable levels of quality and safety by ensuring that:

- only healthy bee colonies and queens are sold;
- honey is only harvested from healthy bee colonies;
- any drug used to control bee diseases is safe and used according to approved directions, and that residues do not enter honey at unsafe levels;
- chemicals used in beehives (e.g., acaricides, paints, and bee repellents) are safe for intended use and are used according to instructions, and that residues do not enter honey at unsafe levels;
- bee handling is properly conducted;
- appropriate temperature controls, storage conditions, and sanitary conditions are maintained while processing honey; and
- shipping and handling practices do not expose honey to contamination.

Good Hygiene Practices

Good hygiene practices are general principles for producing foodstuff that also apply to the production and handling of honey. They entail the use of sanitary measures to prevent microbial contamination and assure sanitary conditions, including by:

- using appropriate cleaning and sanitizing techniques to prevent microbial build-up on processing equipment, utensils, and food contact surfaces;
- observing sanitary practices, using protective clothing, and observing rules of personal hygiene;
- installing hand-washing and hand-sanitizing dip stations;
- using time and temperature controls to prevent microbial growth in susceptible intermediate and finished processed foods; and
- other sanitary measures needed because of the nature of the food being processed, the processing technology and the facilities in which processing takes place.

Good Manufacturing Practices

Good manufacturing practices are principles to ensure quality and safety in manufacturing from receipt of primary products and other ingredients to shipping and marketing of the final product. Like good hygiene practices, they also apply to the production and handling of honey. They include measures to ensure that:

- food materials and ingredients are of the appropriate level of quality and safety before use and are stored properly to prevent contamination and mix-up with other processing materials;
- facilities used in food production are of the appropriate size to prevent overcrowding and allow the proper placement and orderly storage of equipment, raw materials, and other product materials;
- the layout of facilities permits the orderly flow of production materials and personnel in processing;
- facilities are suitably lit;
- equipment is maintained for proper functioning;
- temperatures, times, pressures, machine operations, and other processing parameters are controlled at the specific level required to assure proper processing; and
- appropriate labels are used.

Good manufacturing practices also include promoting the welfare of workers and primary producers, an issue of special concern to the fair trade movement. This issue is a part of and is a growing concern as companies are increasingly sensitive about their image and avoiding negative publicity. Many businesses have developed codes of conduct, corporate social responsibility policies, and other instruments that stipulate minimum working conditions. Some importers and large retailers, especially in the EU, have made the improvement of workers' conditions a criterion for identifying companies and countries to trade with. Workers' welfare issues include their working conditions, their right to bargain for higher wages, minimum age, minimum wages, and maximum working hours.

Hazard Analysis and Critical Control Point Guidelines

Many governments, including India and China, stipulate the use of the Hazard Analysis and Critical Control Point (HACCP) guidelines for identifying food safety hazards, critical limits, and corrective actions. HACCP is a preventive approach to food and pharmaceutical safety that identifies potential physical, chemical, and biological hazards in production processes and designs measures to reduce risks to safe levels. HACCP is concerned with preventing hazards rather than inspecting finished products.

Seven main steps should be followed to implement the HACCP guidelines (see Box 11). At the core of HACCP is identifying all potential hazards associated with food processing and assigning critical control points (CCPs) where control needs exercising to prevent, reduce, or eliminate hazards. Constant vigilance must be maintained over control points and corrective actions should be taken whenever a control point gets out of control including removing suspect food products from distribution channels. This system is very effective if employed properly, but is quite a technical and challenging undertaking.

The EU calls for the implementation of HACCP guidelines under its food hygiene regulations 852/2004, 853/2004 and 854/2004. Food safety Regulation 178/02 also demands that the HACCP process is followed in food production.

ISO Food Safety Standards

The International Organization for Standardization (ISO) is a non-governmental organization based in Geneva, Switzerland. Many of its member institutes are part of governmental structures or are mandated by governments. Other members are national partnerships of industry associations. The ISO awards certification to organizations that successfully implement its standards.

ISO standard 22000:2005 is the main global food safety standard and is applicable across all types of food production systems, including the honey value chain. This system is the latest and most comprehensive food safety and quality management system. It specifies how organizations involved in the food value chain must demonstrate they are controlling food safety hazards so food is safe for human consumption (see Box 12). It applies to all organizations involved in the food chain who want to implement systems that consistently provide safe products. This standard is closely aligned with ISO's quality management systems standard 9001:2008 – a measure of the extent of quality management in any organization – and also incorporates the observation of the HACCP approach to food safety. Being ISO 22000-certified gives honey producers, processors, and traders a competitive advantage as it certifies that they comply with international food safety standards.

Box 11: **The seven steps for following HACCP guidelines**

1. Conduct a hazard analysis.
2. Determine critical control points.
3. Establish critical limits.
4. Establish a system to monitor control of each critical control point.
5. Establish corrective actions to be taken when monitoring indicates that a control point is out of control.
6. Establish verification procedures to confirm that the HACCP system is working effectively.
7. Document all procedures and records appropriate to these principles and their application.

Source: FAO 1997

Other Good Practice Frameworks

Organizations of honey producers and traders can join voluntary good practice frameworks such as the United Nations Global Compact and GLOBALG.A.P. (see Box 13) to improve their production, processing, and packaging practices and to gain access to international markets.

Box 12: **ISO food safety requirements**

ISO standard 22000:2005 requires organizations to:

- plan, implement, operate, maintain, and update food safety management systems to provide products which, according to their intended use, are safe for consumption;
- demonstrate compliance with statutory and regulatory food safety requirements;
- evaluate and assess customer requirements and demonstrate conformity with mutually agreed customer requirements for food safety;
- communicate food safety issues to suppliers, customers, and other parties involved in the food chain;
- ensure that organizations conform to their food safety policies;
- demonstrate such conformity to all relevant parties, and
- seek certification or registration of its food safety management system by an external organization, or make a self-assessment or self-declaration of conformity.

Box 13: **Two examples of voluntary good practice frameworks**

United Nations Global Compact

The Global Compact of the United Nations encourages businesses to adopt sustainable and socially responsible policies based on the following ten principles for human rights, labour standards, the environment, and against corruption:

- Support and respect the protection of internationally proclaimed human rights.
- Make sure that they are not complicit in human rights abuses.
- Uphold the freedom of association and the effective recognition of the right to collective bargaining.
- Uphold the elimination of all forms of forced and compulsory labour.
- Uphold the effective abolition of child labour.
- Uphold the elimination of discrimination in respect of employment and occupation.
- Support a precautionary approach to environmental challenges.
- Undertake initiatives to promote greater environmental responsibility.
- Encourage the development and diffusion of environmentally friendly technologies.
- Work against corruption in all its forms, including extortion and bribery.

