CANADIAN BEEKEEPING EQUIPMENT

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Export potential of beekeeping equipment “kits” composed of low cost hive tools, smokers, bee brushes, queen excluders, and Varroa mite strips; benefits to both rural communities in Nepal and the Canadian economy

Part I: Product Information

Apiculture

Apiculture, or the keeping of honeybees, is an area of agriculture concerned with the production of honey, beeswax, royal jelly, and other bee-manufactured goods (Blackiston, 2009). From international commercial operations to backyard bee-keeping, apiculture is practiced all over the world and provides millions of people with a source of income. Honeybee-manufactured products such as honey, propolis, and royal jelly are rich in nutrients and beeswax has both cosmetic and medicinal uses (Blackiston, 2009). With the proper tools to manage a simple apiary operation, families in developing countries such as Nepal could vastly improve their livelihoods in many ways (Partap and Verma 1998).

Honeybee Biology

Honeybees are members of the genus *Apis*, and are generally characterized by their capability to survive solely off of nectar and pollen (Mace, 1976). Honeybees utilize flower nectar in many ways; it can be used as in instant energy source, stored as honey for later consumption, and converted into beeswax for use as a structural material (McKay, 2011).

i. Honeybee Castes

Honeybees are social insects and live in hive settings. Within a hive, different castes have different responsibilities to ensure the success of the hive (Blackiston, 2009). The Queen is the largest and most important bee in the hive; her sole purpose is to procreate (Blackiston, 2009). Worker bees are by far the most numerous caste in a hive and carry out many functions, such as foraging, nursing, building, and feeding the Queen (Blackiston, 2009). Drones are male bees, and serve no purpose other than to mate with the Queen and ensure genetic diversity of the brood (Blackiston, 2009).

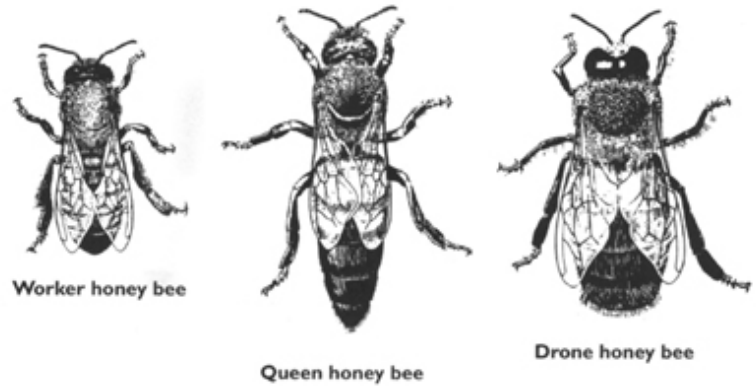


Figure 1: Honeybee caste body types/sizes (https://honeybeenet.gsfc.nasa.gov, 2016).

ii. Foraging and Honey Production

Foraging worker bees make up 98% of the hive population; all are sterile females who have already completed other worker duties such as nursing and building (Guring *et. al,* 2012). Forager bees cover vast areas of land each day, using their specialized tube-like tongues called proboscis to extract nectar from flowers. Nectar is stored in the crop (honey stomach) until the forager returns to the hive where it is passed from the mouth of one bee to another; a process which creates honey through gradual evaporation (McKay, 2011). The honey can then be used as a source of instant energy or stored in honey cells for later consumption (McKay, 2011).

Relevant Honeybee Species

There are many species of honeybee in the world, however, for the purpose of this report only the species which are relevant to the Canadian and Nepali apiculture industries will be discussed.

i. Apis mellifera

Apis mellifera (A. mellifera), commonly known as the European honeybee, is the honeybee species used in commercial honey production operations all over the world (Sharma and Gupta, 2014). *A. mellifera* is the most productive of the domesticated honeybee species and has many favorable qualities; such as lack of swarming/absconding behavior and mild temperament.

