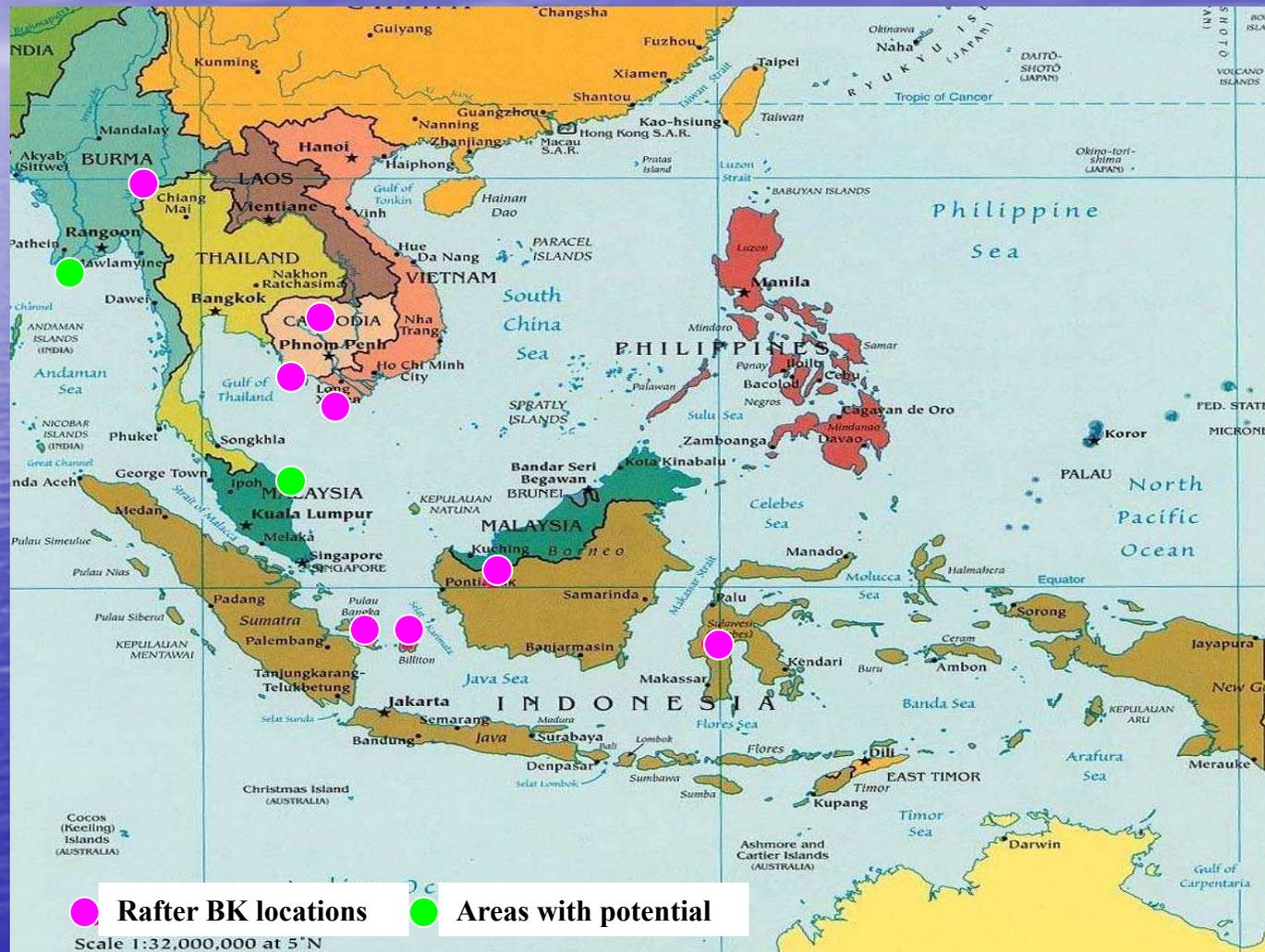


*Rafter Beekeeping in Danau Sentarum
National Park, West Kalimantan,
Borneo*

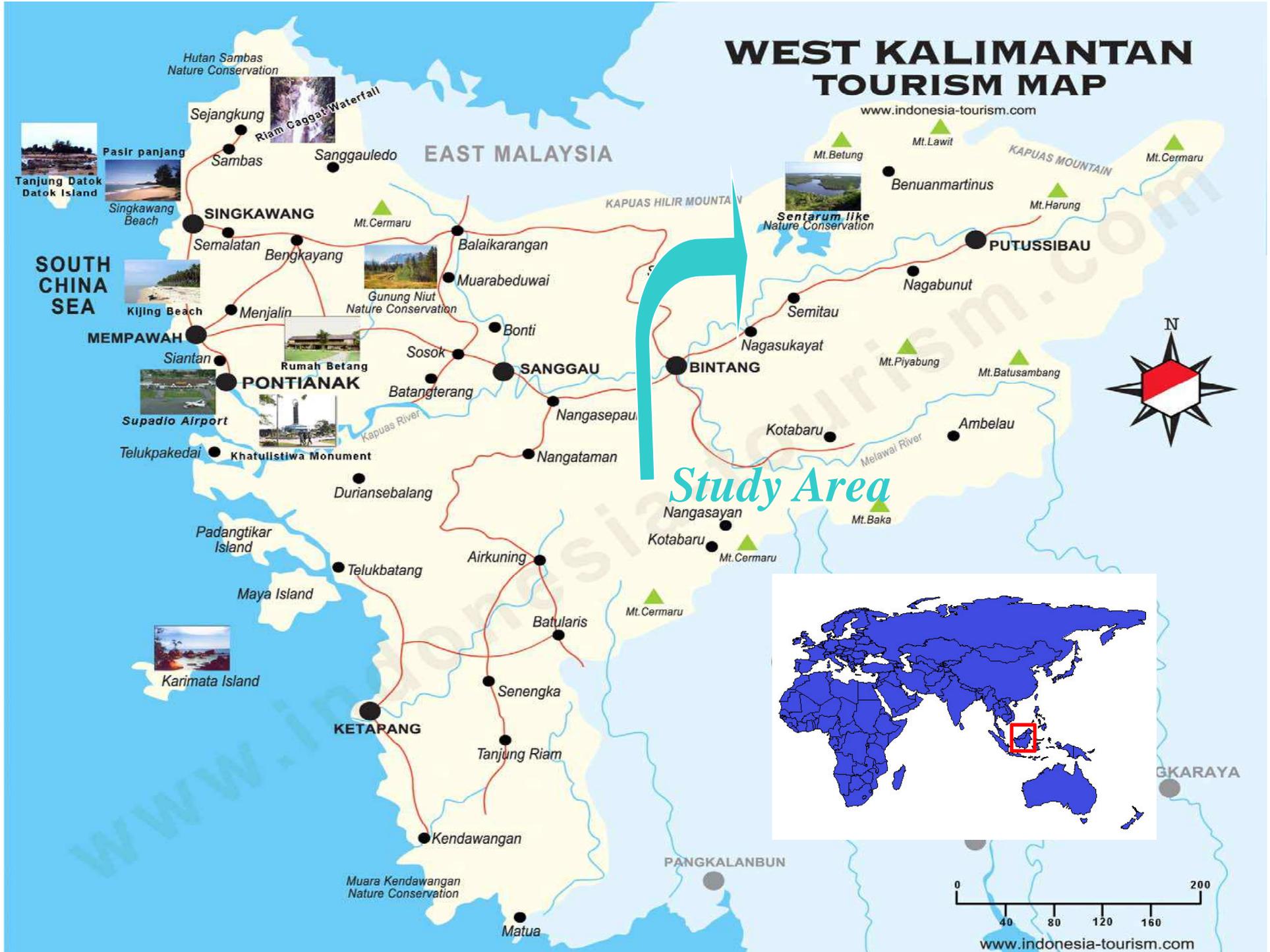
**Presented by
Stephen Petersen, Apicultural Consultant**

Distribution of Rafter Beekeeping in SE Asia

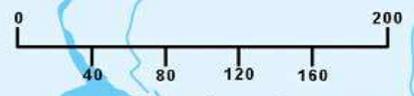


WEST KALIMANTAN TOURISM MAP

www.indonesia-tourism.com



Study Area



www.indonesia-tourism.com



Getting there is half the fun!



House boats ply the Kapuas River, providing the slowest means of transport.

A bit faster are the numerous long boats powered by small outboards.



The principal villages are built on stilts to provide protection from the changing water levels of the rivers and lakes; they may vary 10-14 meters (30-42 feet).



Two main ethnic groups inhabit the area; the *Dayaks* (mainly *Iban*) who are primarily agriculturalists and do some honey hunting in the forest, and the *Melayu* who are fishermen and rafter beekeepers. The *Iban* live in longhouses on higher ground while the *Melayu* live in raised houses along the rivers and lakes.





For the *Melayu*, fishing is the major activity and cash earner especially in the dry season when the fish are concentrated in smaller areas.

Managing *dorsata* bees using rafter techniques (locally called *tikung*) to produce a high quality organic honey is the #2 activity and cash generator for the *Melayu*.