GLOBALG.A.P. standards

GLOBALG.A.P. is a private sector body that sets voluntary standards for certifying agricultural products around the globe. It was established in the late 1990s by European supermarket chains and their suppliers to develop a common standard for good farm management practices. Farmers obtain certification when their farming practices meet GLOBALG.A.P. standards. The six types of GLOBALG.A.P. standards combine environmental, health, safety, and social standards and were developed using FAO's Hazard Analysis and Critical Control Points (HACCP) guidelines (FAO 1997).

These standards indicate that food has been produced by minimizing the detrimental environmental impact of farming operations, with reduced use of chemicals and a responsible approach to worker health and safety and animal welfare. The standards are implemented through partnerships between agricultural producers and retailers.

8 Honey Standards of Hindu Kush Himalayan Countries

In the HKH region only China, India, and Nepal have developed quality assurance systems, and only China and India have systems that enable them to export honey to developed countries, although Indian honey was banned from export to the EU in 2010 when residues of antibiotics were found (see Box 2). While the other countries do not have quality assurance systems for honey, they do have some standards in place.

Standards by Country

China

The mandatory standards for Chinese honey are specified in AQSIQ China (2006) and presented in Table 3. These standards for moisture content, sucrose content, reducing sugars, and diastase are well within the Codex standards.

India

In March 2002, under its Export (Quality Control and Inspection) Act, 1963, the Government of India stipulated that all honey for export should be subjected to quality control and inspection prior to export according to the standards of importing countries. In 2008 the Export Inspection Council of India issued its 'Executive Instructions for the Approval and Monitoring of Processing Establishments for Export of Honey' (EIC 2008). This document details the numerous procedures to be followed and checks to be carried out to meet the standards of the EU and other importing countries. The introduction to these instructions explains how following the stipulated procedures will enable the honey trade export industry to institute good manufacturing practices (GMP), good hygienic practices (GHP), and satisfy Indian and EU legislation. Two of the specifications are that residue monitoring plans and Hazard Analysis Critical Control Point (HACCP) guidelines must be followed. Regular HACCP audits are to be carried out alongside checks that establishments are following good management and good hygiene practices.

AGMARK (an agriculture certifying agency of the Government of India) and the Agricultural and Processed Foods Export Development Authority (APEDA) are the main institutions that monitor the honey trade in India. AGMARK laboratories are responsible for granting licenses and registering honey brands. AGMARK has separate quality standard specifications for the three grades of honey – special, A-grade, and standard (see Table 3). Each lot of honey has to be analysed to meet the quality parameters. Besides chemical standards, a description of the honey based on its colour (light brown to dark brown), consistency (viscous liquid), and taste (sweet) has to be given. The quality parameters for supplying the domestic (Indian) market are the same as for export except that there is no need for residue monitoring plans and a traceability system.

Nepal

Mandatory quality standards for honey in Nepal came into force on 5 February 2001 (HMGN 2001). These contain fewer details than the Codex standards; for example, there is no mention about the condition of containers, cleanliness, homogeneity, taste, aroma, colour, or labelling. These standards say that honey should be clean and free from inorganic or organic foreign matter. An October 2007 regulation of the Food Act (1966) endorsed the production of residue monitoring plans for honey in Nepal. Accordingly, Nepal's Department of Food Technology and Quality Control (DFTQC) prepared and submitted a draft residue monitoring plan to the EU in 2008. However, the plan was judged inadequate and it was found that the country lacked the necessary infrastructure including adequate laboratory facilities to grant Nepalese honey entry into the EU.

Table 3: **Honey quality standards of China, India, Nepal and the Codex Alimentarius Commission**

	Standard limits						Codex standards	
Quality parameters	China	India			Nepal		General	Other
		Special	A grade	B grade	Pure nectar honey	Other honey		
Specific gravity @27°C		Min. 1.4	Min. 1.4	Min. 1.35				
Moisture content	Max. 18%	Max. 20%	Max. 22%	Max. 25%	Max. 23%	Max. 23%	Max. 20%	Max. 23% (heather honey)
Sucrose content (g/100g)	Min. 5	Max. 5	Max. 5	Max. 5	Max. 5	Max. 10	Max. 5	Max. 10 (honeydew, blends of honeydew and blossom, *Robinia*, citrus, alfalfa, acacia, red gum, sweet clover, leatherwood) Max. 15 (*Lavendula* and borage)
Reducing sugars (g/100g)	Min. 70	Min. 65	Min. 65	Min. 65	Min. 65	Min. 60		
Fructose/ glucose ratio	Min. 1–1.15	Min. 1	Min. 0.95	Min. 0.95	Min. 0.95	Min. 0.95		
Sum of fructose and glucose (g/100g)							Min. 60	Min. 45 (honeydew, blends of honeydew and blossom)
Ash or mineral content (g/100g)		Max. 0.5	Max. 0.5	Max. 0.5	Max. 0.5	Max. 0.5	Max. 0.6	Max. 1 (honeydew or blends of honeydew and blossom)
Aniline chloride test Positive or negative		Negative	Negative	Negative				
Acidity as formic acid		Max. 0.20%	Max. 0.20%	Max. 0.20%	Max. 0.20%	Max. 0.20%		
Water insoluble content (g/100g)					Max. 0.5	Max. 0.5	Max. 0.1	Max. 0.5 (pressed honey)
HMF content (mg/kg)		Max. 50	Max. 50	Max. 50	Max. 40	Max. 40	Max. 40	Max. 80 (honey of declared origin from countries or regions with tropical ambient temperature)
Sources	AQSIQ China (2006)	Export Inspection Council of India, Ministry of Commerce and Industries, Government of India			Table 5 in Joshi (2008) from HMGN (2001)		CAC (2001)	

Bangladesh

The Bangladesh Standards and Testing Institution (BSTI) is responsible for setting quality parameters for honey in Bangladesh. Honey is listed as one of 64 food and agricultural products "brought under mandatory certification marks scheme" with standard BDS CAC 12:2007 being the standard for honey.

Bhutan

The Bhutan Agriculture and Food Regulatory Authority (BAFRA) has mandatory standards for packaging, labelling, and handling honey, but no specific parameters for the quality control of honey. Nor does it have an accredited testing laboratory. At present, moisture content is the only parameter that can be measured in Bhutan, with the maximum limit set at 18%. It is assumed that most honey produced in Bhutan is natural and unaltered as it only has limited areas under modern agricultural production and only limited use of chemicals in food production.

Pakistan

Pakistan follows the Codex standards for honey for export. The Quality Control Centre of the Ministry of Science and Technology is responsible for the monitoring of honey quality standards.

