

OP-211 [Beekeeping for Rural Development]

From Forest Flowers to Honey: Synergies Between Beekeeping and Forest Conservation in Nepal

Kedar Devkota

Department of Agriculture Economics, Faculty of Agriculture, Agriculture and Forestry University, Rampur, Chitwan, Nepal

Beekeeping plays a crucial role in Nepal's agriculture, supporting sustainable rural livelihoods through its economic benefits and contributions to pollination. Due to the country's diverse flora, fauna, and favorable climatic conditions, beekeeping has experienced substantial growth over the past decade. It is a high-value enterprise, engaging over 16,000 households and managing 248,995 beehives, which collectively produce 5,168 metric tonnes of honey annually, valued at \$15 million. Beyond honey production, Nepal's beekeeping industry has significant untapped potential. It is estimated that pollen production could generate \$40 million, while propolis and wild honey exports could contribute \$1.3 million and \$1 million, respectively. Commercial beekeeping in Nepal primarily involves two species: *Apis cerana*, a native honey bee, and *Apis mellifera*, an introduced species. A recent study identified several key factors influencing the productivity and profitability of beekeeping in Nepal. These include the number of beehives, colony multiplication, supplementary feeding, honey harvesting periods, and marketing strategies. In addition to honey production, beekeeping plays a vital role in crop pollination, facilitating the production of 75% of Nepal's cultivated crops. This pollination service contributes approximately \$477 million annually, accounting for 10% of the country's Agricultural Gross Domestic Product (AGDP). Furthermore, research on pollinator diversity in Nepal indicates that *Apis* species constitute over 60% of the pollinators for major cultivated crops. Given its economic and ecological significance, beekeeping is essential for agricultural success, substantially enhancing household income while promoting food security and long-term economic stability in the region.



From Forest Flowers to Honey: Synergies Between Beekeeping and Forest Conservation in Nepal



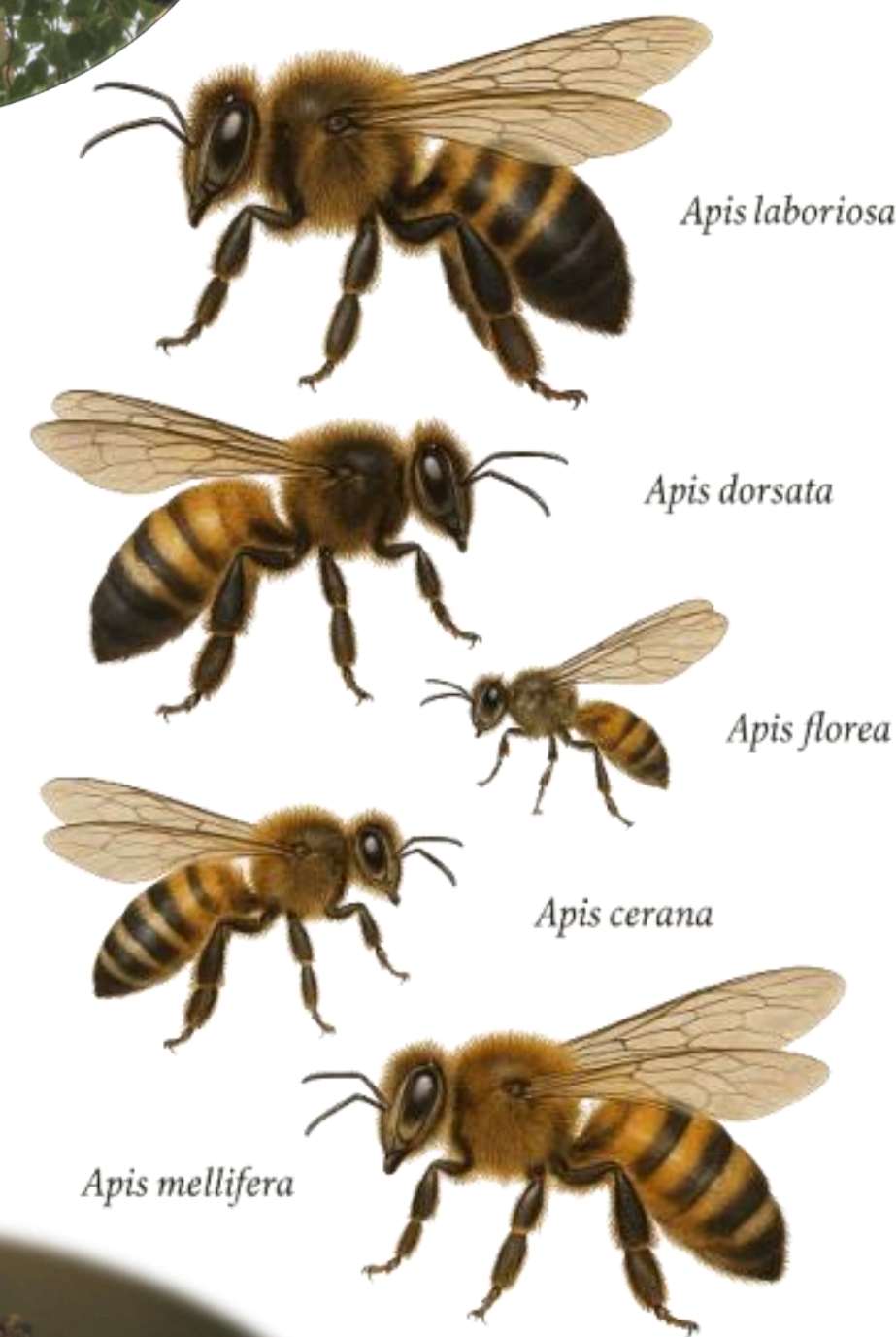
Kedar Devkota, *Ph.D.*
**Agriculture & Forestry University,
Nepal**



