

Indigenous Beekeeping Techniques in Dadeldhura, Nepal

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Dadeldhura in far western Nepal is rich in bee flora and has good potential for beekeeping. According to a 1994 marketing survey, its annual honey production is 3600 kg under traditional management which is relatively high for this region of Nepal (NoFrills Consultants, 1994). The present study was carried out with the objective of documenting indigenous beekeeping techniques, beehives and bee flora. The information was gathered from beekeepers, beekeeping trainees, and the District Agricultural Development Office through interviews and office records. Various tools of participatory rural appraisal, such as semi-structured interview, transect walk, preference ranking and triangulation, were employed. Data obtained from field observation and personal experience were combined with published reports.

Bees and Beekeeping

Beekeeping is a source of additional food and income in Dadeldhura where farmers keep a few colonies of *Apis cerana* in log and wall hives. Honey is valued by local people as food and medicine, but pollen is not used and beeswax is not used to its full potential. The contribution that bees make to pollination, thus increasing yield and quality of fruits and seeds, is not understood by local people.

Village farmers also harvest honey from other honeybee species with traditional honey-hunting methods. *Apis dorsata* migrates from the Terai in March/April and stays in low-hill areas until September. A professional honey-hunter can collect about 20 kg of honey per harvest per *A. dorsata* colony and sell it in local markets. Although *A. florea* honey is considered superior in quality and is highly priced, its production is low and limited to only a few places in low-hill areas. Some beekeepers in low-hill areas are trying to keep stingless bees, *Melipona/Trigona* spp., in their native habitat, i.e., hollowed-out logs.

Indigenous Beehives

Traditionally, *A. cerana* is kept in several types of hive made from hollowed-out logs, wall recesses, wooden pitchers and wicker baskets of *Bauhinia vahlii* leaves and bamboo strips. The most common are log hives and wall hives.

Log hive (mudheghar, dhado)

This is a simple structure made from a hollowed-out log with one or two small entrance holes and each end closed with a wooden stopper plastered in with cow dung and mud (Fig. 1). The length and diameter of horizontal log hives is usually 60–75 cm by 60–80 cm.



Fig. 1. Multipurpose dwelling house with traditional log hives.

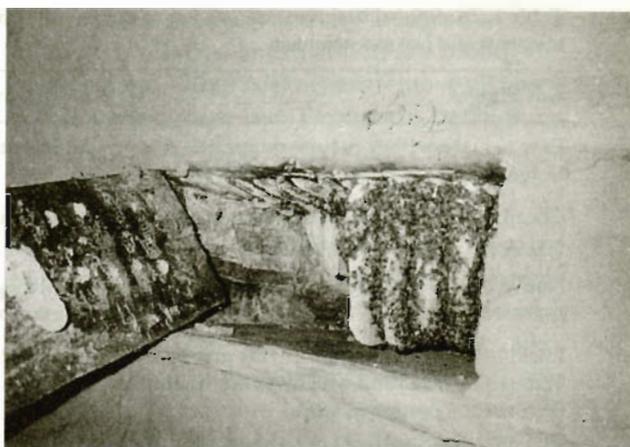


Fig. 2. Traditional wall hives showing 12 combs of which 8 combs were harvested.

Wall hive (*khope ghar, jalekha*)

These are either rectangular or square and vary little in dimensions (Fig. 2). A small entrance hole is located on the outside of the house. Each recess is 40–60 cm (the length from elbow to finger tips) long and 25–30 cm (one 'bitta': the span of a hand) deep. The side walls are plastered with mud and cow dung, and the floor and roof are wooden planks. Bees generally build combs on the wooden roof parallel to the entrance of the hive. The backside of the recess is closed by a wooden plank that is temporarily fixed to the house walls with a mixture of mud and cow dung. While harvesting honey, the back door is removed by scraping off the mud plaster.

These traditional beehives have been in use for hundreds of years and have been gradually improved by farmers. For farmers, they have several advantages over modern hives; however, for bee scientists and beekeeping extensionists, they also have several disadvantages (Table 1).