Organic Honey Standards in the HKH

In the HKH region only India and Bhutan have standards for organic beekeeping and honey production. Bhutan finalized its national organic standards, which includes organic apiculture, in 2007 (DoA Bhutan 2007).

In 2000, the Government of India launched its National Programme for Organic Production (NPOP) to set standards for organic production and criteria and procedures for accreditation and certification. NPOP (2005) gives these standards for all types of organic production including organic beekeeping (see Box 14). These are largely the same as those set out in the Codex Alimentarius (CAC 1999) and EU organic standards. The trademark, 'India Organic' is granted to producers, processors, and exporters that meet the National Standards for Organic Production.

In Nepal, Organic Certification Nepal (OCN) offers inspection and certification services to organic producers, processors, and traders. OCN is a member of the Certification Alliance of organic certifiers. However, OCN is yet to certify any Nepalese honey as organic and no Nepalese honey is being officially certified as organic.

Box 14: **Principles and standards for organic beekeeping in India (NPOP 2005, pp 50–52)**

General principles:

- Collection areas should be organic and/or wild and should be as varied as possible to fulfil the nutritional needs of the colony and contribute to good health.
- The feed supplied should be completely organic.
- Beekeeping is part of animal husbandry: Its general principles, therefore, also apply to beekeeping.

Recommendations:

- Feeding of colonies should be seen as an exception to overcome temporary feed shortages caused by climatic conditions.
- The foundation comb should be made from organic wax.
- When bees are husbanded in wild areas, care should be taken of the indigenous insect population.

Standards:

- Hives must be situated in organically managed fields and/or wild natural areas. Hives must not be placed close to fields or other areas where chemical pesticides and herbicides are used. Exceptions can be made by certification bodies on a case by case basis.
- Feeding should only take place after the last harvest before the season when no forage is available.
- Beehives should primarily consist of natural materials. The use of construction materials with potentially toxic effects is prohibited.
- Permeable materials must not be used in beehives where there is a possibility of permeation of the honey and where residues may be distributed in the area through dead bees.
- Wing clipping is not allowed.
- Veterinary medicine should not be used for beekeeping. When working with bees (e.g., at harvest) no repellent consisting of prohibited substances should be used.
- The following products are allowed for pest and disease control and hive disinfection: caustic soda, lactic, oxalic, and acetic acid, formic acid, sulphur, etheric oils, and *Bacillus thuringiensis*.

9 Challenges for the Hindu Kush Himalayan Honey Trade

The many opportunities for the honey producers and the honey trade in the HKH region are counter-balanced by substantial challenges, the main one being to meet the quality assurance and legislative requirements to export honey to developed country markets. The following challenges mostly apply to Afghanistan, Bangladesh, Bhutan, Myanmar, Nepal, and Pakistan and less so to India and China.

Meeting Requirements of Developed Country Markets

Honey producers, processors, and exporters face many challenges in meeting the demands of consumers, import criteria, and the strict legislation of the markets of the EU, the United States, and other developed countries.

The lack of internationally recognized quality assurance schemes means that Afghanistan, Bangladesh, Bhutan, Myanmar, Nepal, and Pakistan cannot export their honey to the EU and most other developed country markets. The institutional set-up, human resources, and laws and regulations for controlling synthetic agro-chemical and drug residues are insufficient to guarantee the quality of honey sold to the international and domestic markets.

Only countries with approved residue monitoring plans that are on the EU's list of third countries can export honey to the EU (see Box 5 for list of countries). This means that access to EU markets is denied to all HKH countries except China and India despite the fact that chemical residues are only a minor problem in much of the honey produced from the mountains and hills of the other seven HKH countries.

Countries whose food laws, quality standards, food safety policies, and regulations do not meet international requirements find it difficult to gain access to the international honey market. However, putting a quality assurance framework in place is a challenging undertaking for countries with limited resources and technical expertise.

Producers in developing countries in the HKH face challenges in implementing good agricultural practices especially with regard to record keeping and certification. Another major challenge here is the lack of harmonization between existing good agricultural practice-related schemes and the availability of affordable certification systems, which often leads to confusion and high certification costs for beekeepers and honey exporters.

Where food safety legislation and quality assurance measures exist in the HKH region, implementation is often inadequate with poor coordination among the different agencies involved. Besides China and India, only Nepal has developed a residue monitoring system, although it was judged inadequate by the EU. Afghanistan, Bangladesh, Bhutan, Myanmar, Nepal, and Pakistan lack quality assurance plans and systems in line with international standards such as the Hazard Analysis and Critical Control Point (HACCP) guidelines. These countries lack compliance policies, adequate laboratory facilities, adequately trained inspectorate, and laboratory staff and suffer from governance shortcomings and poor collaboration among the authorities responsible for agriculture, food, trade, industry, and health. Their generally inflexible systems also make it difficult to cope with developments in food science and technology, changing consumer demands, and new trade and industry requirements.

The following two requirements block HKH honey from being sold to the EU:

- EU regulations only recognize honey produced by the European honeybee *Apis mellifera*. Although the Codex definition of honey (CAC 2001) is not species specific; some Codex compositional requirements mean that it is difficult for honey from indigenous HKH honeybees to comply with them. For example, the Codex standards specify a maximum moisture content of 20%; but honey from HKH indigenous species often has a higher content.
- Honey with any trace whatsoever of antibiotics cannot be exported to the EU. European traders argue that it is impossible to measure zero presence and are lobbying for a minimum measurable level of antibiotics in honey.

Reputation for Low or Inconsistent Standard of Quality

The food standards of domestic and international markets should not have different requirements. The Codex Alimentarius Commission and the World Trade Organization recognize that local consumers deserve safe and hygienic food just as consumers in developed countries do (see Box 15). However, Chinese and Indian domestic market standards do not meet the requirements that apply to the export market. As a result, these countries face problems in maintaining their image as responsible exporters of quality honey. Deficiencies concerning the implementation of its residue monitoring plan for honey led to India being deleted from the list of EU third countries in 2010; however, it was reinstated in 2011. On the other hand, the increased number of high income consumers and the growth of the information and communication sector in China, India, and other HKH countries have led to consumers becoming more quality conscious and demanding better quality food products.

Box 15: **World Trade Organization and Codex equal treatment principles**

- WTO's National Treatment Principles call for similar food quality and consumer protection standards for goods sold in domestic and export markets to prevent local consumers from being exposed to sub-standard food products (WTO 2012).
- The Codex guidelines on the design and implementation of national regulatory food safety assurance programmes (GL 71-2009) expects all countries to establish residue control systems to protect their citizens as well as to meet the requirements of export markets.

