Chapter 2

Kaski District: the *Apis laboriosa* Environment

Introduction

Kaski district is located in western Nepal. It has an area of 2017 sq.km, with 43 village development committee subunits (VDCs), one sub-metropolitan city, and one municipality. The district headquarters is Pokhara – a popular tourist destination which lies in a large flat fertile valley. The northern part of the district slopes down from the Himalayan mountains of Machhapuchhre (6992m), Annapurna I (8090m), and Annapurna II (7937m).

Climate

The climate varies from sub-tropical, through temperate and sub-alpine, to alpine according to altitude. The low altitude sub-tropical areas are warm for most of the year whilst the Himalayan mountains in the north have a harsh cold climate. Kaski's climate is strongly influenced by the Annapurna massif to the north. These high, steep mountains act as a barrier to the monsoon rain clouds that come from the Bay of Bengal; when the clouds meet the mountains they deposit large amounts of rain – Kaski has the highest rainfall of any district in Nepal. About 70% of the annual rainfall falls during the rainy season from July to September, at this time the temperature is warm and the sky remains overcast for much of the time. The period from October to November is dry and warm, December to February is cold, and March to June is dry and hot. The monthly meteorological data for three different years at Lumle Agriculture Research Station in western Kaski (1500m) are shown in the graphs.

Socioeconomic Setting

The 1991 census recorded 326,330 people living in Kaski (CBS 1991): 76% Hindus, 13% Buddhists, and 11% from other religions. The ethnic groups in the district include Brahmins and Chhetris (41%), Gurungs (17%), and a lesser proportion of Magars, Tamangs, Kamis, and other groups (PDDP 1998). Most areas in Kaski have a mix of Brahmin, Chhetri, Gurung, and Dalit (occupational castes) communities. Apicultural communities (beekeepers and honey hunters) are usually not recorded as a separate group in official statistics. Honey hunters as a group are unique in that they include members from different castes and communities, although some of the specific tasks are restricted to particular castes. Older local people tend to have a great respect for beekeepers and honey hunters irrespective of their caste or ethnicity.

In Kaski, the villages located nearest to the *Apis laboriosa* nesting sites are mostly Gurung villages. These villages tend to have a strong community spirit. The people share agricultural work, natural resource management, and other social and religious activities. Gurung women tend to play an important role in household decision-making, unlike women from Brahmin and Chhetri communities.

Agriculture is the predominant activity in all of Kaski district. Paddy, maize, millet, and wheat are the major cereal crops. Livestock and poultry farming are also important and provide food, manure, and economic security. Industry, trade, commerce, and tourism are prominent economic activities in the more accessible areas. Many people are now migrating out of the more remote villages.

Kaski is a popular tourist destination. Thousands of tourists come to trek around the Annapurna Circuit and up to Annapurna Base Camp. However, notwithstanding the successful efforts of the Annapurna Conservation Area Programme (Bajracharya and Thapa 2000) the fact still remains that the overall benefit to local villages from tourism is small and resultant environmental degradation remains an issue. However, both the trekkers and the lodges they stay in provide a market for local products such as honey, vegetables, and meat.

There are 75 districts in Nepal. Overall Kaski is seen as one of the most developed, but in reality this development is almost entirely confined to Pokhara and the close-by areas. The remoter parts of Kaski where the bee cliffs are found are as poor and underdeveloped as any of the other remote mountain areas of Nepal. In terms of agricultural indicators like the percentage of marginal and landless farmers, access to institutional credit, average number of livestock per farm, farm size, and percent irrigated area, Kaski is one of the poorest districts in Nepal (ICIMOD 1997).

Vegetation and Bee Floral Resources

Kaski's large floral diversity ranges from sub-tropical to alpine species and provides year round forage to *Apis laboriosa* and other honeybee species. The main species that provide nectar and pollen to bees are listed in Table 2.1 together with a calendar showing when and to what extent they are productive and an indication of the climatic region in which they grow. The diversity means that within limited areas, at least, nectar is available for most of the year.