ASOSIASI PERIAU DANAU SENTARUM

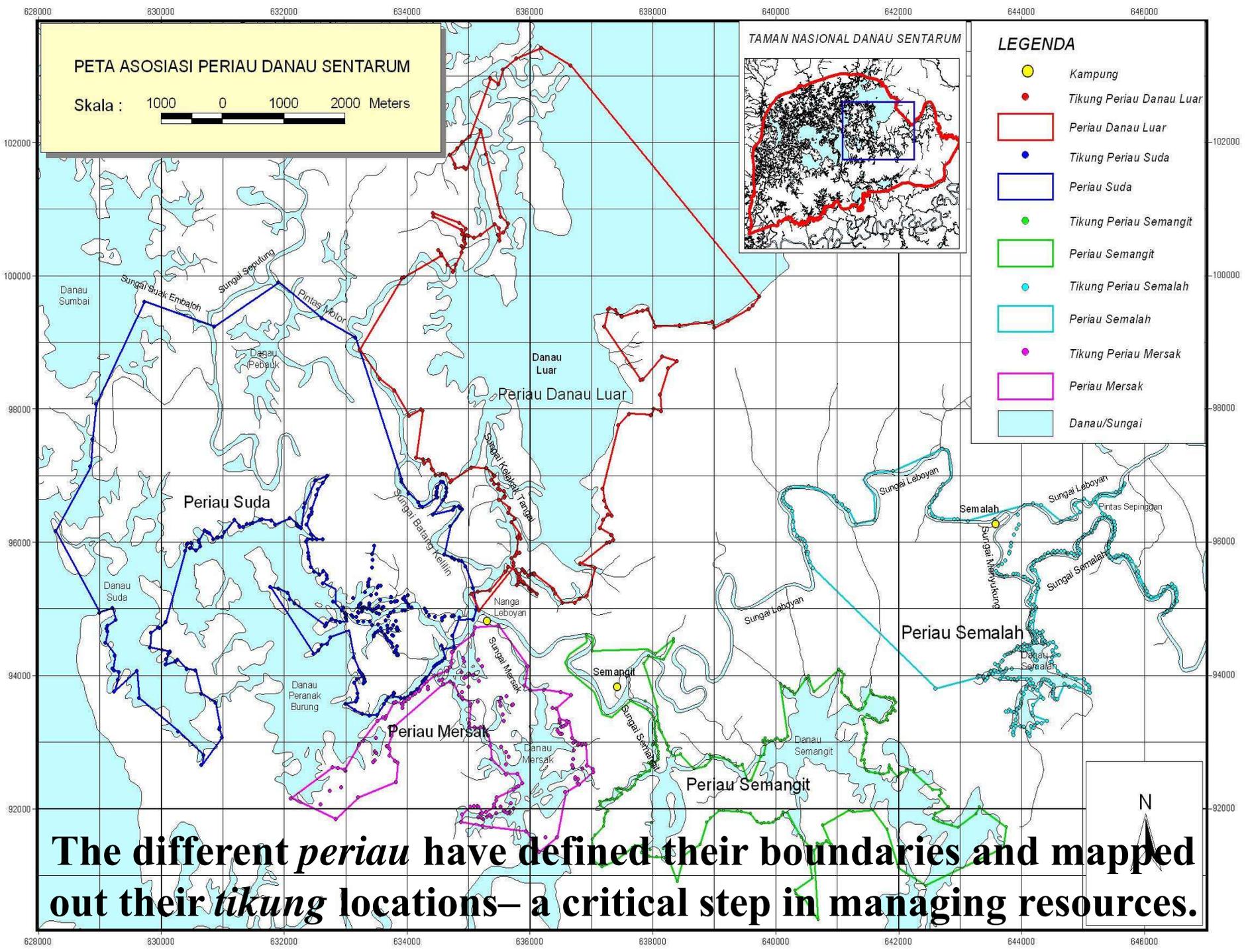


JL. BATANG LEBOYAN, DUSUN SEMANGIT,
DESA NANGA LEBOYAN, KECAMATAN SELIMBAU,
KABUPATEN KAPUAS HULU,
KALIMANTAN BARAT.
INDONESIA.

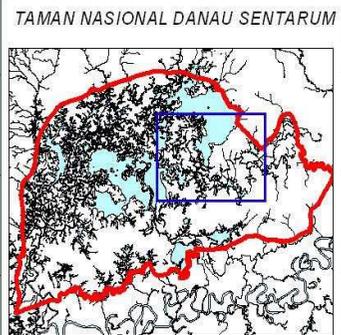
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“Periau” are traditional organized groups of rafter beekeepers usually based on extended family or clan lines. To join a *periau* the beekeeper must have at least 25 rafters.