For rural farmers it is not a matter of right or wrong, it is a matter of practicality. For them, beekeeping depends on their technical know-how and earning capacity which are often not enough to use expensive movable-frame hives. Some farmers who receive training are willing to change from traditional techniques; however,



Fig. 3. ICIMOD in collaboration with RUWDUC displaying different types of hives.

the high cost of equipment makes it difficult for them to begin. Keeping this in mind, the International Centre for Integrated Mountain Development (ICIMOD) in collaboration with the Rural Women's Development and Unity Centre (RUWDUC) has made efforts (Fig. 3) to adapt traditional hives so that movable frames can fit into them. Hence, wall hives with moveable frames (Fig. 4) and straw hives plastered with mud and cow dung (Fig. 5) have been experimentally tested since March 1996. These hives are cheaper and provide better

Table 1. Traditional beehives: advantages as expressed by traditional beekeepers and disadvantages as expressed by bee scientists and bee extensionists

Advantages	Disadvantages
Easy to make as they require no special techniques or accuracy for construction.	Increased chance of queen loss during honey harvesting.
Cheap: require little investment for log hives and no investment for wall hives.	Difficult or impossible to inspect colonies thoroughly.
Native bees are familiar with and well-adapted to these hives.	Management operations such as uniting, dividing, queen-rearing, control of laying workers are not possible.
Liked better by wild swarms. This may be because log hives and wall hives are similar to their natural nesting habitat.	Brood destroyed and adult bees killed during honey harvesting.
Bee colonies abscond/migrate less frequently from traditional hives (this may be because of less disturbance by the beekeeper).	Honey extraction by centrifugal honey extractor is not possible. Honey is extracted by squeezing the combs and contains brood extracts, parts of bee bodies, hive debris and dirt. Such honey does not fetch a good price and ferments quickly.
Less prone to attack by pine marten and other enemies because wall hives are generally 2-2.5 m above the ground and not easily accessible; log hives are hung under the eaves of houses and are thick and heavy.	



Fig. 4. Improved wall hives with movable frames

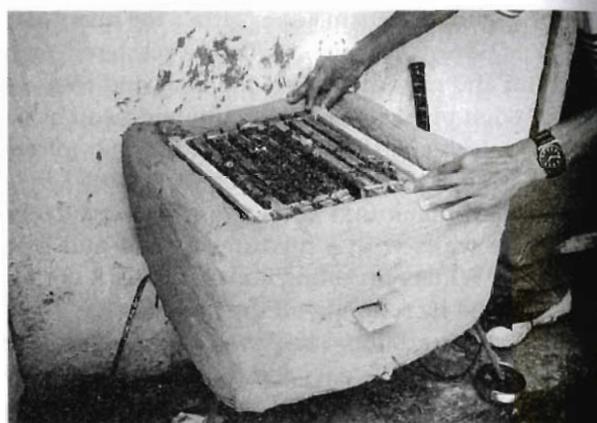


Fig. 5. Low cost movable straw frame hive plastered with mud and cow dung

insulation than Newton B wooden hives. Bee performance also seems to be better so far.

Traditional bee management techniques

Farmers in Dadeldhura consider bees as the 'symbol of fortune'. They rely more on luck than

management techniques. Only a few management techniques are practised.

Catching swarms

Since there is no tradition of buying and selling bee colonies, they are collected as wild swarms. Baited log hives are placed on sunny, sheltered

cliffs. To prevent wax moth and ants, hives are fumigated with smoke of the herb titepati (*Artemisia vulgaris*), pieces of cloth and dehydrated butter (ghee), and then rubbed with honeycomb. Titepati has a strong smell and insect-repellant properties (Regmi and Kama, 1988). As soon the hive is occupied, it is brought home.