ii. Apis cerana

Apis cerana (A. cerana), commonly known as the Asian honeybee, is the only domesticated native honeybee species in Nepal (Gurung *et al.,* 2012). The keeping of *A. cerana* has been practiced for over 2000 years in the Hindu-Kush Himalayan region and is a traditional household activity for many families in rural Nepal (Verma, 1990). When kept in conventional hollow log hives, *A. Cerana* produces an average yield of 4-6 kg/colony/year (Verma, 1990). Yields from properly managed colonies kept in modern moveable frame hives are much higher; progressive beekeepers can produce an average of 25 kg/colony/year (Verma, 1990) and yields of 50 kg/colony/year have been reported in the Kashmir region of India (Sharma and Gupta, 2014).

iii. Apis laboriosa

Apis laboriosa (A. laboriosa) is the largest species of honeybee in the world (Gurung *et al.* 2012). *A. laboriosa* nests on steep cliffs at high altitudes in the Himalayan mountains (Roubik *et al.* 1985). A wild species, *A. laboriosa* honey must be gathered by honey hunters; a destructive yet worthwhile endeavor as *A. laboriosa* colonies have a honey yield of, on average, 45 kg/colony/year (Sharma and Gupta, 2014).

iv. Apis dorsata

Apis dorsata (A. dorsata) is another species of giant wild honeybee in Nepal, however, it resides at much lower altitudes than *A. laboriosa* (Roubik *et al.* 1985). *A. dorsata* colonies reside in trees and also produce large yields of honey, making them prime targets for honey hunters (Sharma and Gupta, 2014).

Product Descriptions

The beekeeping equipment kit is composed of five basic products that are essential to both commercial and small-scale beekeeping operations. These products are accessory products used to manage modern moveable frame hives (Langstroth hives); they are basic, cheap, and easy to use.

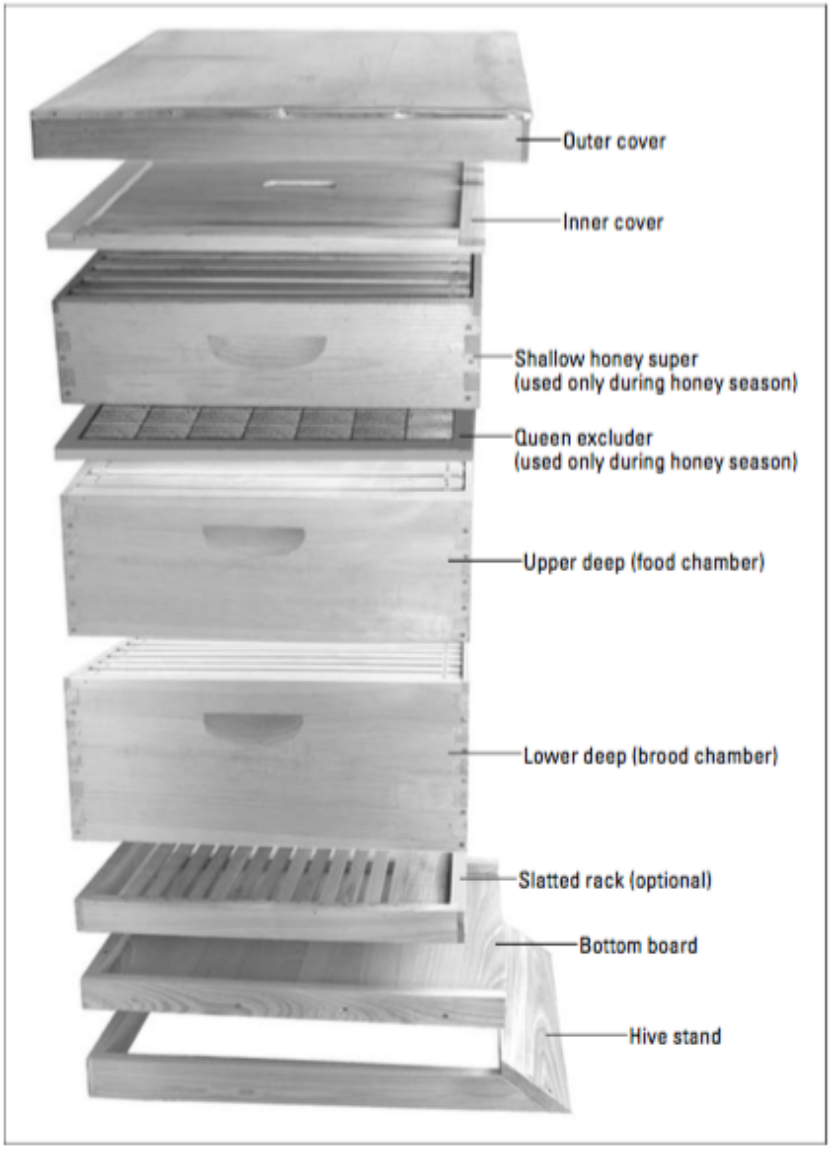


Figure 2: A modern, moveable frame Langstroth hive (Blackiston, 2009).