Honeybees of Nepal

Five species of honeybees, being four natives and ○ one exotic ○,

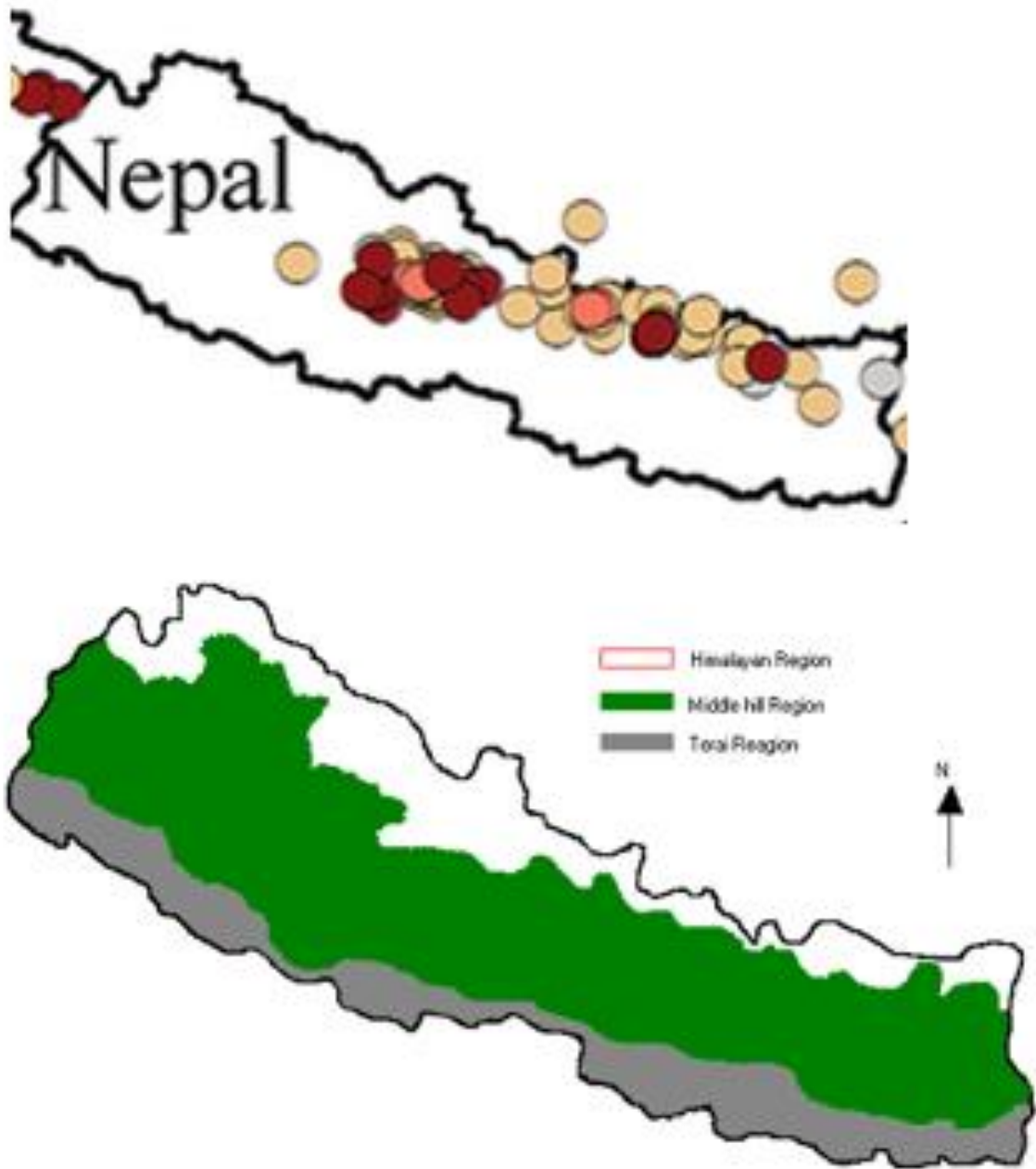
- *Apis laboriosa* S.
- *Apis dorsata* F.
- *Apis florea* F.
- *Apis cerana* F.
- *Apis mellifera* L.



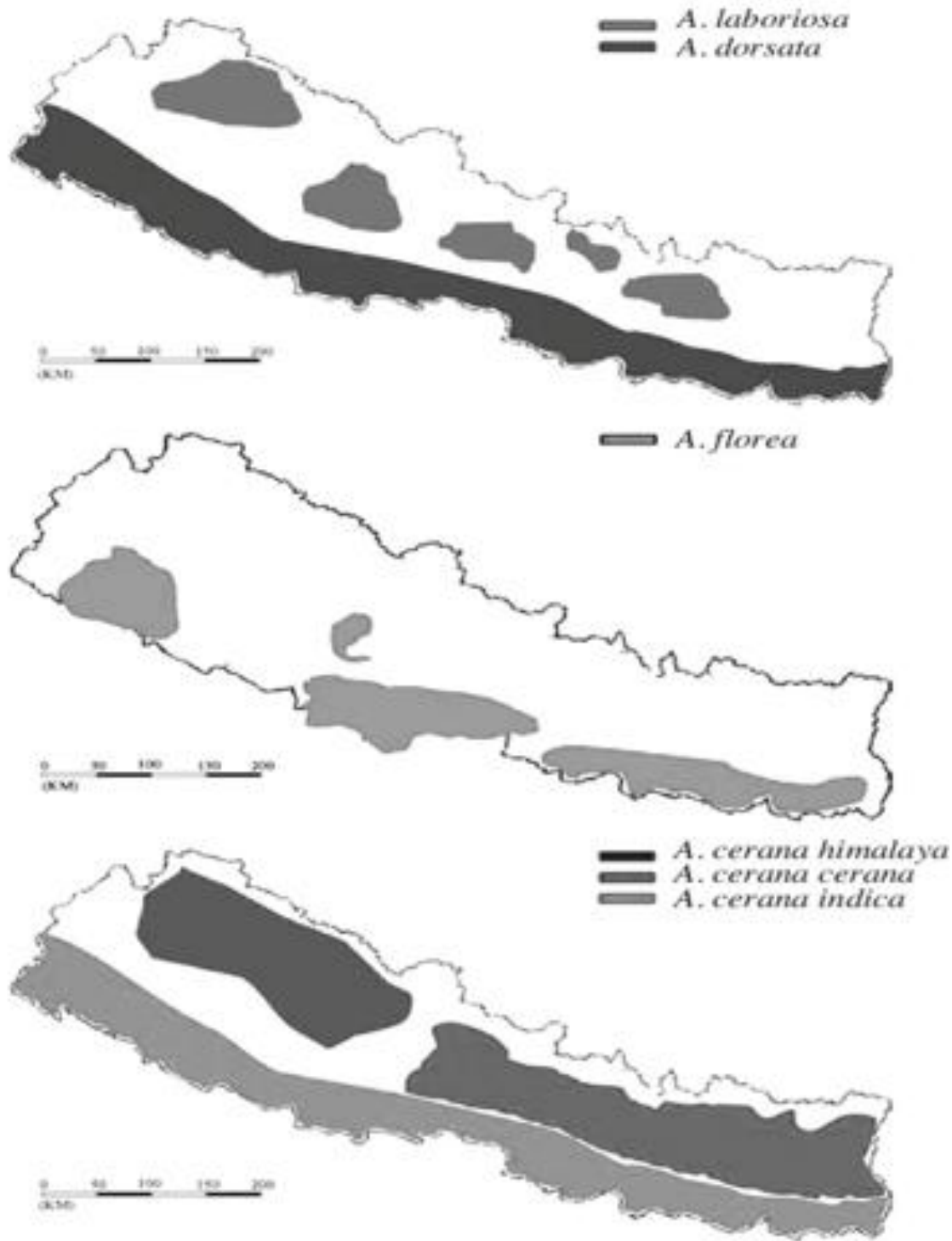
- Two species of stingless bees, Mostly found in the forest, not reared in beehives