Most beekeepers in the HKH region only have limited awareness of the quality and legislative requirements of honey importing countries and the importance of good beekeeping practices. They also view the setting up of quality assurance systems as only necessary for meeting the import requirements of developed countries when in fact such systems should also apply to domestic consumption.

Although most honey produced in the HKH region is of high quality and pure, significant amounts are sub-standard and have unwanted residues. The cases of contaminated honey (see examples in Box 2) and the resulting negative media attention seriously harmed the reputation of honey from the region. The 2010 EU ban on the import of honey from India negatively affected the price of HKH honey.

Sub-standard honey and mislabelled honey are sold in the domestic market in HKH countries. Recorded examples include honey

- adulterated with sugar and overheated (Joshi 1999);
- produced from bee colonies treated with fluvalinate to control varroa mites and with tetracycline to stimulate the growth of *Apis cerana* bees in beehives (see photo);
- sold under false pretences as from a particular region or floral source or as organic or fair trade without any proof of these designations, e.g., Chinese honey labelled as 'Produce of Nepal', or mustard flower honey carrying a label showing bees collecting nectar from chuiri trees; and
- in jars with labels missing important information (see Figure 10).

The Himalayan Honey only gives three of the four pieces of information required by the Codex standards; it is missing the floral source of the honey.

Increasing Competition

Although there is increasing demand, increased production in Asia and other areas has resulted in more competition in honey markets. Also, the accession to the European Union of Eastern European countries that produce large quantities of honey – particularly Romania and Bulgaria, which acceded in 2007 – has made it easier for these countries to sell within the EU, in some cases replacing imports from outside the EU.

Figure 10: **Examples of correctly and incorrectly labelled jars of honey**

Correct label

1. Name under which the honey is sold
2. Source of the honey
3. Name and address of supplier
4. Net weight

Incorrect label (source is missing)

Consumer Preferences

Another challenge is that consumers in developed countries prefer only certain types of honey. EU consumers prefer light coloured honey with a mild taste, while honey from HKH countries varies greatly in taste, colour, and aroma. The diversity of floral resources and the large variations in topography and climatic conditions in HKH countries make it difficult for HKH beekeepers to produce honey with consistent properties.

Other Challenges

Other constraints that apply to honey for sale to domestic, regional, and developed country markets are:

- in mountain areas, many honey traders find it difficult to buy sufficient quantities of quality honey from the scattered populations of small-scale producers;
- the limited knowledge and limited market linkages of poor beekeepers and wild honey collectors, meaning that they mostly sell their honey at low prices to middlemen;
- the poor linkages between value chain actors (beekeepers, honey processors, local traders, exporters, retailers), and the limited coordination between beekeeping and other sectoral agencies including for horticulture, forestry, health, and environment;
- the fluctuations in production and difficulties in predicting supply quantity and price; and
- in many areas, the poor availability of suitable containers for storing, transporting, and marketing honey.

Apis cerana colony being treated with the pesticide fluvalinate (see strip to the left of the bowl) and fed sugar syrup mixed with antibiotics – common practices among beekeepers in the HKH region

Challenges Facing the Organic Honey Trade

The largest challenges facing the organic honey trade are the expense and practicalities of getting organic certification and the current limited benefits it offers.

Although meeting the demanding standards for organic certification generally poses few problems for the many HKH honey producers who use no or minimal amounts of pesticides or additives, the complex documentation required for organic certification often presents a large obstacle for small groups of producers and traders. The process of organic accreditation can be expensive and time-consuming.

Most beekeepers and honey entrepreneurs in the HKH region operate on a small scale. Formal certification can have little or no marketing value to them even though there is a large demand and good potential for organic honey. Often, in practice, the small premiums for organic honey discourage them from investing in certification. Honey producers are scattered and unorganized, have limited access to information, and rarely contact fair trade and organic shops. The small quantities of honey they produce make certification prohibitively expensive.

There is a large potential export market for honey harvested from the wild. However, the Indian organic standards only cover managed honey production (by *Apis mellifera* and *A. cerana*) and not honey produced from wild nests by indigenous species. In the same way the EU defines honey as "the natural sweet substance produced by *Apis mellifera* bees…" while the Codex standards are designed just for honey produced by modern methods in beehives. This effectively excludes the entry of wild honey from indigenous HKH bee species to developed country markets as this type of honey has different characteristics and the process involved in handling it differs.

