# Native honey bees in Cambodia

## - The situation -

Photo: Eric Guerin

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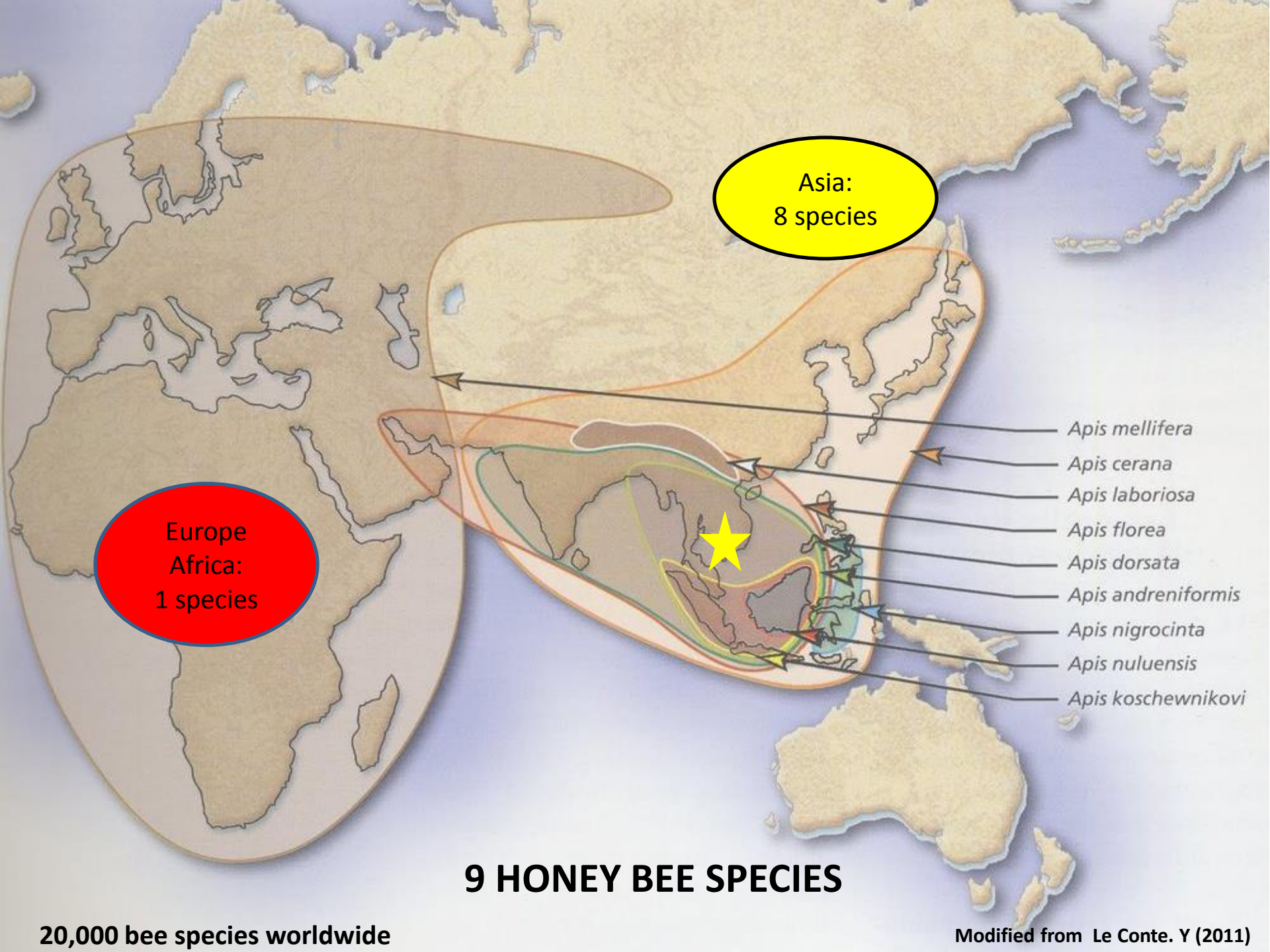