Maps outlining Nepal's territory, with shaded regions indicating the geographical range of different *Apis* species. It illustrates the ecological niches and altitudinal distribution of honeybee species.

Otis et al
2024

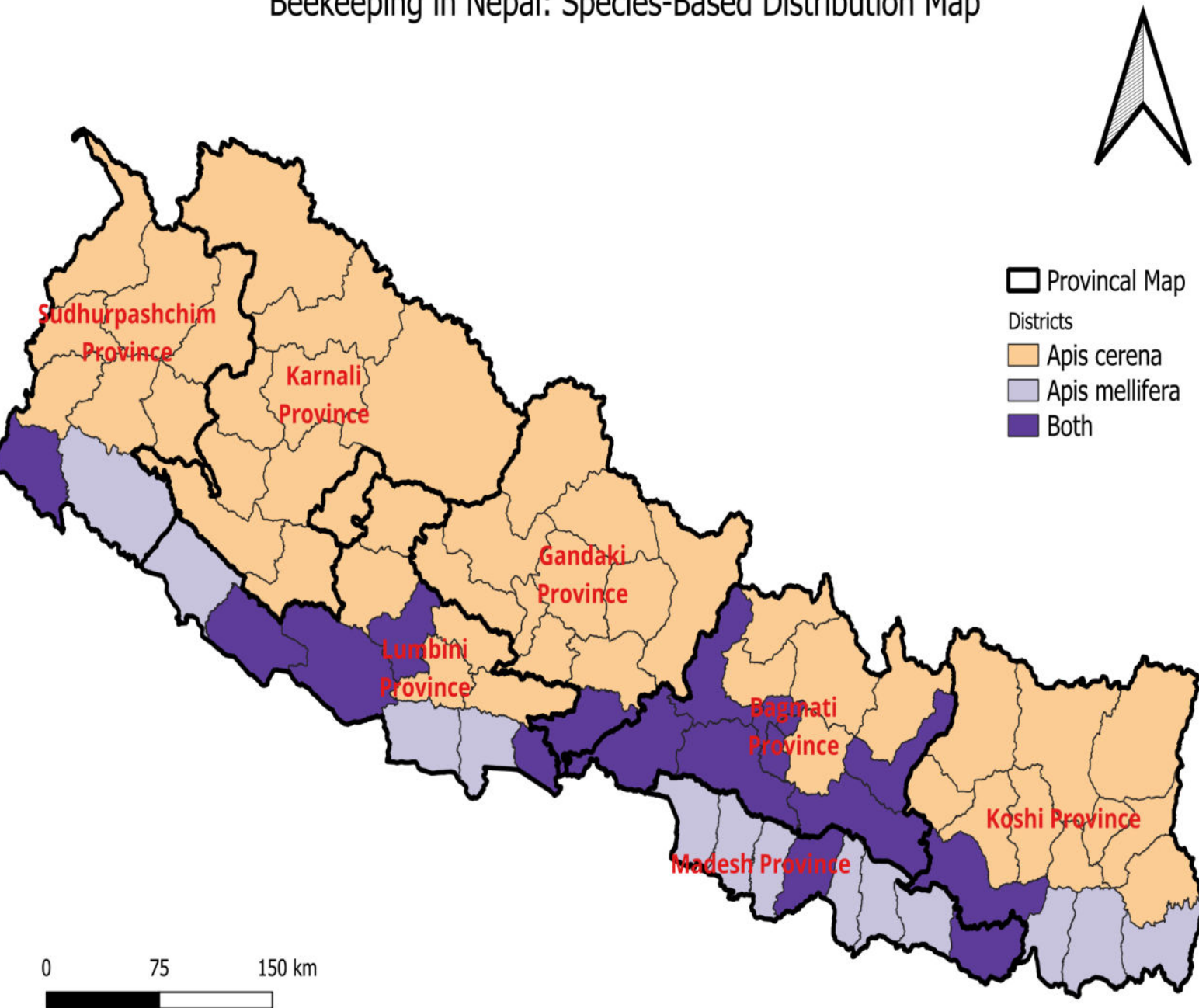


Apis mellifera | Exotic honey bee, but well-established and managed



Aryal, Thapa and Jung 2015

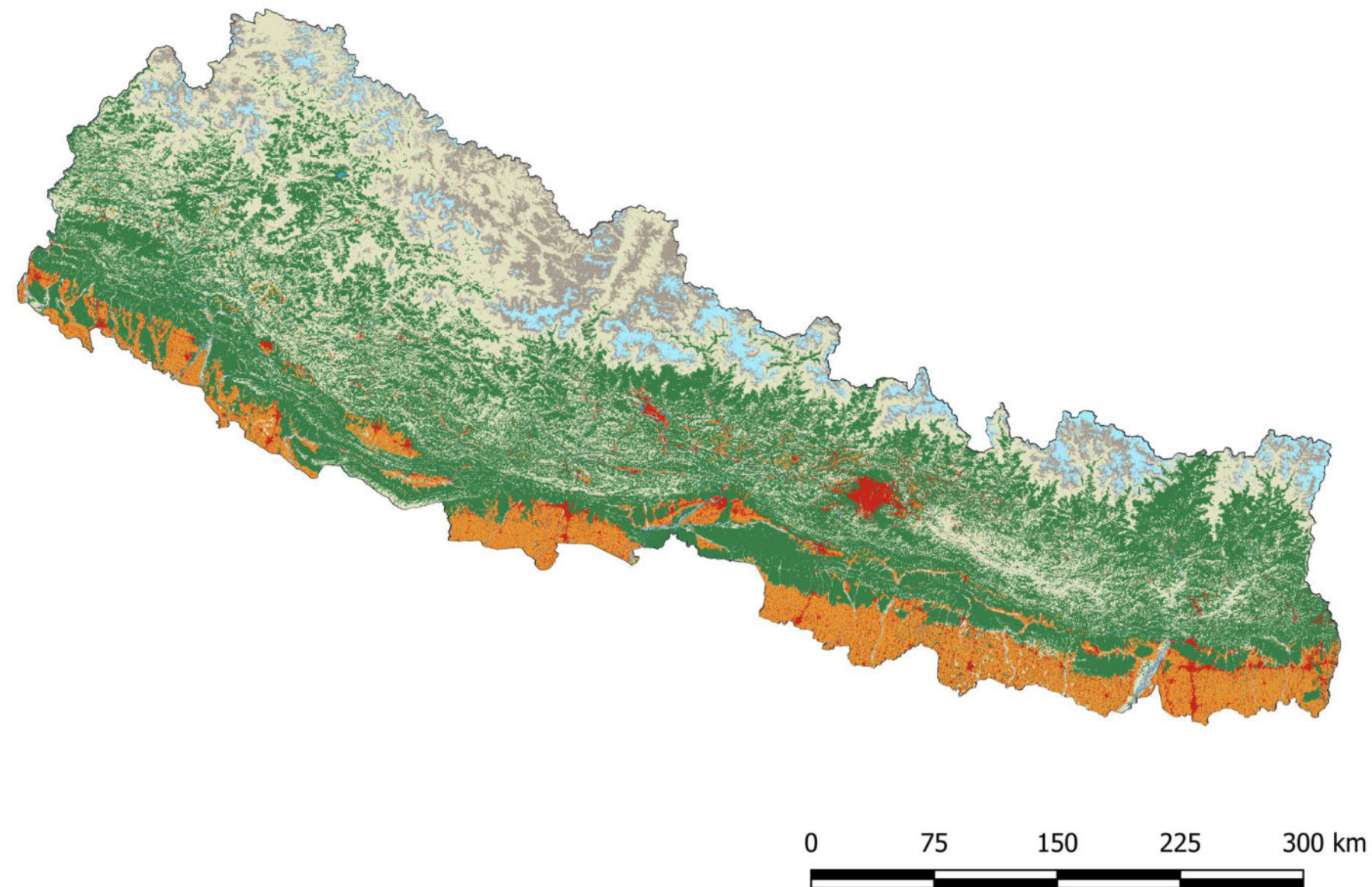
Beekeeping in Nepal: Species-Based Distribution Map



Land use and land cover map of Nepal

How land across Nepal is being utilized and what type of natural or human-made cover exists on its surface.

LULC Map of Nepal





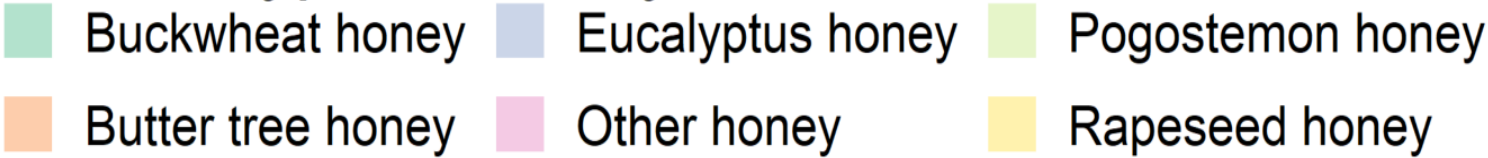
Bee forage calendar of Nepal

Forest Species	Local Name	Flowering Season	Importance for Bees
Needle wood (<i>Schima wallichii</i>)	Chilaune	Feb – Apr	Major nectar & pollen source (spring flow)
Hazelnut (<i>Castanopsis indica</i>)	Katus	Mar – Apr	Strong spring nectar flow