i. Queen Excluder

Queen excluders are rectangular shaped perforated grids that are placed in a moveable frame hive, creating a barrier between the deep food chamber and the supers (Blackiston, 2009). Queen excluder grids can be made from metal or plastic, and the small size of the slots prevents the Queen from accessing and laying eggs in the honey super (Mace, 1976). Without use of a Queen excluder, honey cells may be used as brood chambers, lessening the space available for honey storage and spoiling the clarity of preexisting honey (Blackiston, 2009).

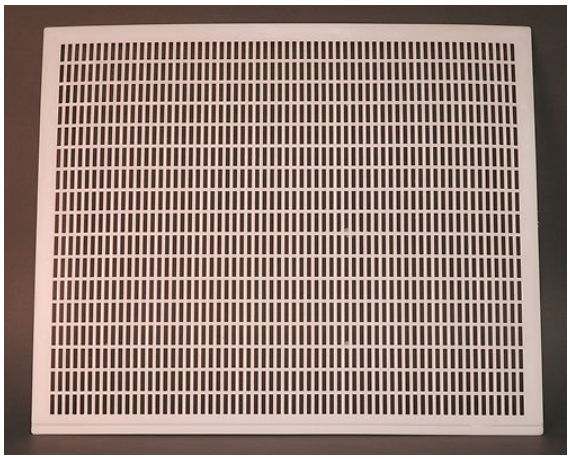


Figure 3: BeeMaid plastic queen excluder (BeeStore, 2016)

ii. Hive Tool

Hive tools are the most basic, yet most important tool used in hive management (Robert Dickson, personal communication, October 2016). Resembling a screwdriver/lever, a hive tool is used to open the hive, pry off frames/supers for inspection and scrape honey/propolis (Thompson, 2016).

Hive tools are usually between 7 and 10 inches in length and are made from stainless steel or other metals (Thompson, 2016).

Figure 4: 8 inch and 10 inch BeeMaid hive tools (BeeStore, 2016)

iii. Bee Brush

The bee brush is another very basic yet important tool. The bee brush is simply a brush with long soft bristles that is used to gently sweep bees out of the way while manipulating the hive (Blackiston, 2009).

Figure 5: BeeMaid bee brush (BeeStore, 2016)

iv. Smoker

The smoker is essentially a fire chamber with bellows attached that produced cool smoke (Blackiston, 2016). Smoke encourages bees to leave the hive, allowing safe access for the keeper (Gurung *et al.* 2012). The smoker also "calms" bees by causing them to gorge on honey, lessening their stinging abilities (Gurung *et al.*, 2012).

Figure 6: BeeMaid Pro-Bellow smoker (BeeStore, 2016).

v. Mite-Away Quick Strips™

Mite-Away Quick Strips™ are sticky gel strips coated with formic acid; a fumigant which kills Varroa mites (Robert Dickson, personal communication, October 2016). Varroa mites are parasites which feed on the haemolymph of immature and mature honeybees (Crane, 1978, Navajas *et al.,* 2010). Varroa mites breed in brood caps (where honeybee pupae/larvae reside), and the formic acid fumigant on Mite-Away Quick Strips™ can penetrate the brood cap and kill the mites without causing harm to the bee (Mite-Away Quick Strips™, 2016).