PETA ASOSIASI PERIAU DANAU SENTARUM
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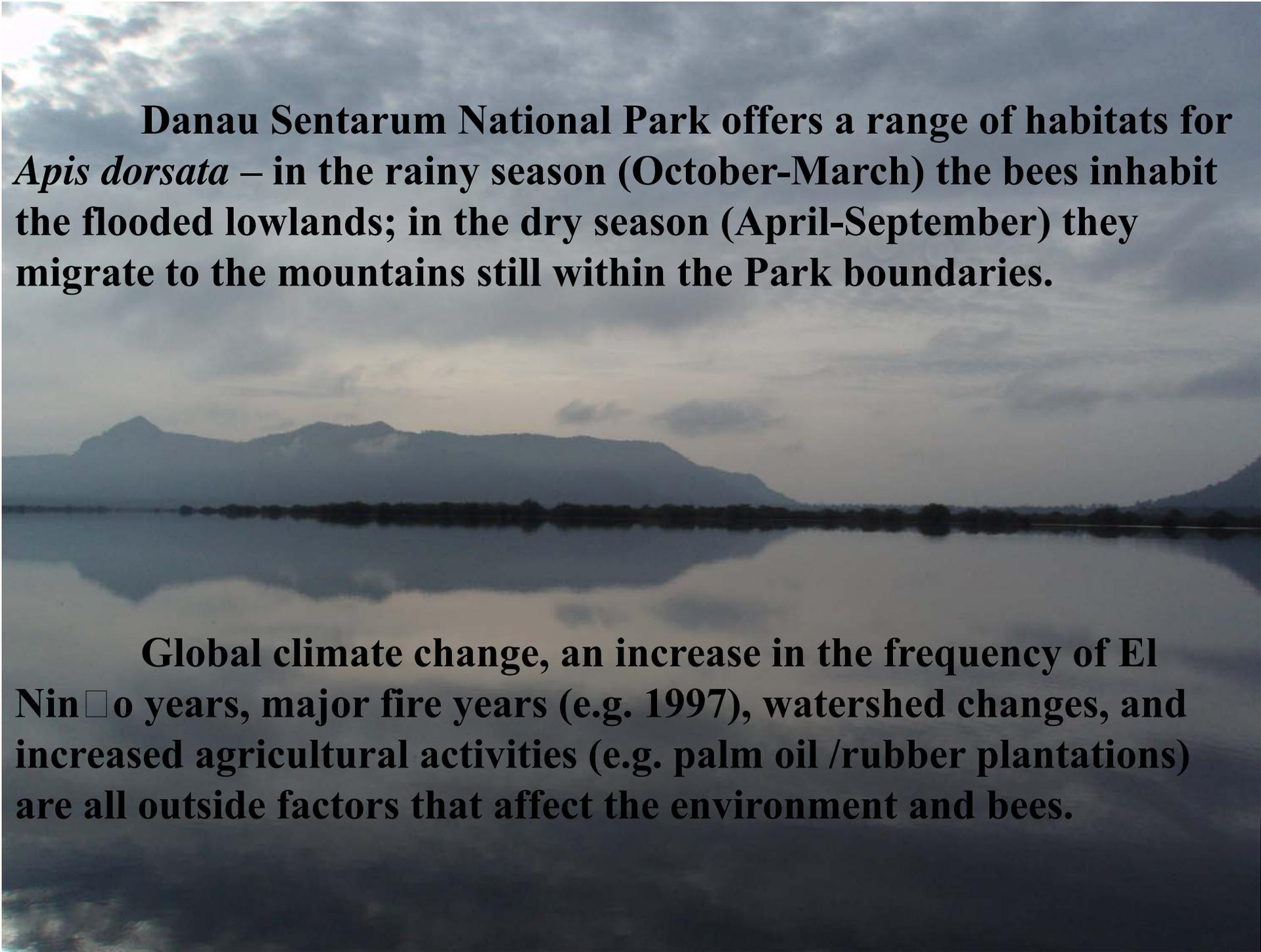


- LEGENDA**
- Kampung
 - Tikung Periau Danau Luar
 - Periau Danau Luar
 - Tikung Periau Suda
 - Periau Suda
 - Tikung Periau Semangit
 - Periau Semangit
 - Tikung Periau Semalah
 - Periau Semalah
 - Tikung Periau Mersak
 - Periau Mersak
 - Danau/Sungai

The different *periau* have defined their boundaries and mapped out their *tikung* locations—a critical step in managing resources.