Nepalese alder (<i>Alnus nepalensis</i>)	Utis	Feb – Mar	Important pollen source
Wild Himalayan Cherry (<i>Prunus cerasoides</i>)	Painyu	Feb – Mar	Nectar for early colony build-up
Rhododendron (<i>Rhododendron arboretum</i>)	Laliguras	Mar – Apr	Nectar-rich, high-altitude forage
Box Myrtle (<i>Myrica esculenta</i>)	Kafal	Apr – May	Mid-hill forest nectar source
Wild Raspberry (<i>Rubus ellipticus</i>)	Ainselu	Apr – May	Major nectar & pollen for <i>A. cerana</i>
Silk Cotton Tree (<i>Bombax ceiba</i>)	Simal	Feb – May	Key nectar during lean period
Sal (<i>Shorea robusta</i>)	Sal	Jul – Oct	Large-scale nectar flow during monsoon–autumn
Indian Rosewood (<i>Dalbergia sissoo</i>)	Sissoo	May – Jun	Pollen and nectar in riverine forests
Black Catechu (<i>Acacia catechu</i>)	Khair	May – Jul	Nectar flow in Terai forests
Eucalyptus (<i>Eucalyptus camaldulensis</i>)	Eucalyptus	Nov – Feb	Reliable winter nectar flow (Terai/mid-hills)
Butter Tree (<i>Diploknema butyracea</i>)	Chiuri	May-July	Important nectar sources