# 9 HONEY BEE SPECIES

**20,000 bee species worldwide**

**Modified from Le Conte. Y (2011)**

# HONEY BEES IN CAMBODIA

## - Apis cerana -

Asian counterpart of Western honeybee (A. mellifera):

- multiple combs cavity nesting
- can be kept in hives

But:

- bees slightly smaller (1 cm)
- smaller colonies (20.000 bees)
- shorter foraging range (3-400m)
- smaller honey yields (5-10kg)



A. cerana

A. mellifera


Modified from Paul Zborowski

# HONEY BEES IN CAMBODIA

## - Apis dorsata -

Giant honey bee:

- 1.7 - 2 cm (= queen of western honey bee)

Colonies:

- 50 – 80,000 bees

Photo: Eric Guerin

Photo: bees unlimited

Nest:

- open air
- single comb
- up to 1.5m length - 1.0m high
- up 30 kg (honey 12kg)

# HONEY BEES IN CAMBODIA

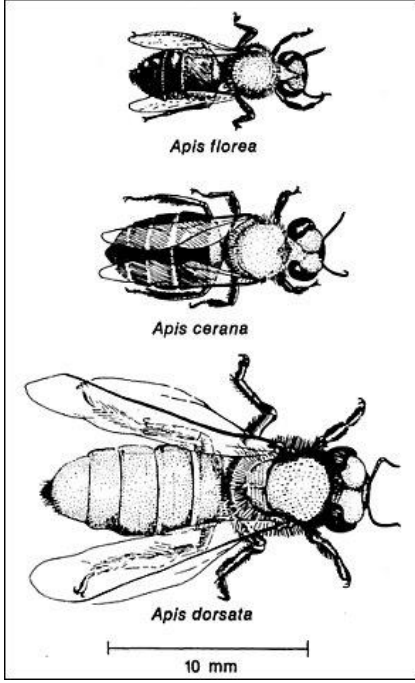
## - Apis dorsata -


Colony aggregations: up to 100 colonies on a single « bee tree » or construction

# HONEY BEES IN CAMBODIA

## - Dwarf honey bees (Apis florea & Apis andreniformis) -

Photo: Albert Stoter




Source: terraincognita96, flickr.

- Worker bee = 7 to 10 mm
- Short flight range = 100 m (700 m max)

# HONEY BEES IN CAMBODIA

## - Dwarf honey bees: Apis florea & Apis andreniformis -

Colonies:

- a few 1000s bees

Nest:

- single comb surrounding small branch

Honey:

- A few 100s grams (<1kg)