Figure 7: Mite-Away Quick Strips™ (http://nodglobal.com/mite-away-quick-strips/, 2016)

BeeMaid

BeeMaid is a Canadian Co-Operative company which was formed in 1954 when the Saskatchewan Honey Co-Operative and the Manitoba Honey Co-Operative merged operations (Company History 2016). In 1961, the Alberta Honey Co-Operative joined and BeeMaid as it is known today was created (Company History 2016). In addition to selling their owner produced honey products, BeeMaid sells a wide variety of beekeeping tools (BeeMaid Honey E-Store 2016). BeeMaid retails, on its website, all of the products included in the equipment kit except for the Mite-Away Quick Strips™. However, NOD (Nature's Own Design) Apiary Products, the company with the patent rights for Mite-Away Quick Strips™ lists BeeMaid as a distributer, and special orders can be placed and fulfilled through BeeMaid (Distributers Canada, 2016).

i. BeeMaid Product Pricing

Note: BeeMaid sells plastic queen excluders for CAD $4.95 per unit until an order of 50 units is placed; then, queen excluders are sold for CAD $4.55 per unit. For the purpose of the creation of this kit, we will base all further calculations on the assumption that a total of 50 kits will be created.

BeeMaid sells four out of the five products in the equipment kit directly from their online BeeStore. Plastic queen excluders are sold for $4.55 CAD when 50 or more are bought. Hive tools are sold for $7.95 CAD, bee brushes are sold for $4.95 CAD, and smokers are sold for $45.95 CAD (BeeMaid BeeStore, 2016). Mite-Away Quick Strips™ are not sold from the BeeStore, but BeeMaid is a distributor and special orders can be made. Mite-Away Quick Strips™ are sold for $49.95 CAD per box; there are 10 strips in each box (Distributers Canada, 2016).

Table 1: Price per 50/units of product (($CAD & NPR) and total price of 50 kits ($CAD & NPR) before tax and shipping

Price (50 units)	**$CAD**	**NPR**
Queen Excluder	$227.50	18,293
Hive Tool	$397.50	31,962
Bee Brush	$247.50	19,901
Smoker	$2,297.50	184,737
Mite-Away Quick Strips (10 doses/unit)	$2,497.50	200,819
TOTAL	**$5,667.50**	**283,375**

The equipment kit is cheapest when 50 kits are produced. If 50 “entities” (villages, families, individuals) ordered an equipment kit, the total cost before tax and shipping would be 283,375 Nepalese Rupees. This is quite expensive, but the price paid by each village/family/individual is quite affordable.

The price paid by one entity for a single kit is $113.35 CAD, or 9,114 Nepalese Rupees. For most individuals/families in rural Nepal, this is still a large amount of money. Therefore, these kits would be well suited for use in a communal beekeeping operation in which multiple families share ownership and operation of an apiary.

Table 2: Price per product ($CAD & NPR) and total price of one kit ($CAD & NPR) before tax and shipping

Price (1 unit)	**$CAD**	**NPR**
Queen Excluder	$4.55	366
Hive Tool	$7.95	639
Bee Brush	$4.95	398
Smoker	$45.95	3,695
Mite-Away Quick Strips (TM) (10 doses/unit)	$49.95	4,016
TOTAL	**$113.35**	**9,114**

Part II: Export Potential to Nepal

Nepal Agriculture & Economics

Nepal is a small and geographically diverse country located in Asia. Nepal consists of three main topological regions; the Himalayan mountain range (34% of area), the mid hills (44% of area) and the terrai plains (21% of area) (Devkota and Upadhyay, 2013). Each of these regions has adapted to specialize in different agricultural sectors; the terrai plains, for example, are well suited for growing a wide variety of crops whereas animal husbandry is more common in the Himalayas (Devkota and Upadhyay, 2013). Overall, the agricultural industry in Nepal accounts for 70% of jobs and 1/3 of national production/exports (Devkota and Upadhyay, 2013).

i. Poverty in the Hindu-Kush-Himalayan Region

World DataBank figures from 2011 show Nepal as having a poverty headcount ratio (at US $1.90) of 14.99; that is, 14.99% of Nepal's population lives on less than US $1.90 per day (World DataBank 2016). Availability of food per person per year is 218 kg in the Himalayas, 264 kg in the mid hills (where urban centers such as Kathmandu are located) and 257 kg in the terrai plains (Devkota and Upadhyay, 2013).