Type of honey harvested by *Apis mellifera* beekeepers

A

Type of honey



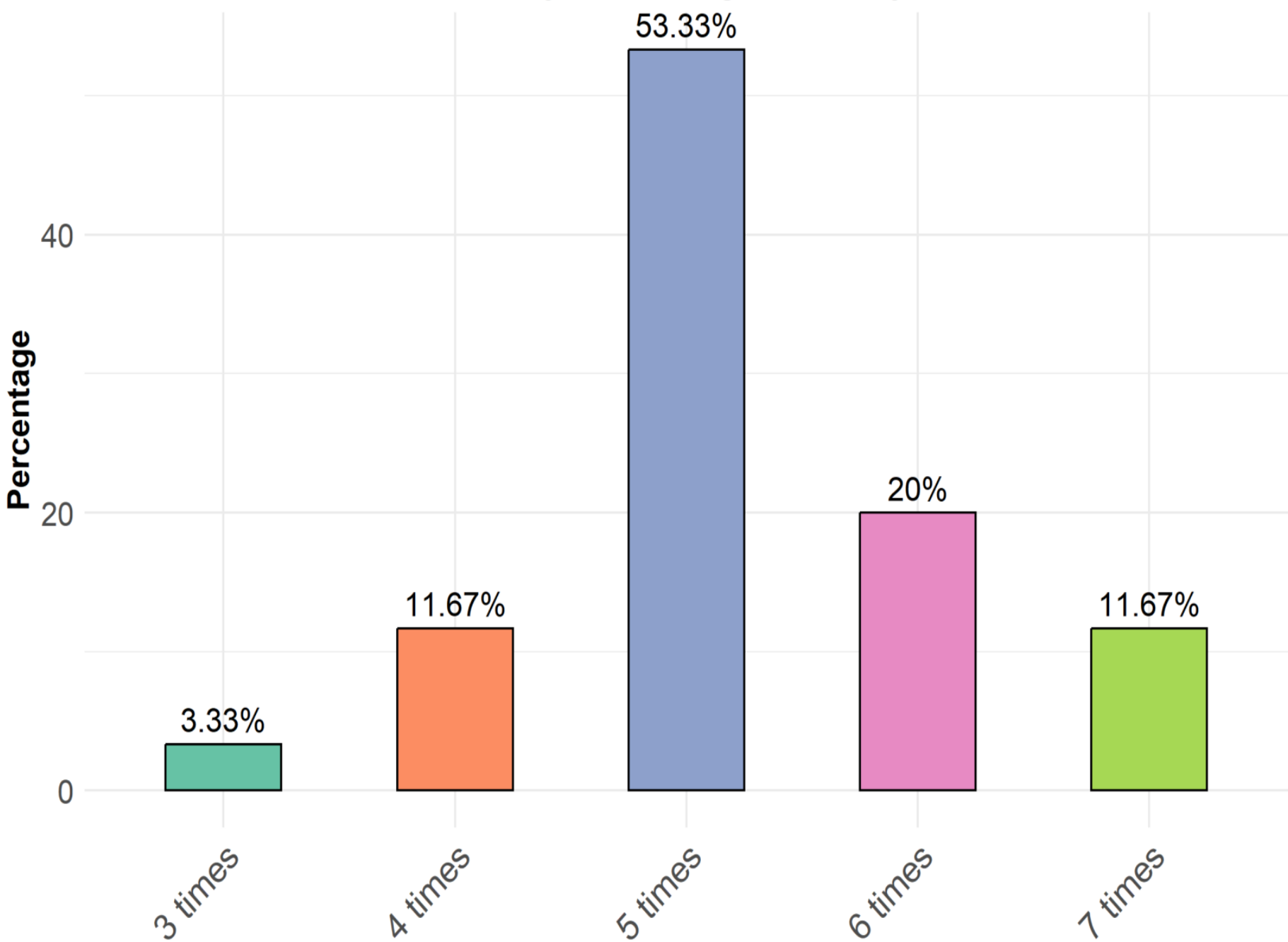
Honey

More than 65% of the honey is harvested from the Forest forage



B

Honey Harvesting Frequency

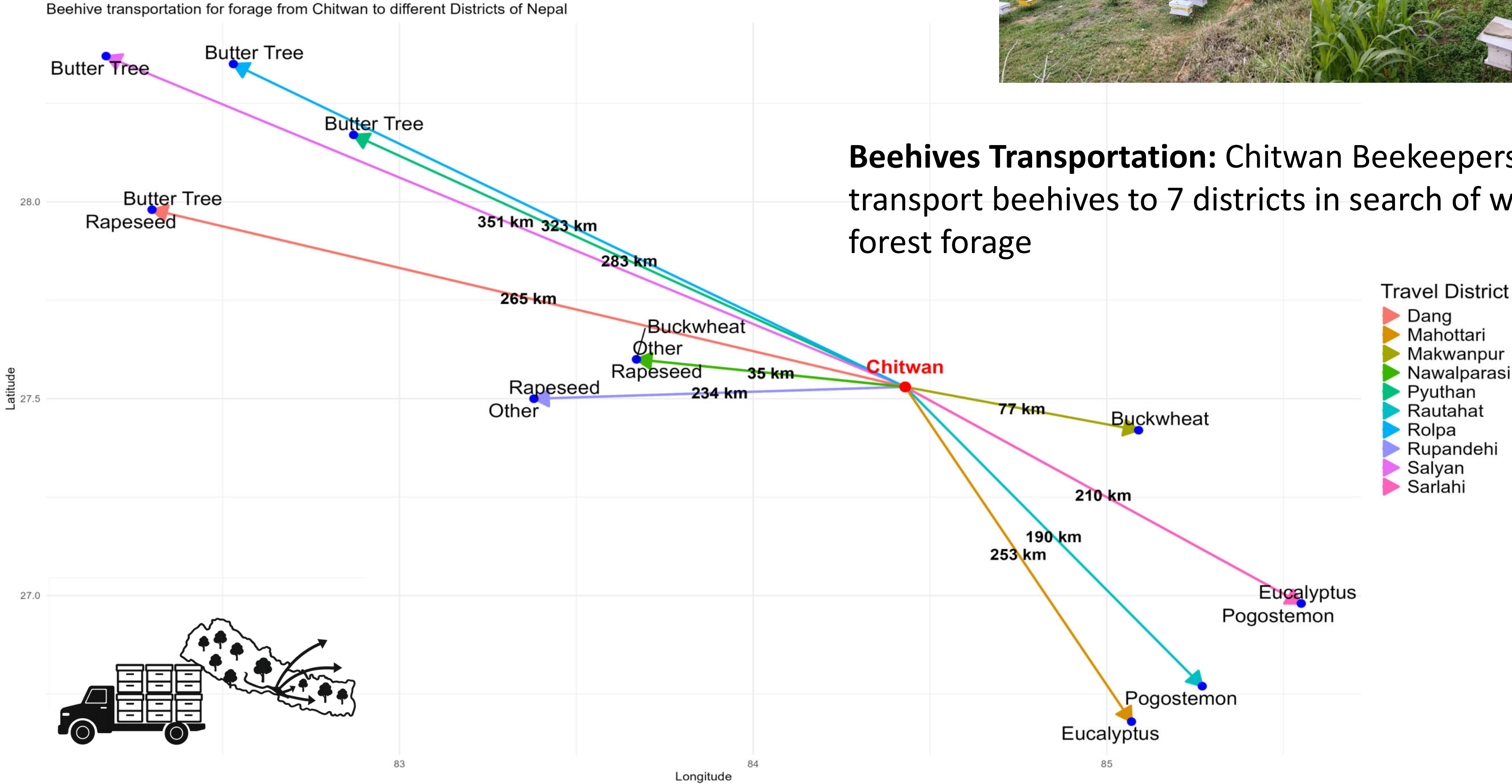


Time of honey harvest

Higher honey harvesting frequency mostly relies on the wild forest forage

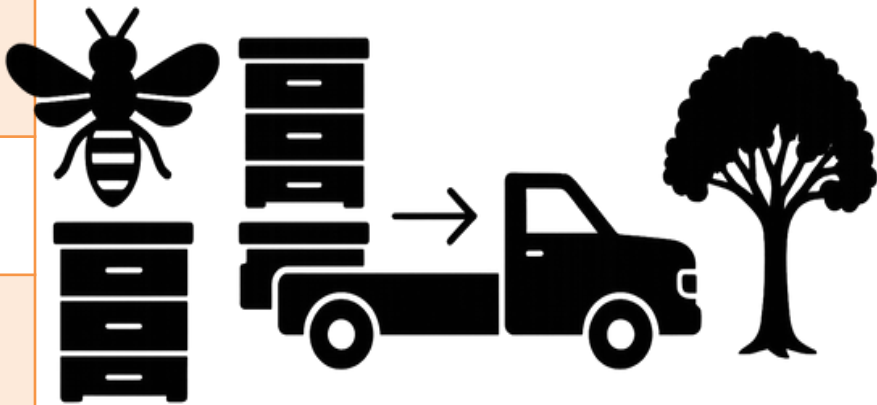


Beehives Transportation for the Forages



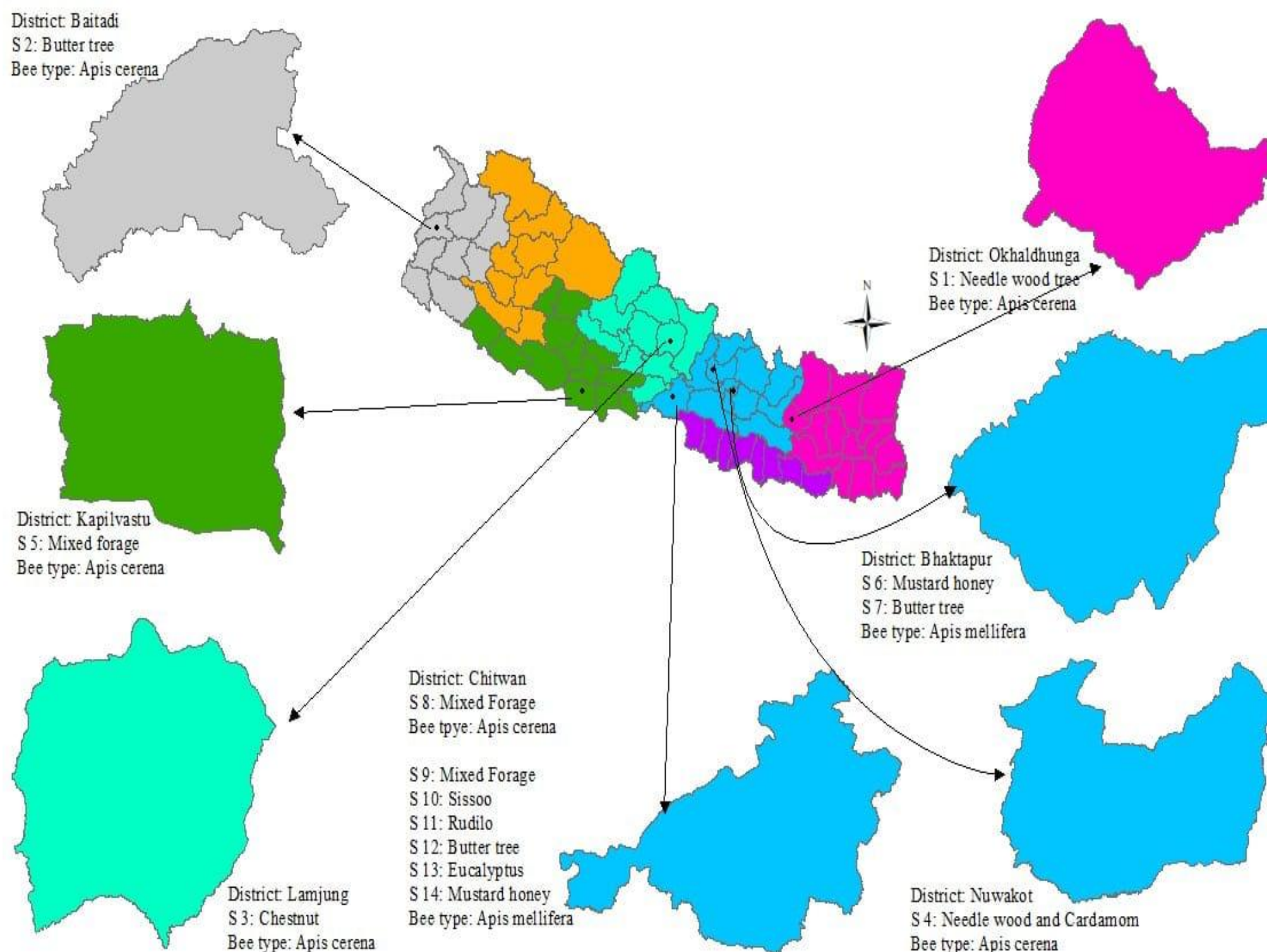
Beehives Transportation for the Forages

Types of honey	Average frequency of harvesting	Month of honey harvesting
Rape seed honey	Average=2 times	October-December
	Ranges=1-3 times	
Butter tree honey	Average=3 times	October-February