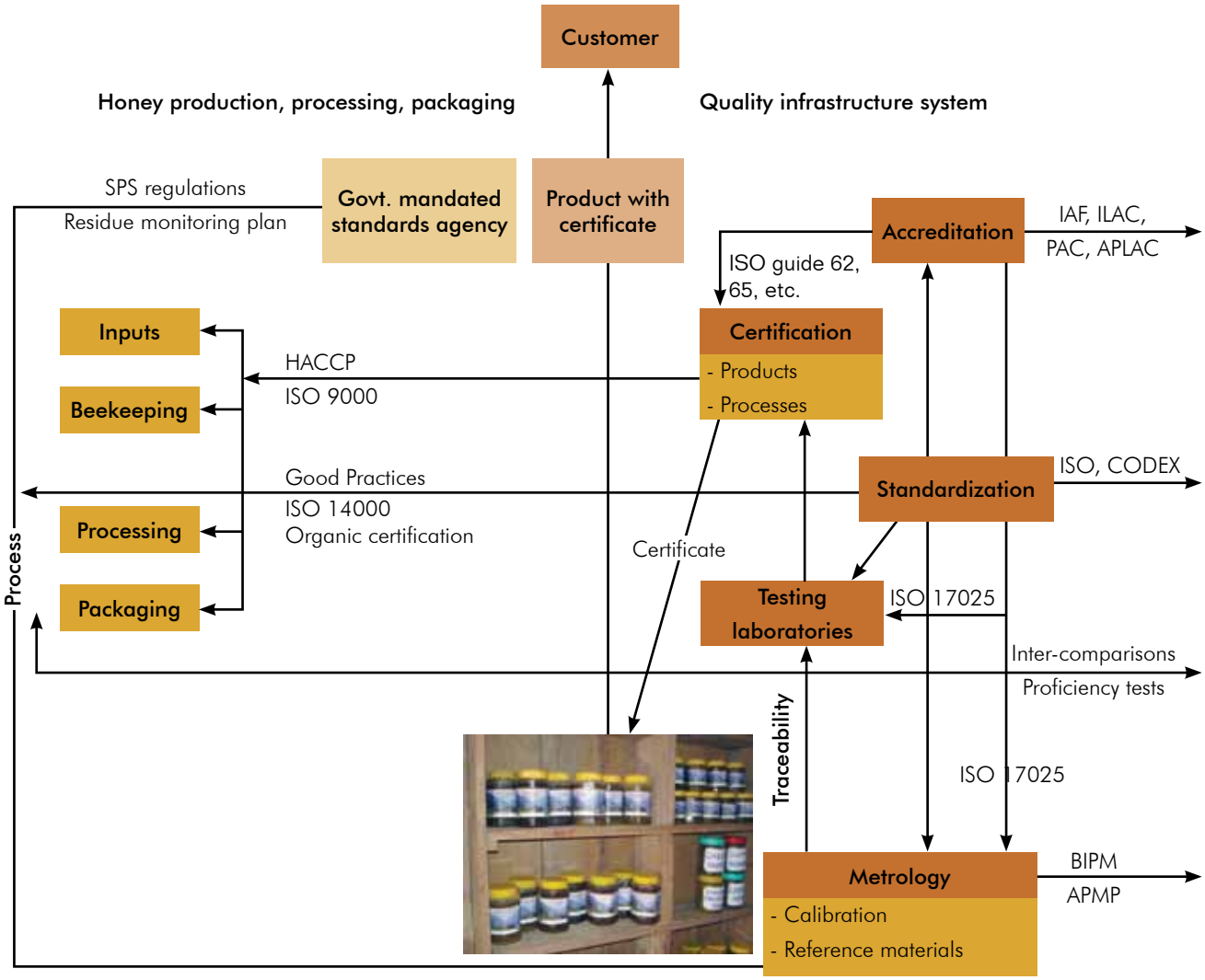
10 Recommendations

This chapter provides recommendations for developing quality assurance systems in the countries of the HKH region, especially Afghanistan, Bangladesh, Bhutan, Myanmar, Nepal, and Pakistan, so that their honey can be sold on national and international markets and to assure that only safe, high quality honey reaches consumers.

For China and India, which already have adequate quality assurance systems, the main recommendation is to strictly implement their systems and enforce food standard legislation related to the production and trade in honey.

The six other HKH countries need to develop and institute residue monitoring and quality control systems for honey with the goal of bringing them in line with the requirements of developed countries. This involves implementing good practices along the entire value chain from primary production to processing and distribution and building linkages along the value chain. Figure 11 shows the various components of such a system.

Figure 11: **Elements and process of a national honey quality assurance system**



Acronyms: APLAC – Asia Pacific Laboratory Accreditation Cooperation, APMP – Asia Pacific Metrology Programme, BIPM – Bureau International des Poids et Mesures, HACCP – Hazard Analysis Critical Control Point, IAF – International Accreditation Forum, ILAC – International Laboratory Accreditation Cooperation, ISO – International Organization for Standardization, PAC – Pacific Accreditation Cooperation, SPS – sanitary and phytosanitary

Source: Modified from Sanetra (2008)

General Recommendations

It is recommended that countries, with the support of regional organizations including ICIMOD:

- review their policies, legislation and practices related to honey production and trade to identify areas for improvement;
- update and introduce policies, legislation, and compliance measures regarding food quality control, residue monitoring, and sanitary, phytosanitary, and environmental aspects of food safety management;
- invest in infrastructure for testing and quality management of honey;
- build up the capacity of human resources in government agencies (including the departments of agriculture, livestock and health services, and food regulatory authorities), research and private sector bodies, and academia to implement a quality assurance system across the honey supply chain;
- facilitate collaboration among honey value chain actors to meet the requirements of trade rules and gain access to international markets;
- raise awareness among honey value chain stakeholders about honey quality and tariff and non-tariff barriers to the honey trade through dissemination of information materials, broadcast in the media, and events such as trade fairs;
- establish national scientific committees representing academia, scientists, technologists, toxicologists, veterinarians, medical professionals, chemists, biochemists, and legal experts to develop standards for honey;
- develop standard protocols on sampling, testing, and monitoring to meet the requirements of target markets
- support value chain actors in applying these standards and protocols, focusing first on selected geographic locations and then gradually expanding to other areas with good prospects for producing large quantities of mountain honey.

Residue Monitoring

ICIMOD and other regional organizations can support authorities in the six HKH countries to implement residue monitoring schemes by:

- reviewing food-related legislation to comply with the World Trade Organization's Agreement on the Application of Sanitary and Phytosanitary Measures and EU legislation;
- preparing the documents needed to set up traceability and residue control systems;
- establishing traceability and residue control programmes; and
- establishing accredited laboratory and certification systems.

Testing laboratories and certifying bodies need to be internationally accredited for results to be accepted by developed countries. However, it is costly to set up such facilities, so smaller HKH countries (Afghanistan, Bangladesh, Bhutan, Myanmar and Nepal) could use well-equipped honey laboratories elsewhere. The national food laboratories of Nepal, Bangladesh, and Bhutan should seek mutual recognition agreements with the National Accreditation Board for Testing and Calibration Laboratories (NABL) in India so that test data accompanying exported honey is internationally recognized.

Good Practices

Governments and development partners should support the institutionalization of quality management, quality assurance, and quality control systems for honey such as the Hazard Analysis and Critical Control Point guidelines, the International Organization for Standardization, and good agricultural practices (GAP) certification.

Each HKH country should develop and implement national beekeeping guidelines and encourage beekeepers, honey traders, and other actors to follow them. Recommended practices should include registering bee colonies and keeping records of management practices and the physical flow of honey.

Organizations of honey producers and traders should also explore joining voluntary good practice frameworks such as the United Nations Global Compact and GLOBALG.A.P. (see Box 13) to improve their production, processing, and packaging practices and to gain access to international markets.

Domestic Standards

Countries should develop their quality assurance systems to satisfy both the import requirements of developed country markets and to safeguard domestic and international consumers. However, in view of the challenges of establishing quality assurance systems to meet the stringent requirements of EU, HKH countries should consider setting and implementing less rigorous standards for sale of honey domestically and also possibly to other HKH countries. Domestic standards for honey production should be developed through coordination between the private sector and government agencies while export standards should meet the Codex standards and the regulations of target markets. The FAO/WHO Model Food Law (FAO/WHO no date) provides guidance on developing national regulatory frameworks.