Small villages in the Himalayan mountains are most affected; it is estimated that every second to fourth household in the Hindu-Kush-Himalayan regions of Nepal lives in a constant state of poverty and malnutrition (Gerlitz *et al.* 2015). Mountainous areas are characterized as being inaccessible (difficult for trade, healthcare, and education) and economically/climatically/geographically fragile; natural resources are scarce and food production is difficult (Gentle and Maraseni, 2012).

ii. Subsistence Farming

Subsistence farming is any farming operation in which 100% of the foodstuffs produced are directly used for consumption by the farmer and his/her family. In contrast, commercial agriculture is the production of food for trade. While commercial agriculture operations are generally very large in terms of livestock populations and/or farmable land, subsistence agriculture operations usually consist of two hectares or less of land and a small population (if any) of livestock. In the HKH region of Nepal, 80% of the population practices subsistence farming, and 90% of that population holds less than one hectare of cultivatable land (Devkota and Upadhyay, 2013).

Limited land ownership puts subsistence farmers in a tough situation; a failed crop could mean starvation (Gentle and Marasemi, 2012). Climatic uncertainty due to global warming is predicted to cause a 3% - 16% decline in agricultural productivity by 2080, and poor households are especially vulnerable (Aase *et al.* 2010). It is therefore imperative that subsistence farming households learn new ways to ensure food security (Gentle and Maraseni, 2012).

Beekeeping in the Hindu-Kush-Himalayan Region of Nepal

Apis cerana (*A. cerana)* is the most common domesticated honeybee species kept in the Himalayan region of Nepal (Matsuka *et al.* 1998). Many keepers lack modern hives and equipment, instead keeping colonies in hollow-log hives and using sticks/rocks/handmade tools to manipulate the hives and extract honey (Partap and Verma, 1998). Honey yields are therefore low, usually between 1 kg – 6 kg per colony/per year (Partap and Verma, 1998).

The introduction of the European honeybee, *A. mellifera* seemed initially to benefit Nepalese beekeepers by producing larger yields of honey; however, with proper management and equipment, *A. cerana* can produce just as much honey and has many merits as a native species (Sharma and Gupta, 2014).

Table 7.1 Comparative merits of *Apis cerana* beekeeping over *Apis mellifera*

Parameters	*Apis cerana* (native bee)	*Apis mellifera* (exotic bee)
Adaptability to ecological conditions	Well adapted	Less adapted
Initial investment	Very low	High
Colony management costs	Negligible	High
Risk involved	Low	High
Potential of stationary beekeeping	Highly suitable	Not suitable
Scale of beekeeping	Profitable even when operated at a small scale. It is most suitable for poor beekeepers operating in remote mountain areas	Profitable only when operated at commercial scale. It is most appropriate for commercial farmers from accessible areas
Pollination value in mountain crops	More efficient	Less suitable, colony strengths low during early in the season
Indigenous knowledge	Exists	Nil
Susceptibility to enemies and diseases	Resistant	Susceptible
Eco-services	High	Low
Opportunities for the genetic improvement	The variety of geographical races/ populations of *A. cerana* that exists in south and Southeast Asia provides excellent opportunities for the genetic improvement of this native species through selective breeding	Low
Adaptability to wide range of temperatures	Tolerate a wide range of temperatures – from 5 to 45 °C. Work well at low temperatures	Less

Figure 8: *A. cerana vs. A. mellifera* kept in HKH region (Sharma and Gupta, 2014)

Apis cerana is undoubtedly the best suited species for beekeeping in the HKH region of Nepal; proper management techniques combined with the tools provided in the Canadian beekeeping equipment kit could ensure that keeping *A. cerana* would benefit beekeepers and their families in many ways.

Benefits

i. Income Benefits

Apiculture operations are a useful endeavor for families living in poverty because they require little investment, minimal infrastructure, and do not require land (Verma, 1990). Furthermore, apiculture operations generally yield a profit within a year of startup (Gurung *et al.* 2012). Honeybees generate numerous products that can be sold as a source of income, including honey, beeswax, royal jelly, and pollen (Verma, 1990). Honey and royal jelly are sold for their nutritional value and are both products that are usually in high demand in Nepal (Gurung *et al.* 2012). Beeswax is an important product gained from beekeeping as well; traditional uses for beeswax in Nepal are candle-making and casting for the manufacture of "kaso", high quality brass cooking pots (Saville in Matsuka *et al.*, 1998). Beeswax can also be used to create cosmetics such as skin/lip chap, both of which greatly benefit the health of people living at high altitudes (Saville in Matsuka *et al.* 1998).