	Ranges=2-5 times	
Pogostemon (Rudilo) honey	1 time	February-March
Eucalyptus honey	1 time	April-May
Buckwheat honey	1 time	January-February
Other honey (Litchi, Dalbergia sissoo, Bombax spp. (Simal), Castanopsis spp. (Padke))	1 time	March-April



Beehives Transportation: Most beekeepers harvested 3 to 5 types of honey from various sources. To increase both the number of harvests and the variety of honey, they needed to migrate their bees to areas with abundant flora.

Honey Analysis from different flora of Nepal



Honey sample: 14 honey samples representing seven different sources (**Butter tree**, Mustard, **Hazelnut**, **Dalbergia**, **Eucalyptus**, Cardamom, **Rudilo** and **Mixed types** of forages)

Honey Analysis: Total phenolic content (TPC), total flavonoid content (TFC), antiradical activity (DPPH) and element concentrations

Honey quality/results: Among the honey samples, the TPC and TFC Needlewood followed by Buttertrees, Dalbergia and DPPH was found to be higher in Hazelnut honey.

Conclusion: Overall nutritional values of honey was found to be higher in Needlewood, Dalbergia and Hazelnut, Butter tree and Eucalyptus, which are forest products

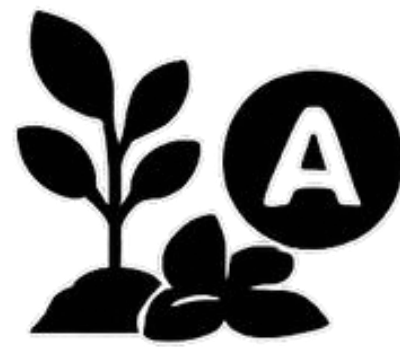
Bees for pollination



30% DECLINE
IN TOTAL
AGRICULTURAL
REVENUE



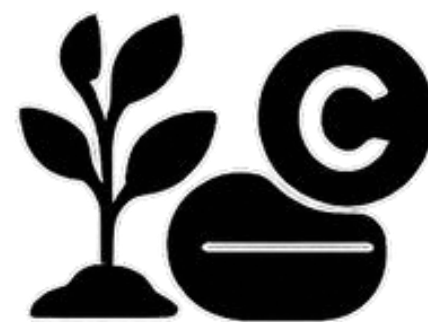
26,162 YEARS
OF HEALTHY LIFE
LOST EACH YEAR