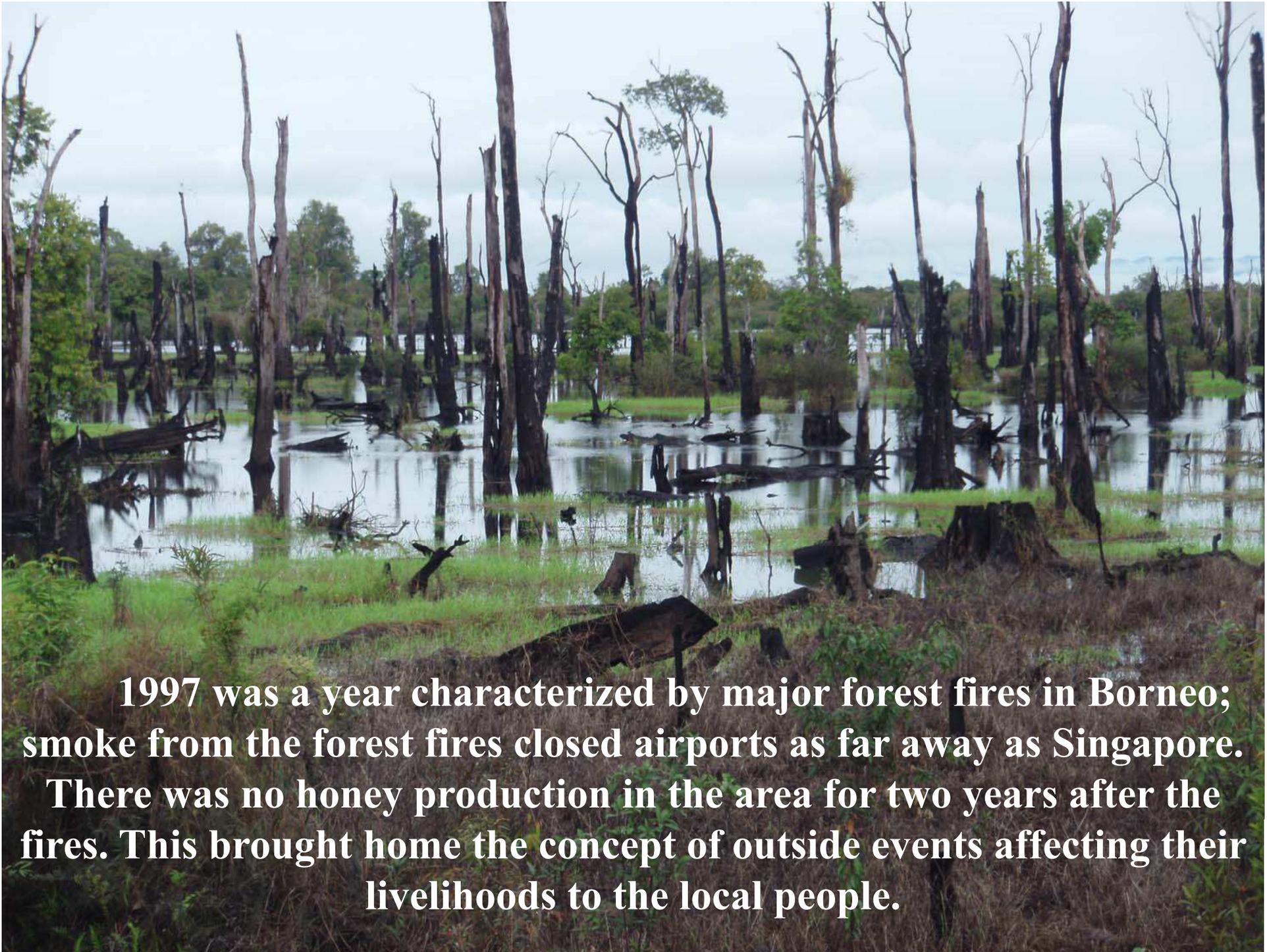


Tradition plays an important role in Kalimantan culture. Indigenous knowledge and skills are passed down through generations.

A landscape photograph of a lake with mountains in the background under a cloudy sky. The text is overlaid on the image.

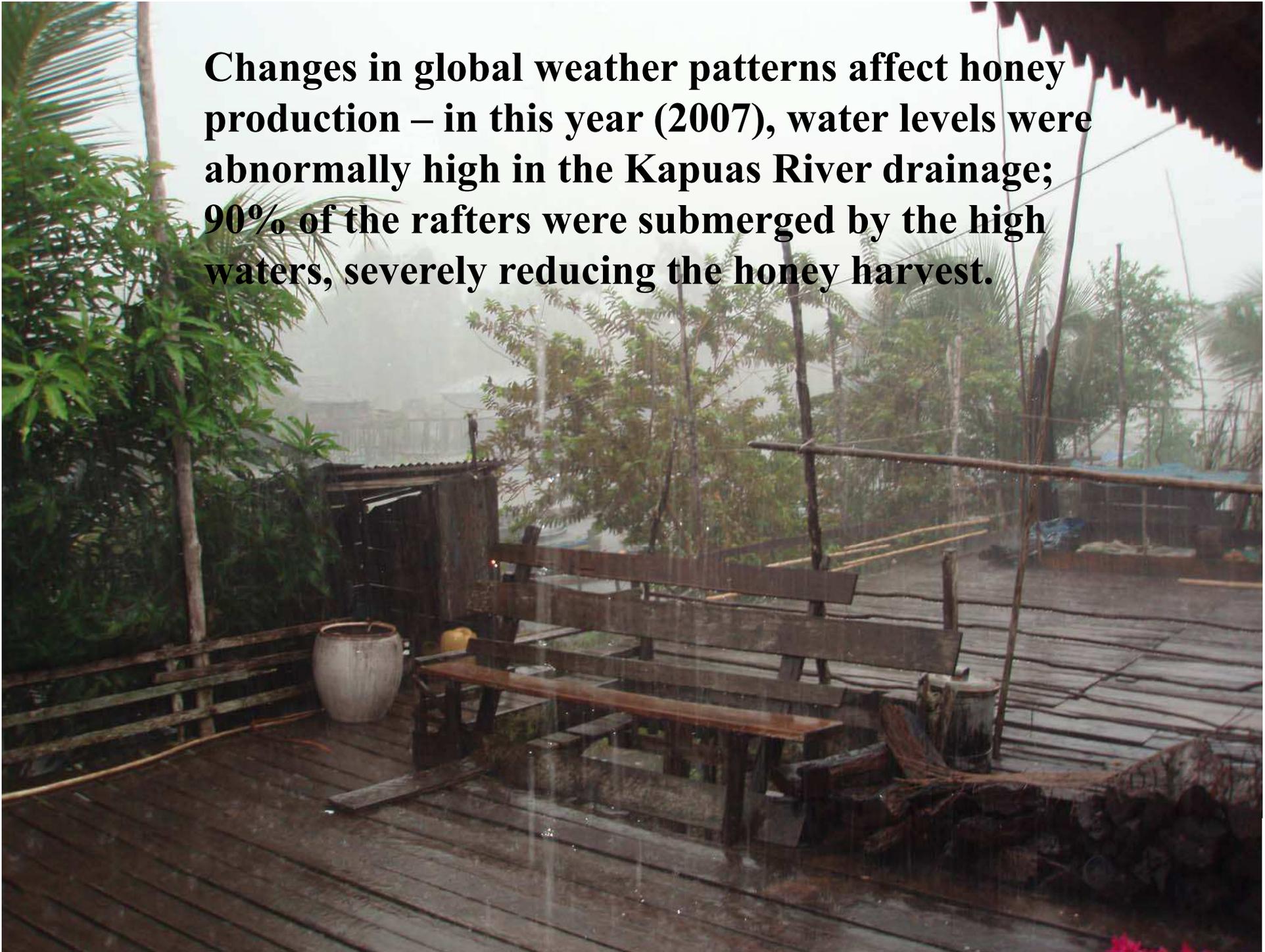
Danau Sentarum National Park offers a range of habitats for *Apis dorsata* – in the rainy season (October-March) the bees inhabit the flooded lowlands; in the dry season (April-September) they migrate to the mountains still within the Park boundaries.