Kaski's sub tropical zone is found between 1000 and 1800 masl. *Schima wallichii* and *Castanopsis indica* forests are the main natural sub-tropical vegetation type, but have been much disturbed by human settlement. Other trees found in these forests include oak, birch, beech, maple, alder, and teak. Riverine forests, generally dominated by simal (*Bombax malbaricum*), grow along the banks of rivers and lakes with *Woodfordia fruticosa, Colebrokia oppositifolia,* and *Erythrina stricta* as common plant components.

Kaski's evergreen coniferous forests are found on slopes above 1800m and contain pine, fir, spruce, and larch trees. However, the main temperate zone forest at altitudes between 1800 - 4000 masl is dominated by *Rhododendron* species: the main plants *are Rhododendron arboreum, Rhododendron barbatum, Lyonia ovalifolia, Michelia kisopa, Quercus lamellosa, Acer sp., Maesa chisia, Eriobotrya elliptica, Berberis spp, Myrsine semiserrata, Schima wallichi, Castanopsis indica, and Myrica*
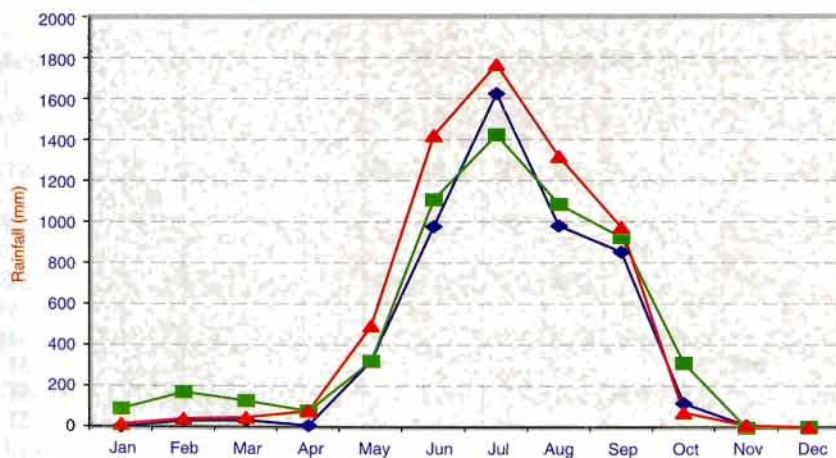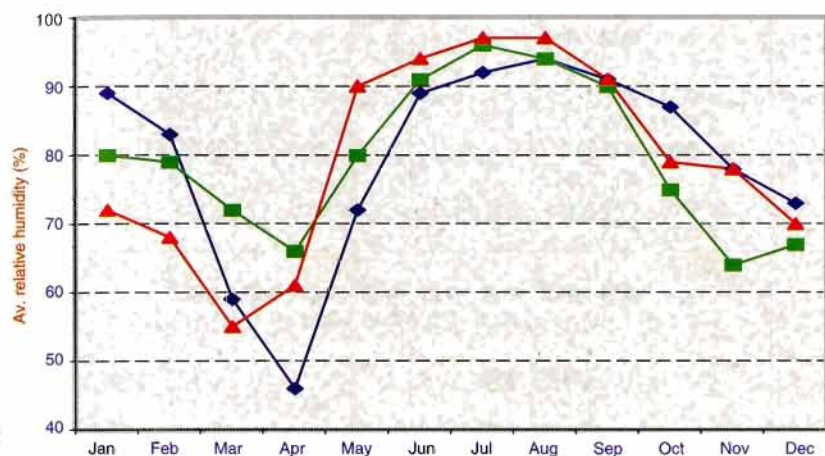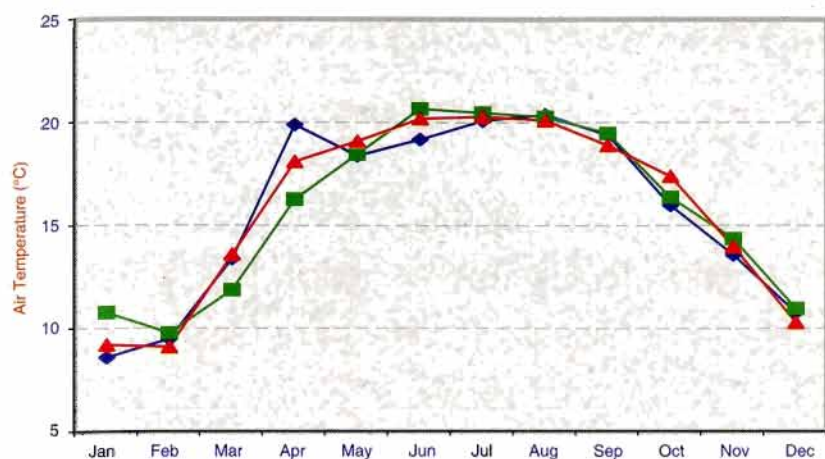
Meteorological data for Lumle, Kaski