ii. Social Benefits

An important benefit of small-scale beekeeping in the HKH region is that women can contribute to the operation (Verma, 1990). In the HKH region, women are the most underprivileged socioeconomic group (12.5% literacy rate) and are usually completely reliant on their husbands and children to provide them with income, food, and housing (Verma, 1992). Beekeeping is a decent position for women because the work is light and close to home (Verma, 1990). Illiterate women can still learn how to keep bees and can be successful at managing all facets of hive operations (Verma 1990).

iii. Environmental Benefits

For centuries, the wild honeybee species *A. dorsata and A. laboriosa* have been exploited for their honey (Sharma and Gupta, 2014). Since these species are large and aggressive, domestication is thought to be impossible and inhabitants of the HKH region have engaged in "honey hunting" as a means to attain their honey (Sharma and Gupta, 2014). Both *A. dorsata and A. laboriosa* produce large quantities of honey each year; on average, a colony can easily produce 45 kg (Sharma and Gupta, 2014). Honey hunting usually results in complete destruction of the hive, as hunters have to dislodge the hives from cliffs/trees in order to gain access to combs (Segur, 2011). It is estimated that between 40% and 50% of wild honeybee colonies are lost each year due to honey hunting, contributing largely to the decline in global honeybee populations (Sharma and Gupta, 2014). If proper management and equipment could lead to *A. cerana* producing yields as large as those produced by these wild species, the economic need for honey hunting would decline, potentially leading to a rise in wild honeybee populations.

iv. Benefits to other Agricultural Sectors

Honeybees, specifically *A. cerana* are especially well suited for the pollination of agricultural and horticultural crops grown in the HKH region of Nepal (Devkota *et al.,* 2016). An increase in *A. cerana* populations would have beneficial effects on native flora and cultivated crops in the area (Verma, 1990). *A. cerana* has a comparative advantage when it comes to pollinating the agricultural crops usually grown in the HKH region; large healthy *A. cerana* populations would lead to an increase in the yield of crops such as rapeseed, amaranth, broomgrass, and millet (Devkota *et al.,* 2016). The relationship between apiculture and cultivation is a mutually beneficial one, and the keeping of *A. cerana* would improve yields and quality of many mountain crops (Gurung *et al.*, 2012).