Photo: Eric Guerin

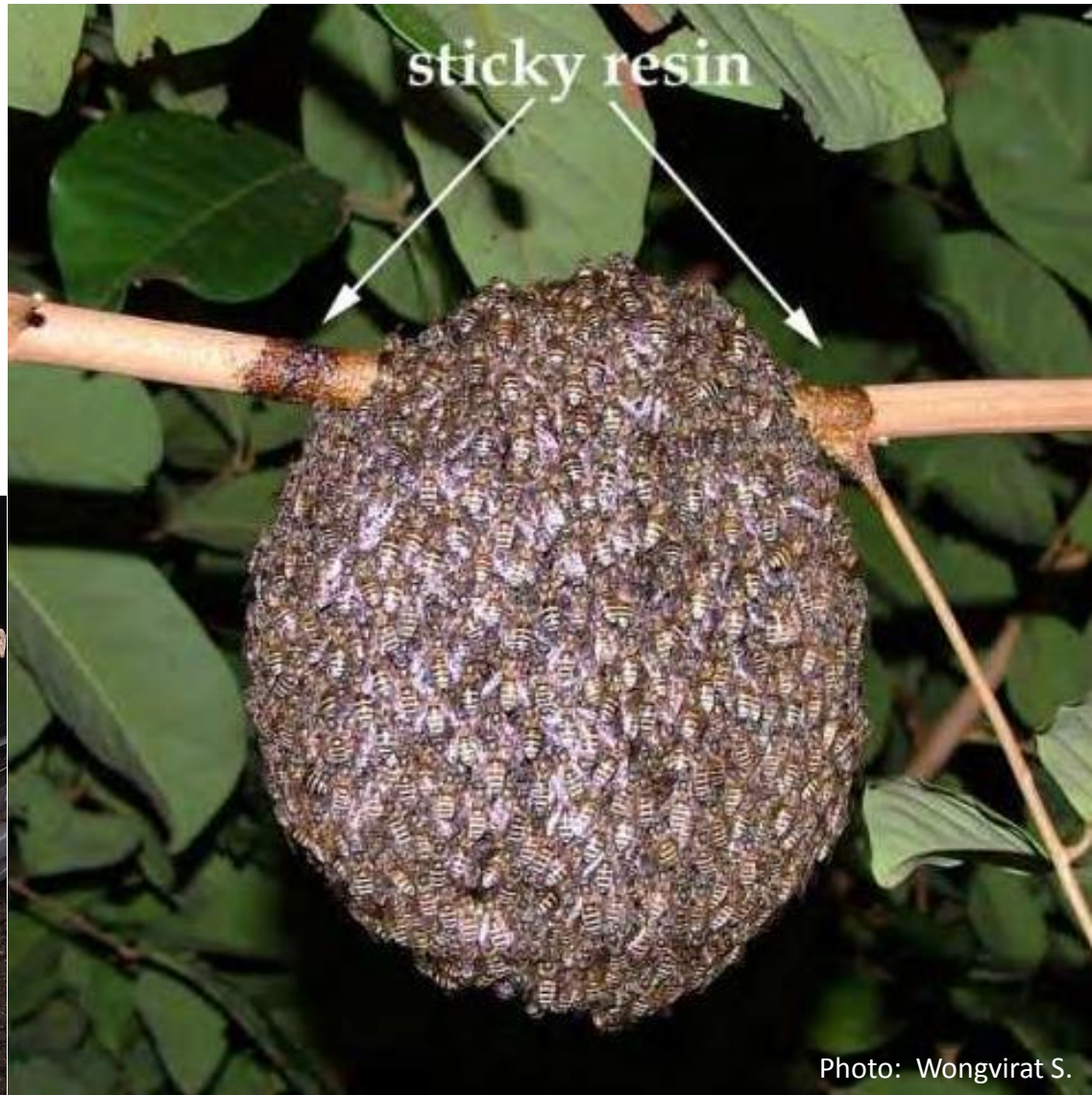



Photo: Wongvirat S.