To catch hived-bees as they swarm, farmers throw clouds of soil, dust, ashes or water at them and repeatedly mutter 'Basa, mauri, basa!' (Stay, bees, stay!). After catching the swarm, the wings of the queen are cut and the swarm is placed in a basket (chhapro) and kept in a dark place. In the late evening, bees are rehoused in their hive. The practice of cutting the wings of the queen greatly disadvantages the survival of secondary (donalo) or tertiary swarms (tenalo hul), since the queen leading these swarms is generally virgin and needs wings for the mating flight. In such swarms, the bees sometimes kill the queen and rejoin their parent colony; but, generally, they start worker-laying, survive 2-3 months and then die. This practice may be contributing to the decline of *A. cerana* in the region. The beekeeping programme is now successfully educating farmers about the virgin queen's need to make mating flights.

Seasonal management

Only a few entrepreneurial farmers practise seasonal management techniques. To keep bees warm, farmers in high-hill areas cover hives with rice/wheat straw or other insulating materials. If hives are too big, they put 'guwo' (dry inflorescences of *Anaphalis* spp. and *Gnaphalium* spp.) inside them and make them narrower with dummy boards of wooden planks. During the monsoon, log hives are covered with pine needles, thatch grass or plastic to protect the bees from rain.

Swarm control

Some experienced beekeepers recognise signs of swarming, especially from outside the hive.

When drone (andyal) activity is high they look for queen cells (raa kothi) and drone brood, and destroy them. Other beekeepers remove all brood combs except one or two. Farmers in Dadeldhura consider the first swarm to be the best.

Pine marten control

Pine marten (*Charonia flarigula*) is a major enemy of bees in Dadeldhura. It can destroy a colony in a night and tends to return to an area having developed a taste for honey. Once attacked, colonies abscond the next day. To control pine marten, some farmers hang 'ghanti' (cow bell) in the hives. When a hive is attacked, the bell rings and the sound scares away the pine marten. Some farmers place 'seto kurro' (*Achyranthes* sp.) outside the hive. This herbaceous plant has sticky inflorescences that adhere to the body-hairs of the pine marten and may make it think that somebody is pulling at it; it thus runs away without destroying the hive.

Bee Flora and Supplementary Feeding

Traditional beekeepers know well the plants that provide nectar and pollen. Some experienced beekeepers can determine the botanical origin of unifloral honey such as chiuri (*Aesandra butyracea*), tori/rayo (*Brassica* spp.), neem (*Azadirachta indica*), suntala/mausam (*Citrus* spp.), kirmada (*Berberis asiatica*), ghangaru (*Pyracantha crenulata*), tooni (*Cedrela toona*) by tasting it. From field observation, 76 bee plants were recorded in the district (Table 2). At most times of year bees do not need to be fed; but there are occasions when supplementary or emergency feeding is required. Unfortunately, farmers in Dadeldhura do not provide this. Some beekeepers leave one or two honeycombs during harvesting for their bees. Honey is also provided once during winter and once after housing newly hived swarms. In high-hill areas, where winter is cold, bees are given a half-boiled, fully ripe, sweet variety of greater pumpkin. In some areas, fully ripened snake