Part III: Unknowns and Recommendations

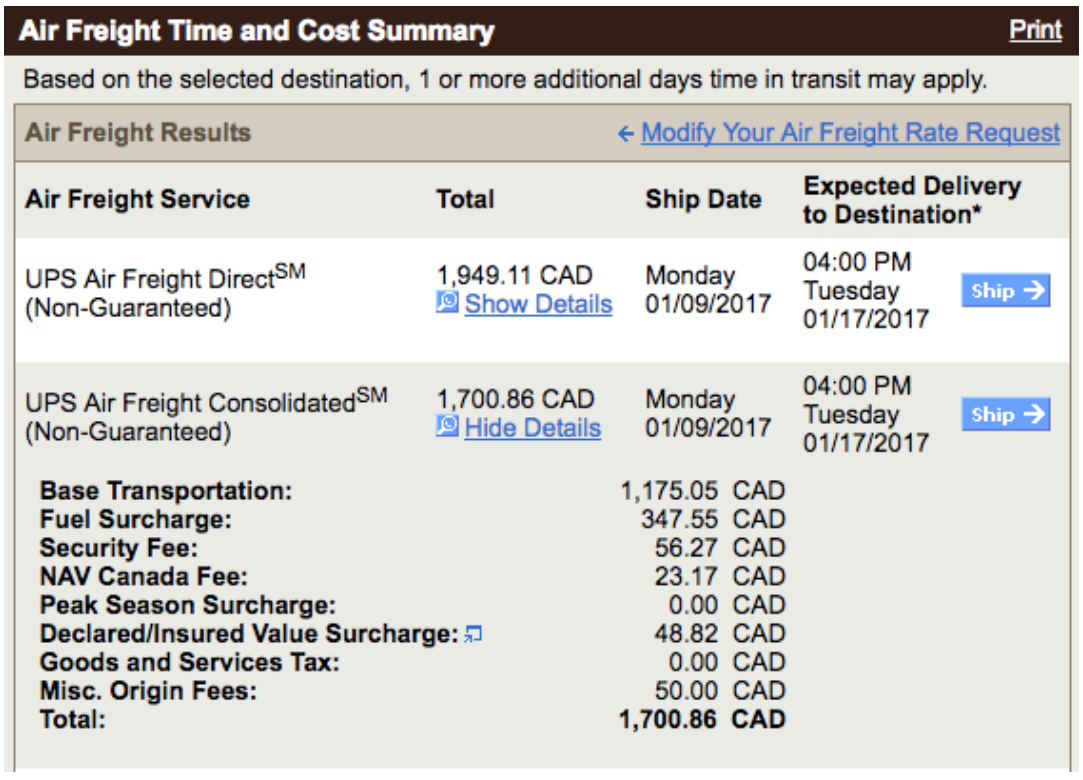
Contacts in Nepal

At this point, there has been no contact with anyone in Nepal regarding the beekeeping equipment kits. Further steps would include connecting with interested persons in Nepal – a prospective contact could be ICIMOD (International Centre for Integrated Mountain Development), an organization based in Kathmandu which provides knowledge and agricultural training to rural mountain communities in the HKH region.

Transportation

i. Canada to Nepal

Transportation logistics of the beekeeping equipment kits from Canada to Nepal have not yet been determined. A phone meeting with BeeMaid's Spruce Grove warehouse director was arranged but cancelled due to unforeseen circumstances. This meeting could be easily rescheduled if interest in the equipment kits ensued. A rough cost estimate based on the total shipping weight and total insured value of 50 equipment kits was determined on the UPS international website. The transportation path was from Spruce Grove, Alberta to Kathmandu, Nepal.



Air Freight Time and Cost Summary Print

Based on the selected destination, 1 or more additional days time in transit may apply.

Air Freight Results ← Modify Your Air Freight Rate Request

Air Freight Service	Total	Ship Date	Expected Delivery to Destination*	
UPS Air Freight Direct℠ (Non-Guaranteed)	1,949.11 CAD Show Details	Monday 01/09/2017	04:00 PM Tuesday 01/17/2017	Ship →
UPS Air Freight Consolidated℠ (Non-Guaranteed)	1,700.86 CAD Hide Details	Monday 01/09/2017	04:00 PM Tuesday 01/17/2017	Ship →

Base Transportation:	1,175.05 CAD
Fuel Surcharge:	347.55 CAD
Security Fee:	56.27 CAD
NAV Canada Fee:	23.17 CAD
Peak Season Surcharge:	0.00 CAD
Declared/Insured Value Surcharge:	48.82 CAD
Goods and Services Tax:	0.00 CAD
Misc. Origin Fees:	50.00 CAD
Total:	**1,700.86 CAD**

Figure 9: Estimated air freight costs for 50 beekeeping equipment kits (UPS, 2016).

ii. Kathmandu to HKH region villages

Transportation logistics for this portion of the journey have not been determined. This would have to be discussed with BeeMaid representatives as well as personnel in Nepal.

Competition

It is likely that similar or identical products exist in China and can be produced and shipped at a lower price. Cost and quality comparisons should be made to determine whether or not the beekeeping equipment kit (when composed of BeeMaid products) is a cost efficient product for Nepalese beekeepers.

References

Aase, T.H., Chaudhary, R.P., and Vetaas, O.R. (2010). Farming flexibility and food security under climatic uncertainty: Manang, Nepal Himalaya. *Area*, 2(2), 228-238.

Adgaba, N., Al-ghamdi, A.A., Hailu, M., Shenkute, A.G., Ansari, M.J., Hepburn, H.R. & Radloff, S.E. (2013). Queen excluders enhance honey production in African honey bees, Apis mellifera, by limiting brood rearing during peak nectar flow. *Journal of Apicultural Research,* 52(5), 184-189, DOI: 10.3896/IBRA.1.52.5.02

"Bee Maid Honey E-Store." *Bee Maid Honey*. N.p., 2016. Web. 18 Oct. 2016.