Table 2.1: Bee Floral Calendar for Kaski District

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	zone
Agricultural crops													
Allium cepa				○□									ST-T
Amaranthus paniculatus					○□		●□						ST-T
Brassica spp	●■	●■									●■	●■	ST-T
Coriandrum sativum			○□	○□									ST-T
Cucumis sativus						●□	●□	●□	●□				ST-T
Cucurbita maxima					●□	●□							ST-T
Cucurbita pepo				●□	●□								ST-T
Daucus carota			○□	○□	○□								ST-T
Fagopyrum esculentum								●■	●■				ST-T
Lagenaria siceraria							○□	○□	○□				ST-T
Raphnus sativus		●■	●■										ST-T
Zea mays						●	●						ST-T
Horticultural crops													
Carica papaya					●■								ST
Citrus spp			●■	●■									ST-T
Juglans regia			●										T
Malus domestica			●■	●■									T
Musa paradisica	○□	○□	○□	○□	○□	○□	○□	○□	○□	○□	○□	○□	ST
Prunus armenica		●■	●■										T
Prunus domestica		●■	●■										T
Prunus persica		●■	●■										ST-T
Punica granatum			●□	●□									ST-T
Pyrus communis		○□	○□										ST-T
Pyrus pashia		○□	○□										ST-T
Ornamental plants													
Callistemone spp			●■	●■	●■	●■	●■	●■	●■	●■			ST
Campsis grandiflora				●■	●■	●■	●■						ST
Euphorbia pulcherima	○□	○□											ST
Grevillea robusta			●■	●■									ST
Ocimum sanctum								○□	○□				ST-T
Rosa spp			○□	○□									ST-T
Tagetes spp								○□	○□				ST-T
Wild plants and trees													
Abies spectabilis						○	○						T
Acer spp			●■	●■									T
Aconitum spp									○□				T
Aconogonum molle						○□	○□						T-A
Aesculus indica				●■	●■								T
Albizia spp				●■	●■	●■	●■						ST-T
Alnus nepalensis											●		ST-T
Arundinaria falcata				○	○								T
Bauhinia purpurea			○□	○□									ST
Berberis spp			○□	○□	○□								ST-T
Bombax malbaricum		■	■										ST
Buddleia asiatica		●■	●■										ST-T
Butea monosperma	●■	●■											ST-T
Caryopteris odorata		●■	●■										ST-T
Castanopsis indica									○□	○□			ST-T
Celtis australis			○□	○□									T

●	Major pollen source	■	Major nectar source
◉	Medium pollen source	◻	Medium nectar source
○	Minor pollen source	□	Minor nectar source
◇	Honeydew		

ST	sub-tropical
T	temperate
A	alpine

cont'd ...