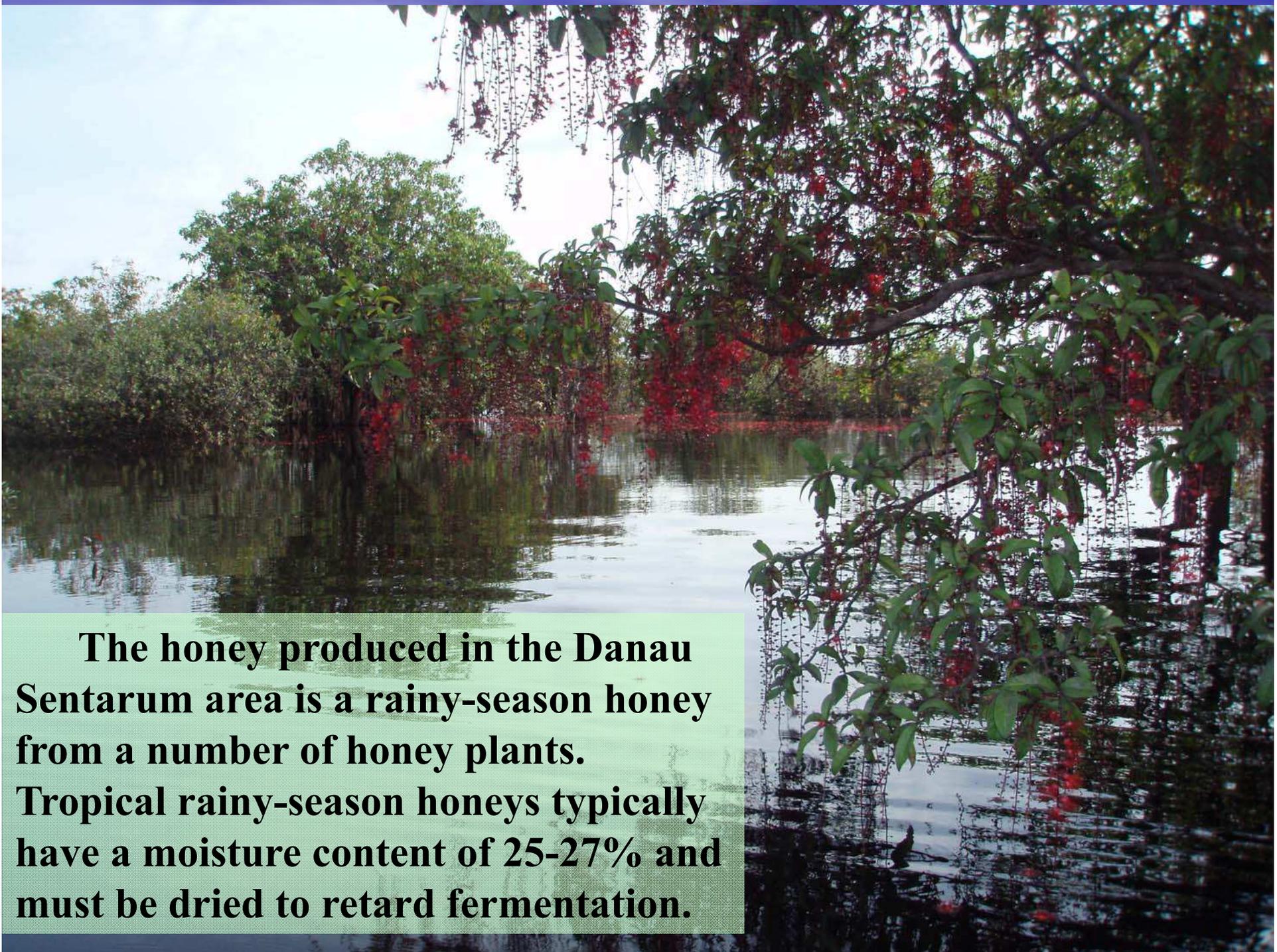
Global climate change, an increase in the frequency of El Niño years, major fire years (e.g. 1997), watershed changes, and increased agricultural activities (e.g. palm oil /rubber plantations) are all outside factors that affect the environment and bees.