"Company History." *Bee Maid Honey*. N.p., 2016. Web. 18 Oct. 2016.

Crane, E. (1978). The Varroa Mite. *Bee World*, 59(4), 164-167.

Devkota, K., Dhakal, S.C., and Thaba, R.B. (2016). Economcs of beekeeping as pollination management practices adopted by farmers in Chitwan district of Nepal. *Agriculture and Food Security,* 5, 1-6.

Devkota, S., and Upadhyay, M. (2013). Agricultural productivity and poverty reduction in Nepal. *Review of Development Economics*, 17(4), 732-746.

Gentle, P. and Maraseni, T.N. (2012). Climate change, poverty, and livelihoods: adaptation practices by rural mountain communities in Nepal. *Environmental Science and Policy*, 21, 24-34.

Gerlitz, J.Y., Apablaza, M., Hoermann, B., Hunzai, K., and Bennett, L. (2015). A multidimensional poverty measure for the Hindu-Kush-Himalayas, applied to selected districts in Nepal. *Mountain Research and Development*, 35(3), 278-288.

Gurung, M.B., Partap, U., Shrestha, N.C.T.D., Sharma, H.K., Islam, N., and Tamang, N.B. (2012). *Beekeeping training for farmers in the Himalayas: Resource Manual for Trainers.* Kathmandu, ICIMOD.

Mace, H.

McKay, B. (2011). Honey. *Journal of Agricultural & Food Information, 12*(2),130-140.

"Mite Away Quick Strips." *NODGLOBAL*. N.p., 2016. Web. 02 Dec. 2016.

Moniruzzaman, M. and Rahman, M.S. (2009). Prospects of Beekeeping in Bangladesh. *Journal of Bangladeshi Agricultural University,* 7(1), 109-116.

Navajas, M., Anderson, D.L., de Guzman, L.I., Huang, Z.Y., Clement, J., Zhou, J., and Le Conte, Y. (2010). New Asian types of Varroa destructor: a potential new threat for world apiculture. *Adipologie*, 41, 181-193.

Neupane, B.P., Malla, K.P., Kaundinnyayana, A., Poudel, P., Thapa, R., and Shrestha, S. (2015). Antioxidant properties of honey from different altitudes of Nepal Himalayas. *Polish Journal of Food and Nutrition Sciences,* 65(2), 87-91.

Neupane, K. W., Woyke, J., and Wilde, J. (2012). Effect of Initial Strength of Honey Bee Colonies (Apis mellifera) Supered in Different Ways on Maximizing Honey Production in Nepal. *Journal of Apicultural Science, 56*(2), 71-81.

In Matsuka, M., Verma, L.R., Wongsiri, L.R., and Partap, K.K.S.U. (Eds.), ***Asian Bees and Beekeeping: Progress in Research and Development*** **(155-158). Enfield: Science Publishers, Inc.**

Rahut, D.B., Ali, A., Kassie, M., Marenya, P.P., and Basnet, C. (2014). Rural livelihood diversification strategies in Nepal. *Poverty and Public Policy,* 6(3), 259-312.

Roubik, D.W., Sakagami, S.F., and Kudo, I. (1985). A Note of Distribution and Nesting of the Himalayan Honey Bee Apis laboriosa Smith. *Journal of the Kansas Entomological Society,* 58(4), 746-749.

Sanford, M.T. (2006). Honey cooperatives: has their time come? *Bee Culture*, 134(4), 17-19.

Saville, N.M. (1998). Smallscale Beeswax Processing in Remote Western Nepal. In Matsuka, M., Verma, L.R., Wongsiri, L.R., and Partap, K.K.S.U. (Eds.), *Asian Bees and Beekeeping: Progress in Research and Development* (155-158). Enfield: Science Publishers, Inc.

Segur, J. (Producer), & Segur, J. (Director). (2011). *Becoming a Man – Facing the Giant Bees* [Motion Picture]. Canada: Independent.

Thapa, R. (2001). The Himalayan giant honey bee and its role in ecotourism development in Nepal. *Bee World*, 82(3), 139-141.

Thompson, J. (2016). Best Hive Tool? *Bee Culture*, 144(4), 56-58.