Table 2.1: Bee Floral Calendar for Kaski District (cont'd)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	zone
Wild plants and trees (cont'd)													
Colebrokia oppositifolia	●■	●■	●■	●■	●■						●■		ST-T
Coriaria nepalensis		◉□	◉□	◉□	◉□								T
Dendrocalamus strictus			◉	◉									T
Elaeagnus parvifolia			●■	●■	●■	●■							T
Englehardtia spicta				●■									ST
Ephedra gerardiana					◇□	◇□							T-A
Eriobotrya elliptica		●■	●■										T
Erythrina stricta							◉□	◉□					T
Eurya acuminate	●■	●■	●■							●■	●■	●■	ST-T
Ficus auriculata					◇								ST-T
Ficus bengalensis				◇									ST-T
Ficus nemoralis				◇	◇								ST-T
Ficus religiosa				◇									ST-T
Ficus semicordata				◇									ST-T
Fraxinus floribunda				●■	●■								T
Ilex dipyrena				◉□	◉□								T-A
Juniperus spp				◇	◇								T-A
Kapium insigne						◇	◇						ST-T
Leucoceptrum canum		●■	●■										ST-T
Lindera pulcherima										◉□	◉□		T
Lyonia ovalifolia		◉□	◉□	◉□									ST-A
Maesa chisia			●■	●■	●■	●■	●■	●■					ST-T
Michelia champaca				◉□	◉□	◉□	◉□						T-A
Michelia kisopa								◉□	◉□	◉□			T
Myrsine semiserrata	◉□	◉□	◉□	◉□	◉□	◉□	◉□	◉□	◉□	◉□			T
Pinus roxburghii		◇◉	◇◉	◇◉									ST
Prunus cerasoides											●■		ST-T
Quercus incana				○	○	○	○						ST-T
Quercus lamellosa				○	○	○	○						T
Quercus semicarpifolia				○	○	○	○						T
Rhododendronanthopogon		◉□	◉□										T-A
Rhododendron arboreum		◉□	◉□										ST-A
Rhododendron barbatum		◉□	◉□										T-A
Rhus javanica								●■	●■				ST-T
Rhus succedanea					●■	●■							T
Rubus spp				◉□	◉□	◉□							ST-T
Salix caliculata		◉□	◉□										ST-A
Schima wallichi					●■	●■							ST-T
Symplocas racemosa			○	○	○								T
Taxus baccata						◇	◇						
Tsuga dumosa						◇	◇						
Viburnum erubescens	◉□	◉□	◉□	◉□	◉□								T
Woodfordia fruticosa		◉□	◉□										ST
Zizyphus spp		◉□				◉□	◉□	◉□	◉□				ST-T

● Major pollen source	■	Major nectar source	ST	sub-tropical
◉ Medium pollen source	◼	Medium nectar source	T	temperate
○ Minor pollen source	□	Minor nectar source	A	alpine
◇ Honeydew				

esculenta. There is a pure *Rhododendron* forest between Sikles and Ghalegaun on a south-facing slope, and an extensive area of rhododendron forest between the Modi and Mardi rivers (see map at front). The area west of the Modi river and the Modi basin north of Ghandruk has been much disturbed by humans. In these areas the degraded forests at the lower elevations of the temperate zone mostly contain *Daphniphyllum himalayansis, Maesa chisia, Berberis spp.,* and *Rhododendron areboreum* with some *Quercus lamellosa* and *Myrsine semiserrata* in the upper reaches. The most common plants in these forests are *Daphne bholua, Cyathea spinulosa, Berberis aristata, Quercus semecarpifolia, Lyonia ovalifolia, and Lindera pulcherrima,* with *Reinwardtia indica, Galinsoga parvifolia, Drymeria cordata, Chilenthus grise, Viola canescens, Aconogonum molle, Berberis aristata, Plantago major, Artemisia indica, Dichrocephala integrifolia, Rubia manjith, Spiranthes sinensis* seen as common weeds (mostly exotic plants with an undesirable and overwhelming rate of multiplication).

The alpine region includes the base camp areas of Machhapuchhre, Annapurna, and Gangapurna. The most common plants in this area are *Juniperus recurva, Ephedra gerardiana, Rhododendron lepidotum, Rhododendron anthopogon, Delphinium roylei, Aquilegia nivalis, Corydalis juncea,* and *Salix caliculata.*