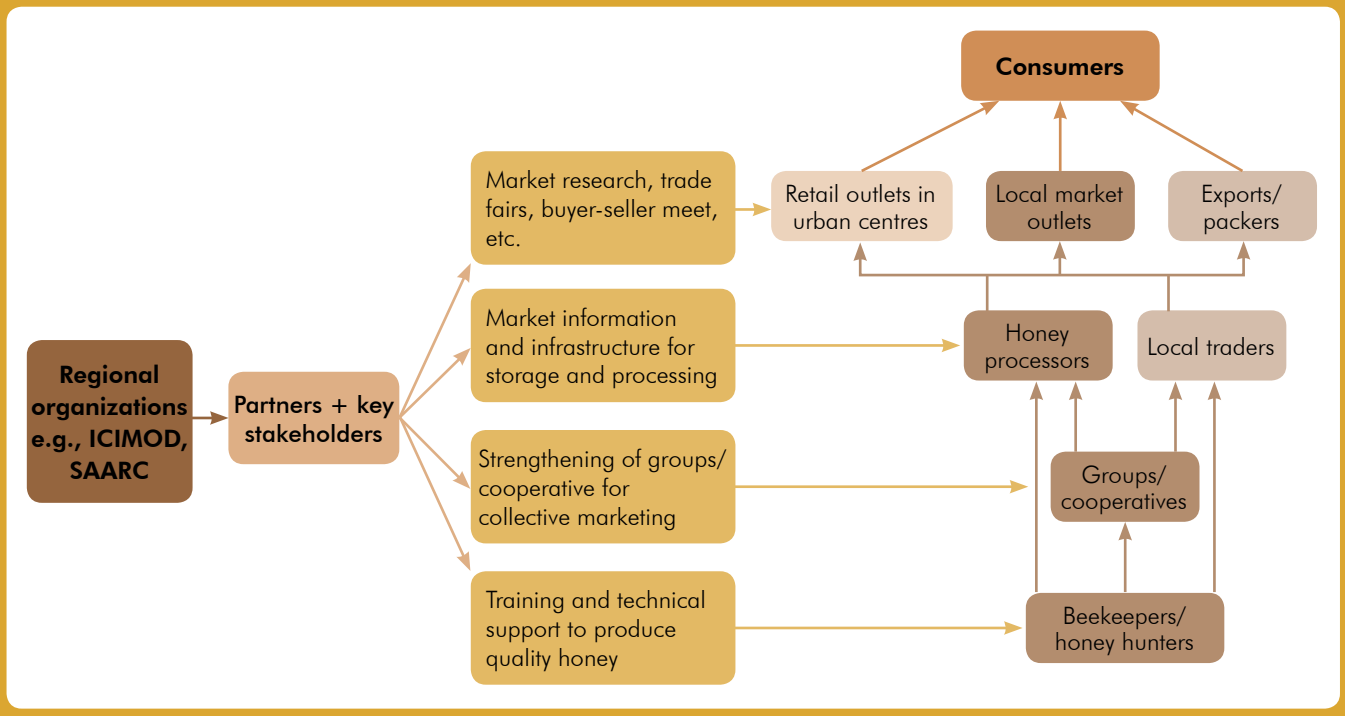
Support and Technical Assistance

Development agencies should support technology development, market research, and capacity building to develop the honey trade in the HKH region. The governments of HKH countries should also provide technical assistance and financial incentives to beekeepers and honey entrepreneurs to adopt procedures like good manufacturing practices (GMP, HACCP, and GLOBALG.A.P.) and other internationally recognized quality control systems for honey production.

Support is also needed to build the capacity of honey value chain actors to maintain record keeping systems, form cooperatives, and strengthen business linkages. Apiculture extension agents should be trained and assigned to inform beekeepers and honey processors about quantity, price, and demand as well as to provide advice on good beekeeping, honey harvesting, and processing techniques and practices.

Regional organizations like ICIMOD can facilitate and provide a platform for value chain actors, supporters, and enablers to discuss issues and clarify roles (Figure 12). The partner agencies of ICIMOD's beekeeping programme provide a regional network to support national authorities, including sanitary and phytosanitary national enquiry points, Codex national committees, and World Trade Organization focal points to review country policies and formulate acts, regulations, and standards.

Figure 12: **Potential role of different organizations in facilitating trade in honey**



Cooperation Among Honey Value Chain Actors

Honey experts, professionals, and institutions at regional and country levels should establish forums to share knowledge on all aspects of honey production and trade and to lobby for producer and trader interests. These forums could lobby, for example, for the revision of EU standards to include a definition of honey that does not exclude products from indigenous HKH honeybees. They could similarly lobby the European Union, the Codex Alimentarius Commission, and national authorities to set quality parameters that recognize that honey from wild *Apis dorsata*, *Apis florea*, and *Apis laboriosa* has naturally higher moisture content than beehive honey, and that *Apis dorsata* honey has higher levels of hydroxymethylfurfural (HMF).

Beekeepers and honey hunters should organize into groups or cooperatives and establish honey collection centres to make large volumes of honey available in one place, thus encouraging traders to invest in travelling to more remote areas. The Beekeepers Association of Bhutan (BEKAB) is successfully implementing such a model.

Increasing Honey Consumption and Market Expansion

Markets can be expanded by:

- raising consumer awareness in domestic markets about the benefits of honey by organizing trade fairs, honey festivals, and honey tasting events, and by disseminating promotional materials about honey;
- developing market strategies for specific types of high value honey, such as chuiri honey produced by small-scale *Apis cerana* beekeepers in western Nepal; and
- investigating international niche markets such as organic and fair trade honey by branding honey and providing documented proof about its characteristics.

Information Sharing

Government agencies and research institutes and universities within countries and across the region should collaborate more closely to facilitate the exchange of information and data. This is especially needed to identify and assess the economic, social, and environmental impacts of non-tariff measures, to determine whether non-tariff measures are legitimate under World Trade Organization provisions, to help conduct political negotiations with importing countries, and to help establish bilateral agreements to address conflicts over non-tariff measures. A regional-level database of all legislation related to exporting honey to international markets would be extremely useful.

In addition, a market information system on the honey trade in the HKH region is needed to provide information on price, demand-supply conditions, and other critical current issues affecting the production and sale of honey.