Table 2. Bee Flora of Dadeldhura District

Bee Flora	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	District
AGRICULTURAL CROPS													
<i>Brassica campestris</i> (Mustard)	*-	*-	*-									*-	LH-HH
<i>Brassica juncea</i> (Indian mustard)	*-	*-	*-									*-	LH-HH
<i>Brassica napus var. toria</i>	*-	*-	*-										LH-HH
<i>Brassica oleracea var. capitata</i>		*-	*-										LH-HH
<i>Brassica oleracea var. botrytis</i>		*-	*-										LH-HH
<i>Raphanus sativus</i> (Radish)		*-	*-										LH-HH
<i>Cucumis sativus</i> (Cucumber)							*-	*-					LH-HH
<i>Cucurbita maxima</i> (Greater pumpkin)				*-	*-								LH-HH
<i>Cucurbita pepo</i> (Pumpkin)							*-	*-					LH-HH
<i>Lagenaria siceraria</i> (Bottle gourd)							*-	*-	*-				LH-HH
<i>Daucus carota</i> (Carrot)						*-	*-	*-					LH-HH
<i>Trigonella sp.</i> (Fenugreek)			*-	*-									LH-HH
<i>Coriandrum sativum</i> (Coriander)				*-	*-								LH
<i>Allium cepa</i> (Onion)						*-	*-						LH-HH
<i>Sesamum indicum</i> (Sesame)							*-	*-					LH-HH
<i>Amaranthus paniculatus</i> (Amaranth)					-	-							MH-HH
<i>Zea mays</i> (Maize)						-	-						LH-HH
<i>Fagopyrum esculentum</i> (Buckwheat)							*-	*-					MH-HH
HORTICULTURAL CROPS													
<i>Citrus limon</i> (Lemon)				*-	*-								LH
<i>Citrus aurantifolia</i> (Lemon)				*-	*-								MH-HH
<i>Citrus reticulata</i> (Mandarin)				*-	*-								LH
<i>Citrus sinensis</i> (Sweet orange)				*-	*-								LH
<i>Citrus limetta</i> (Sweet limetta)				*-	*-								MH
<i>Malus domestica</i> (Apple)				*-	*-								HH
<i>Musa paradisiaca</i> (Banana)	*	*	*	*	*	*	*	*	*	*	*	*	LH
<i>Prunus armeniaca</i> (Apricot)				*-	*-								HH
<i>Prunus domestica</i> (Plum)			*-	*-									MH-HH
<i>Prunus persica</i> (Peach)			*-	*-									MH-HH
<i>Pyrus pashia</i> (Pear)			*-	*-									MH-HH
<i>Punica granatum</i> (Pomegranate)					*-	*-							LH-HH
<i>Mangifera indica</i> (Mango)				*-	*-								LH
<i>Juglans regia</i> (Walnut)			-	-	-								HH
<i>Psidium guajava</i> (Guava)		*-	*-										LH
<i>Carica papaya</i> (Papaya)				*-	*-	*-							LH
FORAGE CROPS													
<i>Trifolium spp.</i> (Clovers)			*-	*-	*-	*-	*-						MH
<i>Rumex spp.</i> (Almado)							*-	*-	*-	*-	*-		MH-HH
<i>Cirsium wallichi</i> (Thistle)					*-	*-							HH
<i>Polygonum spp.</i>					*-	*-							LH
<i>Oxalis corniculata</i>								*-	*-				LH
<i>Saccharum spp.</i> (Tall grass)									*-	*-			LH
HEDGEROW PLANTS													
<i>Adhatoda vasica</i> (Basak)	*-	*-	*-	*-									LH-MH
<i>Prinsepia utilis</i> (Dhatelo)	*-	*-											HH
<i>Pyracantha crenulata</i> (Gangaru)				*-	*-								MH-HH
<i>Yucca sativa</i> (Adam's needle)						*-	*-						MH-HH

(Contd.)

Table 2. (Contd.)

Bee Flora	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	District
<i>Berberis aristata</i> (Berberis)			*-	*-									MH
<i>Vitex negundo</i> (Indian privet)					*-	*-							MH
<i>Opuntia</i> spp. (Prickly pear)				*-	*-	*-							LH-MH
ORNAMENTAL PLANTS													
<i>Tagetes erectus</i>									*-	*-	*-		LH-HH
<i>Calendula arvensis</i> (Marigold)	*-	*-											LH-MH
<i>Aster</i> spp. (Starworts)									*-	*-			LH-HH
<i>Helianthus annuus</i> (Sunflower)			*-	*-	*-								LH-MH
<i>Rosa</i> spp. (Garden roses)			*-	*-	*-								LH-MH
<i>Ocimum sanctum</i> (Tulasi)									*-	*-			LH-HH
WILD PLANTS, FOREST TREES													
<i>Aesandra butyracea</i> (Chiuri)									*-	*-	*-		LH
<i>Myrica esculenta</i> (Kafal)		*-	*-										MH-HH
<i>Grewia optiva</i> (Bhewal)								*-	*-				MH
<i>Sapindus mucorossi</i> (Soapnut tree)					*-	*-							MH
<i>Bauhinia variegata</i> (Koqiralo)										-	*-		MH
<i>Bauhinia purpurea</i> (Geranium tree)			*-	*-									MH
<i>Bauhinia vahlii</i> (Camel's foot)					*-	*-							LH
<i>Cedrela toona</i> (Tooni)			*-	*-									MH
<i>Azadirachta indica</i> (Neem)			*-	*-									LH
<i>Dalbergia sisso</i> (Sissoo)			*-	*-									LH
<i>Prunus cerasoides</i> (Wild cherry)					*-	*-							MH-HH
<i>Phyllanthus emblica</i> (Amla)	*	*											MH
<i>Rhododendron arboreum</i> (Guras)			*-	*-									MH-HH
<i>Rhododendron</i> spp. (Setoguras)			*-	*-									HH
<i>Salix</i> spp. (Willow)		*-	*-										MH
<i>Shorea robusta</i> (Sal)			*-	*-									LH
<i>Fragaria</i> spp. (Wild strawberry)					*-	*-							MH
<i>Kapium insigne</i> (Khirro)					*-	*-							MH
<i>Elaeagnus parvifolia</i> (Gunyeli)		*-	*-										LH-MH
<i>Rubus ellipticus</i> (Raspberry)			*-	*-									LH-MH
<i>Zanthoxylum</i> spp. (Nepali pepper)			*-	*-									MH
<i>Rosa</i> spp. (Wild rose)			*-	*-	*-	*-							LH-MH
<i>Caesalpinia capitata</i> (Kunyeli)			*-	*-									MH