1997 was a year characterized by major forest fires in Borneo; smoke from the forest fires closed airports as far away as Singapore. There was no honey production in the area for two years after the fires. This brought home the concept of outside events affecting their livelihoods to the local people.

Changes in global weather patterns affect honey production – in this year (2007), water levels were abnormally high in the Kapuas River drainage; 90% of the rafters were submerged by the high waters, severely reducing the honey harvest.





The honey produced in the Danau Sentarum area is a rainy-season honey from a number of honey plants. Tropical rainy-season honeys typically have a moisture content of 25-27% and must be dried to retard fermentation.

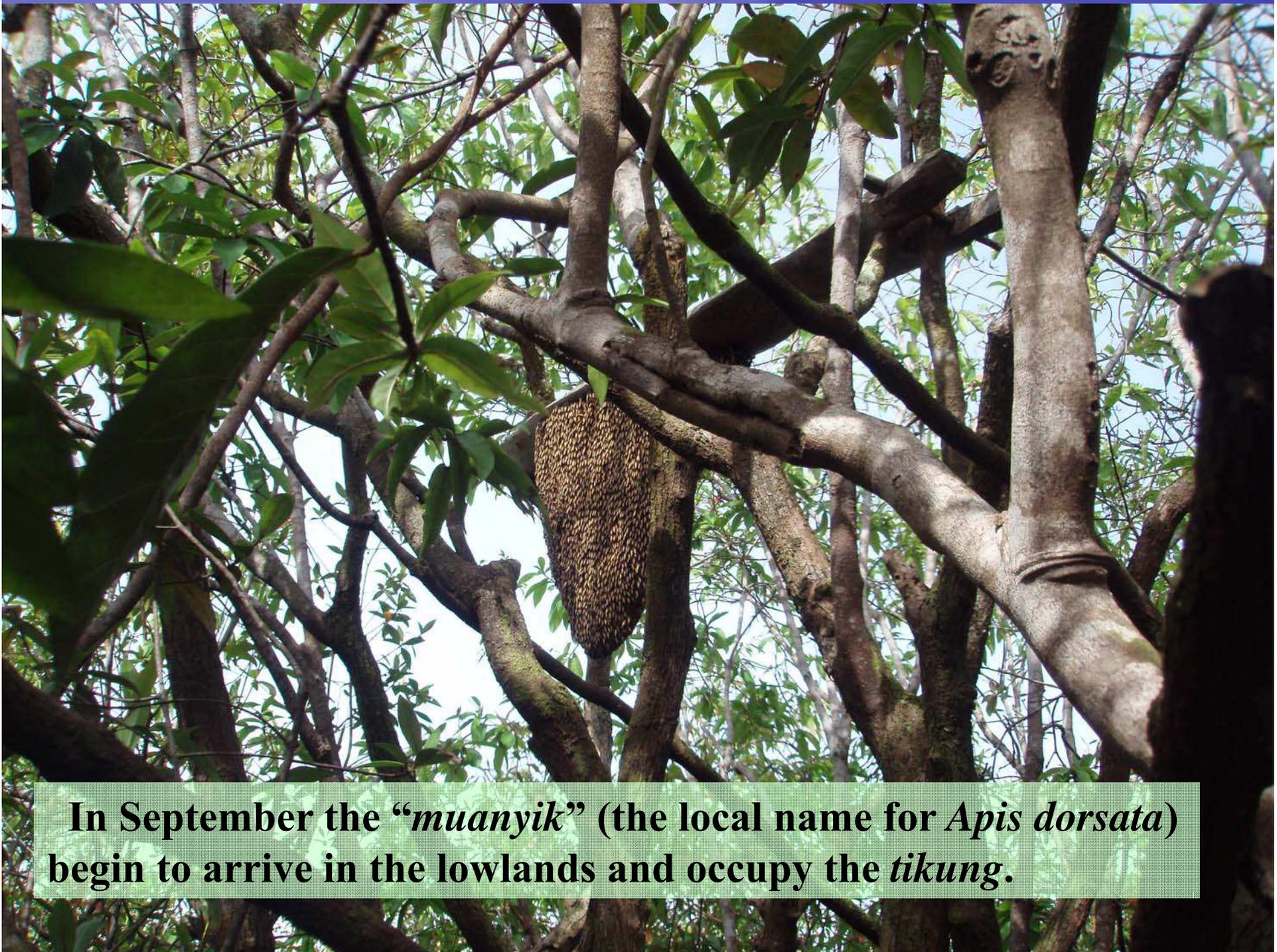


Specially shaped rafters or “*tikung*” are placed 3-4 meters above the normal high water level. Some families have as many as 1,000 *tikung* – typical occupancy rates are 25%-40%.