Promotion of Organic Honey Production, Certification, and Trade

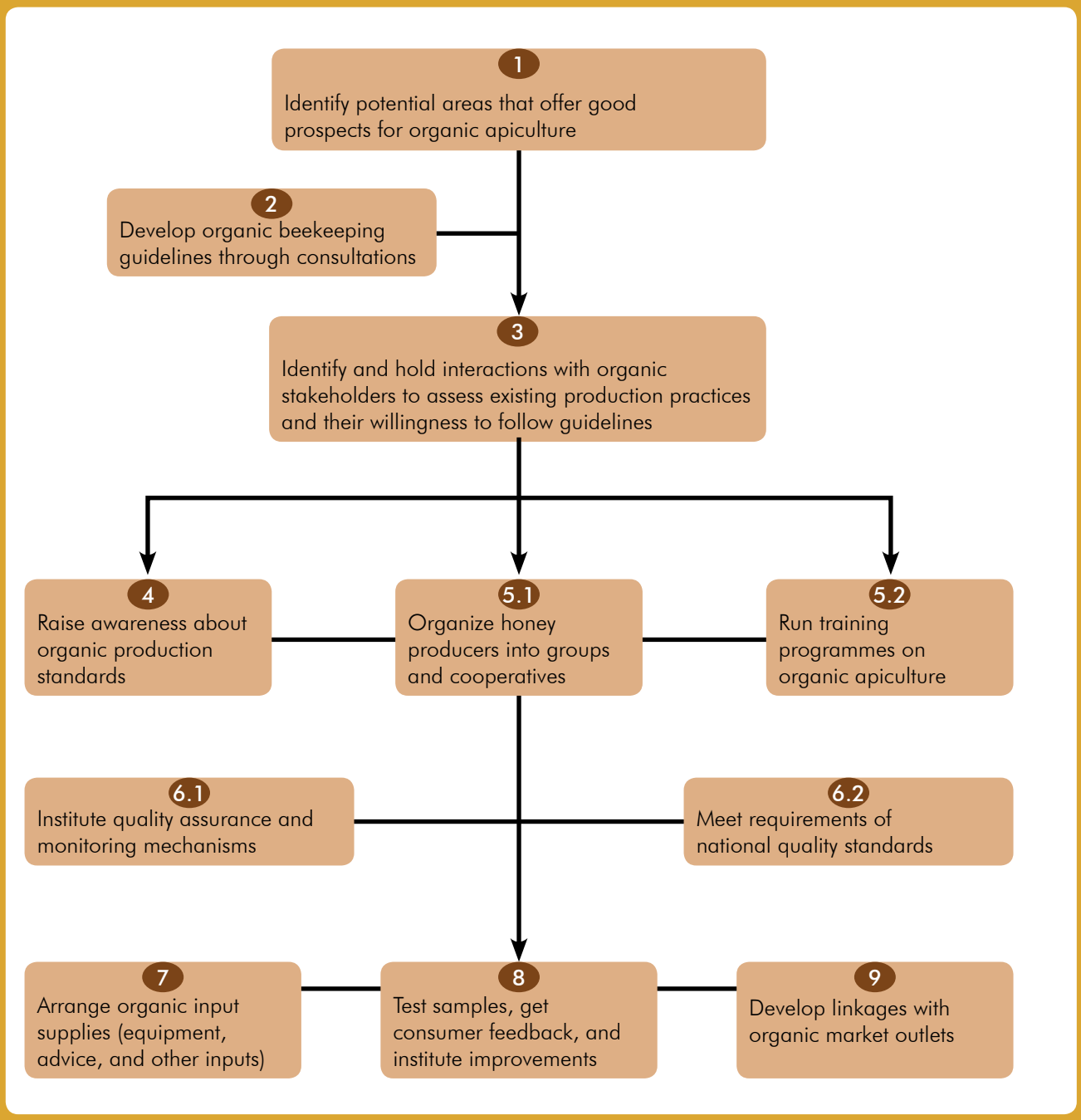
The HKH region has good potential for development of the organic honey trade; some recommendations for its development are given in Figure 13.

As there are fewer non-tariff barriers to the honey trade within the HKH region, organic honey traders should direct their efforts towards domestic and regional markets as the volume of certified organic honey in the HKH region is small while demand is growing locally.

The countries of the HKH region should explore establishing common standards, quality parameters, and a regional trademark for HKH organic honey

Proactively reaching consumers with attractive packaging helps expand markets

Figure 13: **Steps for promoting domestic organic honey production, quality control, and trade in the HKH**



and honey gathered from indigenous wild honeybee species. The early stages of development of the organic honey trade in the HKH region should focus on alternative assessment procedures such as participatory guarantee systems, group guarantees, and codes of conduct. Governments should facilitate training programmes for beekeeper groups and cooperatives to establish internal control systems and train national inspectors to inspect honey produced organically for certification purposes. Organic farming and apiculture extension services should be developed, and simple guidelines should be produced for organic honey producers and processors.

The smaller countries of the region could coordinate with India's National Programme for Organic Production (NPOP) and private sector organizations (laboratories and certifying bodies) for organic standard testing and certification.

1. Identify areas that offer the best prospects for organic honey production for being rich in honeybees, having a tradition of beekeeping, having little use of chemical fertilizers and pesticides, and for being unpolluted.
2. Develop organic beekeeping and organic honey production guidelines and standards in line with local conditions and requirements of the honey trade through consultations between national organic programmes, certifying agencies, and other stakeholders.
3. Identify organic honey producers, honey hunters, traders, distributors, and input providers and assess their willingness to follow guidelines for organic honey production and handling, and assess their existing practices.
4. Conduct awareness-raising campaigns for producers, honey hunters, traders, distributors, and input providers on food safety, hygiene, and the benefits of organic production.
5. Form groups and build capacity: Organize honey producers into groups and cooperatives and train their members on organic honey production, handling, and packaging. The formation of groups and cooperatives will also increase the bargaining power of small producers and enable them to meet the demands of large retailers, procure organic inputs in bulk and lobby for their interests. The government and donors should support producers to make the transition to certified organic production by providing grants and loans.
6. Internal quality assurance: Develop internal control systems to assure quality organic honey and to meet standards through consultations between producers, traders, and organic programme professionals. These systems should specify the minimum requirements for colony management, honey harvesting, processing, transport, storage, permitted inputs, production processes, post-harvest handling, packaging, and labelling.

   Note that there are different ways to assure quality and get it certified. For domestic and regional markets, it may not be necessary to get products certified by third parties or internationally accredited bodies. Group certification via internal control systems (participatory guarantee systems) could be adequate and cost effective for small farmers (Thimmaiah 2007). Such systems should accommodate farmers with limited literacy to process paperwork for certification. Bhutan is developing such a system (DoA Bhutan 2007).
7. Forge links between organic honey producers and input suppliers to ensure that inputs meet organic standards.
8. Quality assurance: Carry out the chemical and physical analysis of honey to certify it meets standards and tolerances and to assure consumers that it is genuinely organic.
9. Develop partnerships between producers and traders and retailers as follows:
   - Motivate traders and retailers to sell organic honey by taking them on visits to organic apiaries and providing them with information and trial amounts of organic honey.
   - Facilitate dialogues between buyers and producers for channelling feedback from consumers to producers.
   - Link organic producers and buyers (mainly supermarkets, hotels, and restaurants) in formal contracts or buyback agreements.

Consumer education and awareness is important to develop organic sales as most consumers in the HKH region are reluctant to pay premium prices for organic produce as they do not realize the environmental and health benefits of organic farming.