40% LOSS
IN PLANT-BASED
VITAMIN A
PRODUCTION



605 ADDITIONAL
DEATHS YEAR



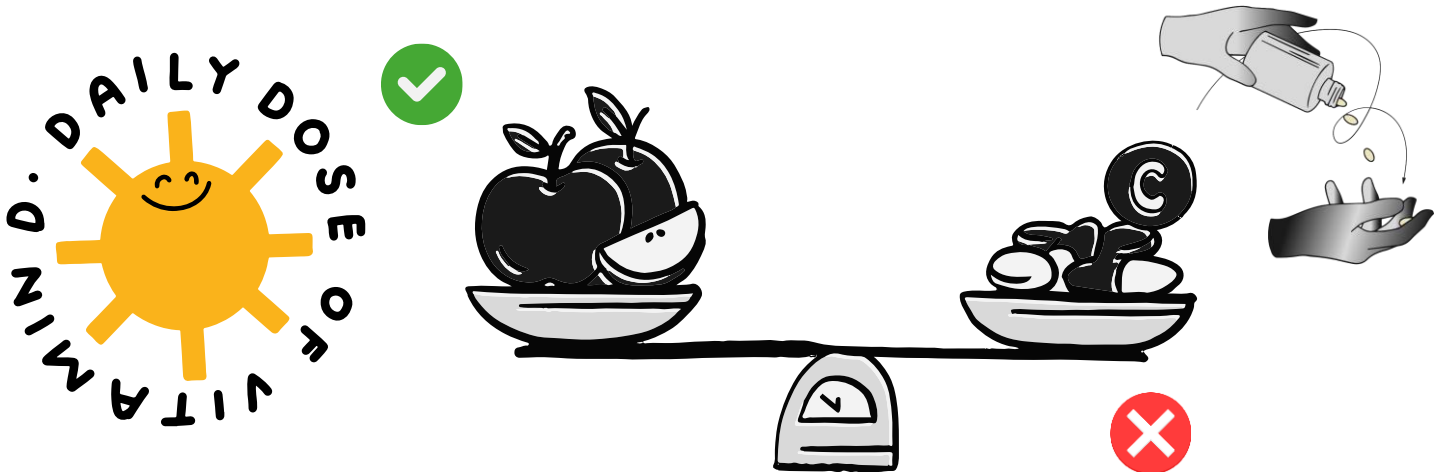
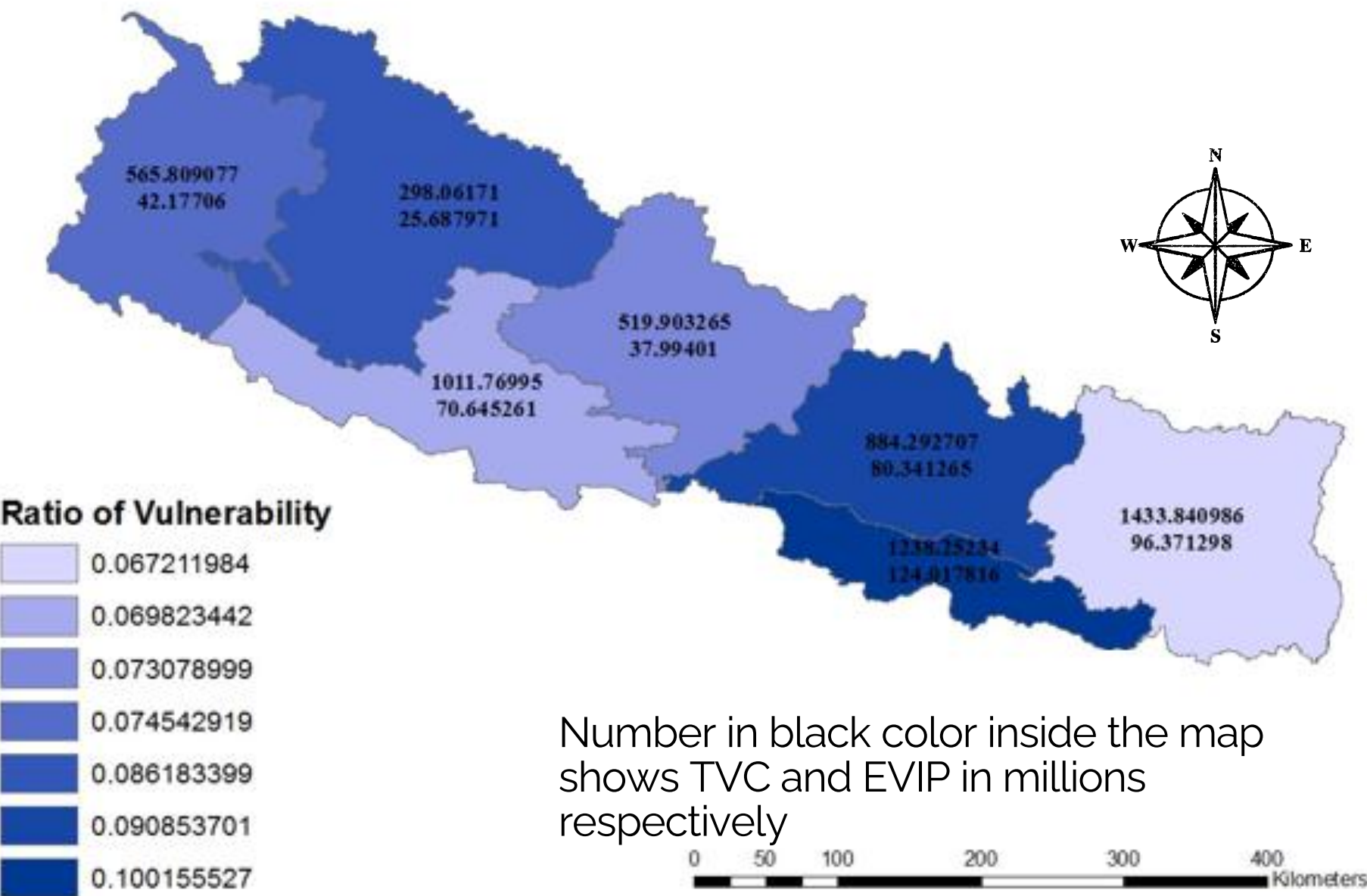
14% LOSS
IN PLANT-BASED
VITAMIN C
PRODUCTION



>80% OF
MEDICINAL HERBS
WILL DECLINE

Smith et al.
2022

Madesh province is highly vulnerable to pollinator loss followed by Bagmati Province, Karnali Province and Koshi Province is least vulnerable



Conclusion



The beekeeping in Nepal is an emerging agricultural enterprise in Nepal, contributing economically more than \$10 million from honey and other bee product markets and \$477 million by providing pollination services in Nepal.



More than 60% of the beekeepers rely on the wild or forest forages for their beekeeping.



Honey from Needlewood, Hazelnut and Butter tree has the highest values of TPC, TFC and antiradical activity.



Forest conservation supports the beekeeping and beekeeping is also supporting the forest conservation (win-win situation), making beekeeping enterprises vital for sustainable livelihood and agricultural production.



THANK YOU!!



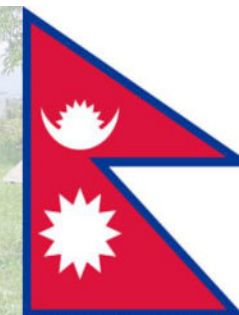
Kedar Devkota, Ph.D.
Assistant Professor
Agriculture and Forestry University, Nepal
Email: kdevktoa@afu.edu.np
Whatsapp: +9779845956983

Apitherapy and
Bee products

Bee Biology and
Bee Health

Pollination and
Bee Flora

Beekeeping
Economy



INTERNATIONAL BEEKEEPING CONFERENCE

"Modern Beekeeping Practices for Human Health, Sustainable Crop Production and Livelihood"

6-10 April 2026

Agriculture and Forestry University, Rampur, Chitwan, Nepal

Abstract will call
soon.....



Agriculture and Forestry University
Chitwan, Nepal



Ministry of Agriculture and Livestock
Development (MoALD)
Department of Agriculture (DoA)



Federation of Nepal Beekeepers
Association