# HONEY BEES IN CAMBODIA

## - Migration -

Asian honey bees move their nest location in response to seasonal changes

Migration itineraries are poorly known

A. andreniformis: higher elevations in rainy season ; lower elevations in dry season

A. dorsata: up to 200 km (Tonle Sap in rainy season; Phnom Kulen in dry season)

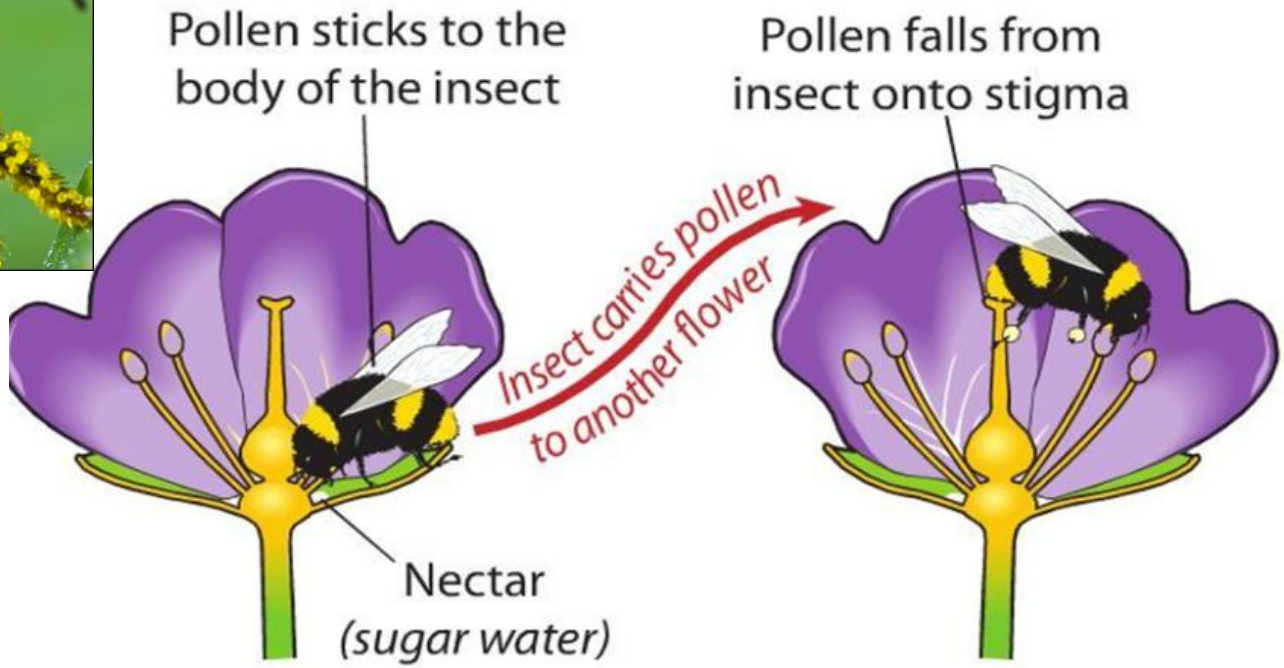
# VALUE OF HONEY BEES

## - Pollination services -

**Pollination** is the movement of pollen within or between flowers that results in the production of seeds (and fruits).

Pollinators also benefit form pollination as they get nectar (sugar) and pollen (proteins)





# VALUE OF HONEY BEES
## - Pollination services -

30% of our food is derived from plants pollinated by bees and other insects

WITH BEES

WITHOUT BEES

Crops yields are maximized (quality and quantity) by:

- High diversity (number of species)
- and abundance (size of populations) of pollinators

# VALUE OF HONEY BEES
## - Pollination services -

While some crops can be pollinated by numerous pollinators, others require the presence of a specific honey bee species

A. dorsata having the unique ability to forage at dusk is crucial for the pollination of nocturnal flowering plants (dragon fruit)

Photo: Marcus Karlsson

# HONEY BEES IN CAMBODIA

## - Natural ecosystems conservation -

**Pollinisation**

**Fruits/seeds**

Pollination by native honey bees is essential to natural ecosystems conservation:

- Forest regeneration (to replace dead trees)
- Many animals and micro-organisms depend on honey bee-pollinated plants for their survival

# HONEY BEES IN CAMBODIA

## - Natural ecosystems conservation -


Here also honey bees abundance and diversity are important

The forest communities of Cambodia evolved with two or more honey bee species present

A decline in diversity and/or abundance of honey bees could have cascading effects in biodiversity loss

# VALUE OF HONEY BEES

## - Natural ecosystems conservation -

Photo: Wanling Tang

Asian honey bees are prey for a variety of insect, mammalian and bird predators

Several bird species such as honey buzzards are specialist predators of honey bees

# VALUE OF HONEY BEES

## - Socio economic & socio cultural -


Honey hunting is an ancestral activity in Cambodia; hunter communities are often among the poorest

Wild honey is one of the main ingredients in traditional medicine, bee wax is used for blessing ceremonies

# THREATS ON HONEY BEES

## - Deforestation -


Deforestation: loss of floral resources and nesting sites

A. dorsata and A. andreniformis are particularly affected

# THREATS ON HONEY BEES

## - Deforestation -


Rainy season nesting site

Eh girls!
They burnt the campsite…

Dry season nesting site

**Deforestation of an area might also impact bee populations in other areas (migratory species)**

# THREATS ON HONEY BEES

## - Agriculture intensification -

**Monoculture (reduced plant diversity):**

Deprive bees of nesting sites and food resources

Food resources might be important but incomplete:

- only pollen (corn…)
- only nectar (rubber tree…)

Photo: Sachiko Kojima


Photo: Bruna Campanholo

# THREATS ON HONEY BEES

## - Agriculture intensification -

**Pesticides** :

1. kill whole colonies nesting in orchard (in particular A. florea)
2. kill foragers of colonies nesting outside the crop but foraging in the crop (all species)

A beekeeper from Oudomxay (Laos) lost 40 A. cerana colonies in one day (AESBO, 02/2019)


Photo: Eric Guerin


Photo: DigitalB2BTrade.com

2 A dorsata unsustainable HH.mp4

# THREATS ON HONEY BEES

## - Unsustainable honey hunting -

Most hunted species: A. dorsata & A. florea

Photo: Md. Akhlas Uddin

Even though bee colonies might survive and built a new nest, unsustainable honey hunting reduces their reproduction capacity (swarming).

# THREATS ON HONEY BEES

## - Unsustainable honey hunting + colony destruction -

# THREATS ON HONEY BEES

## - Unsustainable honey hunting + colony destruction -

Opportunistic honey hunters with no bee experience might use fire or insecticides to prevent bee stings.

Source: NTFP

Source: NTFP

# THREATS ON HONEY BEES

## - Unsustainable honey hunting -

A. florea is also intensively hunted

4 Honey Hunters of Cambodia (Apis florea).mp4

Photo: Eric Guerin

Photo: Eric Guerin

# THREATS ON HONEY BEES

## - The responsibility of consumers -

As in any wildlife conservation program, the market also plays a role

Bee brood consumption enhance unsustainable hunting

Growing interest for nature tourism and online sales might increase the demand for bee brood



Photo: Eric Guerin

# THREATS ON HONEY BEES

## - Climate change-

The consequences of climate change on honey bees is a complex matter and much remains to be understood.

Among climate change effects on Asian honey bees :

- habitat loss
- increased  exposure to forest fires
- mismatches between bees and flowers
- higher exposure to pests and diseases

# THREATS ON HONEY BEES

## - Status of native honey bees in Cambodia -

**Apis cerana:**

- In decline over the past 10 years in most Asian countries (1):
  - Average 55%
  - 40-55% for Cambodia

**Apis dorsata:**

- Populations stable in some areas (Mondulkiri), in strong decline in others (Phnom Kulen - Tonle Sap)
- Very sensitive to deforestation
- Very intensively hunted

*(1) Theisen-Jones H. & Bienefeld K., 2017*

Photo: Eric Guerin

No global assessment of honey bee populations in Cambodia

# THREATS ON HONEY BEES

## - Status of native honey bees in Cambodia -

**Apis andreniformis:**

- Rarest honey bee species in Cambodia
- Also rare and in decline in Thailand and Vietnam
- Very sensitive to deforestation (undisturbed deciduous to evergreen forests)

**Apis florea:**

- More resilient to deforestation (common in disturbed areas: urban, agricultural, secondary forest)
- Very intensively hunted
- Highly exposed to pesticides

Photo: Eric Guerin

# CONSERVATION

## - Forest conservation & agro-ecology -


Forest conservation and reforestation as well as agro-ecology contribute to native honey bees conservation

# CONSERVATION

## - Sustainable honey harvesting-

By harvesting the honey head only:

- honey yields are increased (2-3 honey harvests)
- bee colonies have a higher swarming rate

To be efficient : train honey hunters and educate customers

Sustainable honey harvesting :

- Cambodia (Mondulkiri)
- Thailand (Doi Phu Kha National Park)