Governments and development agencies should support producers, especially small beekeepers and honey gatherers, to comply with organic standards and to get their products certified. ICIMOD and its partner institutions in the eight HKH countries could play a pivotal role in disseminating information, knowledge, and technologies for organic honey production.

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Annexes

Annex 1: **Sources of Information on Honey Standards and Import Requirements**

Type of information	Website
Import requirements of European Union countries	http://exporthelp.europa.eu
A database of European Union legislation	http://eur-lex.europa.eu/RECH_mot.do
Detailed information on the requirements of the honey trade in and to the European Union	http://ec.europa.eu/food www.eurlex.europa.eu http://exporthelp.europa.eu
Standards of the Codex Alimentarius Commission	www.codexalimentarius.org
Detailed information on legislative and non-legislative requirements of the trade in products of animal origin including honey. The database of the Centre for the Promotion of Imports from Developing Countries (CBI)	www.cbi.eu/marketinfo
The Animal and Plant Health Inspection Service (APHIS) and the Food and Drug Administration (FDA)	www.aphis.usda.gov
GLOBALG.A.P. standards	www.globalgap.org
International Organization for Standardization (ISO) certification schemes and information on traceability systems	www.iso.org
The Agricultural and Processed Food Products Export Development Authority (APEDA) of the Government of India	www.apeda.gov.in
The International Federation for Organic Agriculture Movements (IFOAM)	www.ifoam.org
Information on Fair Trade and Fairtrade certification:	www.fairtrade.net www.flo-cert.net

Annex 2: **Procedures for Importing Products of Animal Origin, Including Honey into the European Union**

This is an abridged version of EC (2006)

1) The national authority submits a formal request for approval including the following information.
   a) Type of animal/product for which approval is sought
   b) Anticipated volume of trade and main importing countries
   c) Class of animals involved
   d) Description of minimum treatment (heat, maturation, acidification, etc.) applied to the products
   e) Number and type of establishments considered to meet European Union requirements

It should also include confirmation that all establishments proposed satisfy European Union requirements. References to the appropriate European Union legislation must be given.

2) Commission acknowledges request and sends relevant pre-mission questionnaire.
3) National authority submits completed questionnaire, with proposed residue monitoring programme for approval, and with copies of national legislation applicable to the animals/products concerned.
4) Bilateral contacts between the national authorities and the Commission to resolve outstanding issues.
5) If the Commission is satisfied with the information provided, an on-the-spot inspection is organized by the farm verified organic (FVO) team.
6) Following completion of the farm verified organic inspection, a copy of its report is sent to the national authorities, the relevant Commission services, the European Parliament, and the Member States.
7) If the outcome of the mission is satisfactory, and all other outstanding issues have been resolved, the Commission prepares the draft legislation:
   a) to add the third country to the list of third countries from which imports of the animal/product are approved;
   b) to draw up if necessary animal health certification based on the country or part of the country's health situation to accompany imports;
   c) to approve the residue monitoring programme; and
   d) to set up an initial list of approved establishments.
8) The proposed legislative texts are adopted by the Commission and published in the official Journal, after a favourable opinion of the Standing Committee on the Food Chain and Animal Health has been received.
9) If an implementation date is not specified in the legislative text then it will be the date of official notification of the text by the Commission to Member States.

Annex 3: **European Union Directives and Regulations on Monitoring Residues in Honey**

Decisions and regulations	Issue
EEC Regulation 2377/90 (26 June 1990)	Laid down a procedure for establishing residue limits of veterinary medicinal products in foodstuffs of animal origin
Council Directive 96/93/EC (17 December 1996)	Concerning the certification of animals and animal products
Council Directive 2002/99/EC (16 December 2002)	Laid down the animal health rules governing the production, processing, distribution, and introduction of products of animal origin for human consumption
EC Decision 2003/881/EC (11 December 2003)	Concerning animal health and certification conditions for imports of bees (*Apis mellifera* and *Bombus* spp.) from certain third countries, and repealed Decision 2000/462/EC
EC Decision 2004/432/EC (29 April 2004)	The approval of residue monitoring plans submitted by third countries in accordance with Council Directive 96/23/EC
EC Regulation 852/2004 (29 April 2004) and amending Regulations (EC) 853/2004 and 854/2004	Foodstuff hygiene
EC Regulation 853/2004 (29 April 2004)	Laid down specific hygiene rules for food of animal origin
EC Regulation 882/2004 (29 April 2004)	Concerning official controls performed to ensure verification of compliance with feed and food law, animal health, and animal welfare
EC Regulation 2076/2005 (5 December 2005)	Laid down transitional measures for implementation of Regulations (EC) 853/2004, (EC) 854/2004 and (EC) 882/2004 of the European Parliament and the Council and amending Regulations (EC) 853/2004 and (EC) 854/2004
EC Regulation 333/2007 (28 March 2007)	Laid down the methods of sampling and analysis for the official control of levels of lead, cadmium, mercury, inorganic tin, 3-MCPD, and benzo(a) pyrene in foodstuffs

Annex 4: **Substances to be Monitored for Residues in Honey for Consumption in the European Union**

As defined in Decision 2001/159/EC and modified in 2001/487/EC

Compounds	Quantification limit in ppb (parts per billion)	European Union maximum residue limits
Drugs		
a) Chloramphenicol*	0.3	Absent
b) Nitrofurans** Furazolidone [AOZ] Furatadone [AMOZ] Nitrofurantoin [AHD] Nitrofurazone [SEM]	1.0	Absent
c) Sulphonamides Sulfadimidine Sulfadiazine Sulfadimethoxine Sulfadoxine Sulfamerazine Sulfanilamide Sulfamethoxypyridazine Sulfamethoxazol Sulfathiazol Trimethoprim	10	Absent
d) Streptomycin	10	10 (when used as a pesticide) Absent (when used as an antibiotic)
e) Tetracyclines Tetracyclin Oxytetracyclin Chlortetracyclin Doxycyclin	10	Absent
f) Tylosin	10	Absent
Organochlorine compounds incl. PCBs (polychlorinated biphenyls)	10	
Organophosphorus compounds	10	
Pyrethroids Cyfluthrin Cypermethrin Deltamethrin Permethrin Fenvalerate Fluvalinate Cyhalothrin	10	
Carbamates	10	
Miscellaneous Coumaphos Cymiazol Amitraz Brompropylate	 10 10 20 10	 100 Absent 200 100
Heavy metals Lead Iron Cadmium Mercury Arsenic Zinc	 5 50 20 20 20 100	Absent

Minimum required performance limit (MRPL)
* Chloramphenicol 0.3 ppb
** Nitrofurans 1 ppb for all

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