Notes: Nectar source * ; pollen source - ; HH = high hills; MH = mid-hills; LH = low hills.

gourd is also provided. In recent years, some farmers provide 'gud' (a home-made sugarcane product).

Honey Harvesting, Processing and Uses

Harvesting period

Honey harvesting depends upon climatic conditions, forage availability and cultural

considerations. In high-hill and mid-hill areas, honey is harvested twice a year during April/May and October/November. In low-hill areas, an additional harvest can be taken in chiuri (*Aesandra butyracea*) and mustard (*Brassica* spp.) blooming periods. Chiuri is considered as a major source of honey in the low hills where farmers harvest honey twice or thrice during its blooming period. Traditionally, honey is harvested on

auspicious days in the lunar calendar. Generally, it is harvested during the bright half of the lunar month (shukl-pachhy), and never on Saturdays, Sundays, Tuesdays or during 'panchak' (a period when all planets are visible simultaneously) according to the lunar calendar. There are also cultural considerations determining the harvesting of hives when outsiders are present because honey is regarded as a gift from God and should not be shown to strangers. Only a few beekeepers, who do not follow cultural traditions, harvest honey whenever they like.

Harvesting technique

For harvesting honey, farmers use a smoker (hantaro) made from a piece of cloth tied into a roll. After smoking bees, they are brushed off the combs using a small broom of thatch grass (babiyo) that is usually dampened with water. Then combs are cut from the top of the hive and placed in a large-mouthed vessel (bata). Due to lack of awareness, both honey and brood combs are removed from the colony during harvesting and consequently much brood is lost. Successful training is creating awareness of how to reduce brood damage during harvesting.

Processing

Honey is generally extracted by squeezing the whole combs. Some farmers squeeze both honey and brood combs together but others separate the brood and honeycombs. Brood comb is considered to be highly nutritious and is fed to milk cattle and children. Squeezed honey is packaged in pre-used utensils especially in plastic gallons and glass bottles. Such honey has a high moisture content. It does not fetch a good price and ferments quickly. To prevent fermentation, some farmers cook their honey by

direct heating. The resulting honey does not ferment but loses its nutritional and medicinal benefits. However, in recent years farmers of low-hill areas sell sealed honeycomb and receive a good price.

Uses

Honey is considered as one of the five heavenly foods, 'panchamrita' (a mixture of milk, curd, ghee, honey, sugar). In Dadeldhura, more than 90 per cent of honey is consumed directly. The remaining is used (i) to make 'addu', a sweet dish made of roasted and ground rice, til (sesame) and honey; (ii) as a medicine to cure eye disease, wounds, burns, cuts, stomach aches, gastritis, diaorrhea, colds, etc; (iii) to ease childbirth (by taking honey during the birthing period); and, (iv) as an energetic and stimulant food, etc.

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