Photo Eric Guerin

# CONSERVATION

## - Rafter beekeeping -

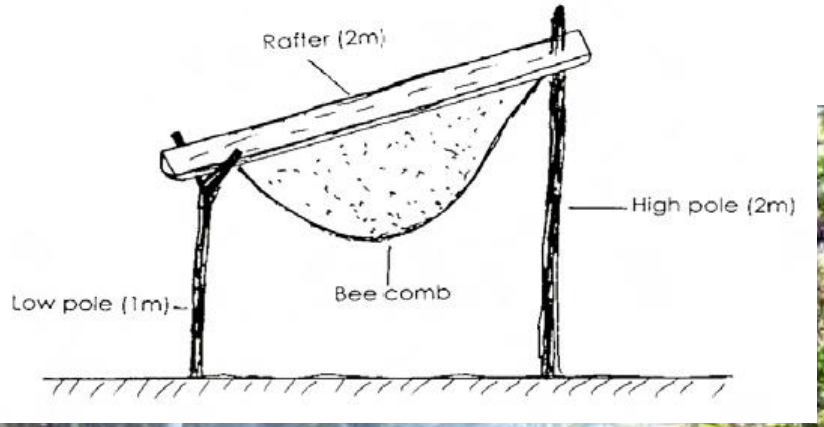



Photo: Eric Guerin

Rafter beekeeping:

- Indonesia
- Vietnam
- Cambodia
- Thailand

# CONSERVATION
## - Sustainable honey harvesting from dwarf bees -



Sustainable honey from A. florea:

- Thailand (Kanchanaburi)

# CONSERVATION
## - Beekeeping -

Beekeeping may contribute to protect native honey bee by providing alternative incomes to honey hunters


3 beekeeping options in Cambodia :

- A. mellifera,
- A. cerana,
- Stingless bees

# CONSERVATION
## - Beekeeping -

Beekeeping as part of native honey bee conservation:

- A. cerana to preserve A. laboriosa (Lai Chau, VN)
- A. cerana to restore A. cerana population (Oudomxai, Laos)
- Meliponicutlure to preserve A. dorsata (Indonesia)

# CONSERVATION

## - Beekeeping with Apis mellifera -

In many cases more profitable

But, A. mellifera  introduction might affect native bees by :

- outcompeting for floral resources
- spreading pests and diseases

A. mellifera  initial introduction resulted in dramatic decline of A. cerana populations in China, South Korea, India…

Today, the two species coexist in many Asian countries but has the threat completely disappeared? :

- A. mellifera filamentous virus detected on A. cerana in China (2016)

**A. mellifera is already present in Cambodia**

**Its introduction in protected areas should be avoided**


A. mellifera ban:

- A. mellifera prohibited to protect Apis cerana wild mint honey (Hagiang, VN)


Photo: Eric Guerin

# CONSERVATION

## - Beekeeping with A. cerana & stingless bees -

**Advantages of native species vs. A. mellifera :**

1. more resistant to pests and diseases
2. cheaper (investment and management)
3. require lower skills
4. produce less honey but of superior quality:
    - lower risk of chemical contamination
    - high medicinal value of stingless bee honey

High value of bee products from native species:

- A. cerana honey 3 x more expensive than A. mellifera honey (VN)
- Stingless bee honey and propowax exported to Singapore

# CONSERVATION

## - Beekeeping with native species -

**When developing beekeeping with native bees, local subspecies should be preferred** to avoid genetic contamination of local bee populations.

Learn from the mistakes made in Europe:

- Hybridization among the causes of colony collapse disorder
- Conservation of A. mellifera subspecies a major concern in Europe

Becautious while purchasing native bee colonies:

- Hybrid A. cerana cerana x A cerana indica (Vietnam)


# CONSERVATION

## - Bee sanctuaries -

A network of bee friendly managed lands

Objectives:

- to protect bees and other pollinators
- to raise public awareness on the importance of pollinators

Basic rules:

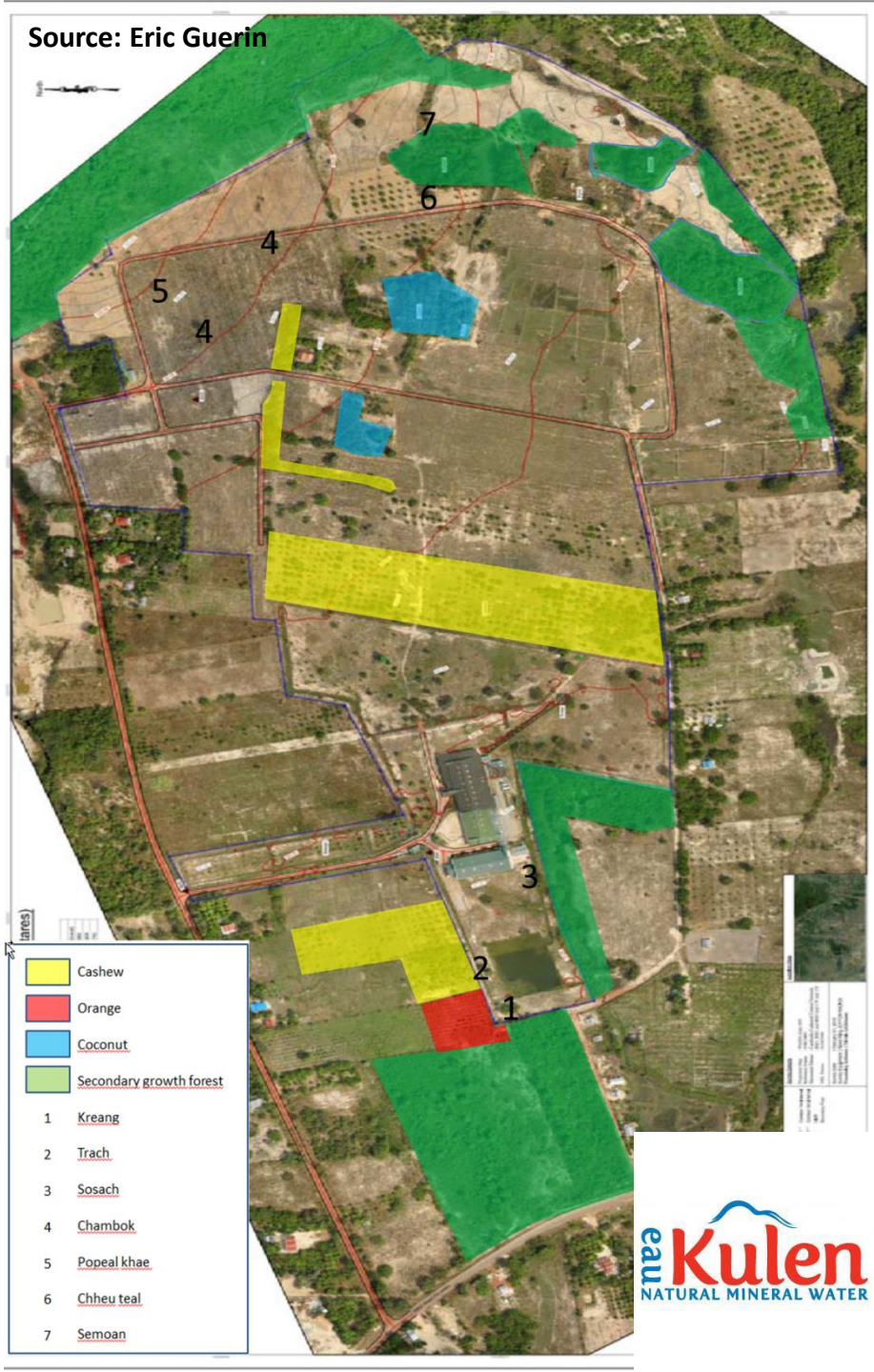
- no introduced bees
- no honey hunting
- preserved / restored ecosystems
- agro-ecology
- maximum of bee plants (foraging and nesting)

Potential sites:

- core areas national parks, biosphere reserves…
- private lands

Eau Kulen (Siem Reap):

- Native bees conservation integrated in the management of a 40 ha land



# Thank you!