Branches are trimmed to provide a flyway (*bagain muka*) for the bees. The *tikung* may be attached in a number of different ways; *tikungs* will last 30-40 years and are left in position year around.





In September the “*muanyik*” (the local name for *Apis dorsata*) begin to arrive in the lowlands and occupy the *tikung*.



The rafters are concave on the upper side to facilitate rain water runoff; the underside is rounded and smooth duplicating the bees preferred nesting site (a tree branch). They are placed at about a 30° slope from the horizontal.

Putat (*Barringtonia acutangula*)



Kayu Tahun (*Carallia bracteata*)

Masung (*Syzygium claviflora*)



Bunga-bunga Pakan Lebah

(Important honey plants)

Ubah (*Syzygium ducifolium*)

Kawi (*Shorea belangeran*)

Leban (*Vitex pinnata*)

Ringin (*Dillenia beccariana*)

Akar Libang (*Connarus monocarpus*)

With an intimate knowledge of the phenology (bloom times) of the local flora, *periau* members can produce unifloral honeys; most often however, it is a blend of the seasons' flowers.

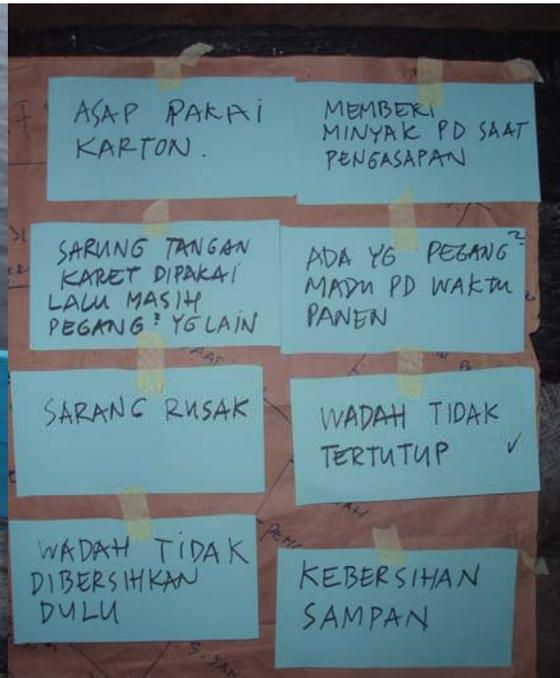


“Periau” members receive training in five areas to increase their skills. To join APDS (Asosiasi Periau Danau Sentarum) initiates must undergo training in:



- 1. Learning & practice of sustainable harvest techniques.**
- 2. ICS training (Internal Control Systems).**
- 3. Internal Inspector training.**
- 4. Small Holder Management training.**
- 5. Advance training in marketing and Quality Control (QC).**





Used fuel to start smoker.

Touching honey during harvest.

Bucket uncovered.

Boat not clean.

Using cardboard for smoke.

Contaminated rubber gloves.

Broken Honeycomb.

Unclean bucket.

In a post-harvest session the ICS inspectors critique what they have observed of the initiates.

Quality control begins in the field. *Periau* members are held to strict criteria.

Making a tikung:

Select a 1-2.5 meter long log between 25-40 cm in diameter; preferred woods are #1 Tembesu (*Fagraea fragrans*), #2 Medang (*Litsea sp.*), and #3 Kawi (*Shorea belangeran*). Round off the bottom side in the fashion of a tree limb.



After roughing the *tikung* out with the hand axe it is further smoothed with a plane and rasp. Wet or green wood is easier to work.





The upper side of the *tikung* is made concave to facilitate rain water run-off thus protecting the comb underneath.

Simple hand tools are all that are available for *tikung* construction. Below from left to right - adze, plane, hand-axe, rasp, auger, and handsaw.





Using a handsaw a notch ($\pm 20 \times 10$ cms) is fashioned in both ends of the *tikung* to help secure it to the trees.





A 20-25 mm hole is drilled across the two arms at the ends of the *tikung* and fitted with a wooden peg.

This will secure the *tikung* to a branch in the field.

All done! It takes a beekeeper about 4-6 hrs to produce a *tikung*.



Convex bottom on which the bees can build comb.



Concave top to channel rainwater away from comb.



The notches in the ends of the *tikung* make it easy to affix in any number of situations; the pegs prevent the *tikung* from falling out during windy periods.

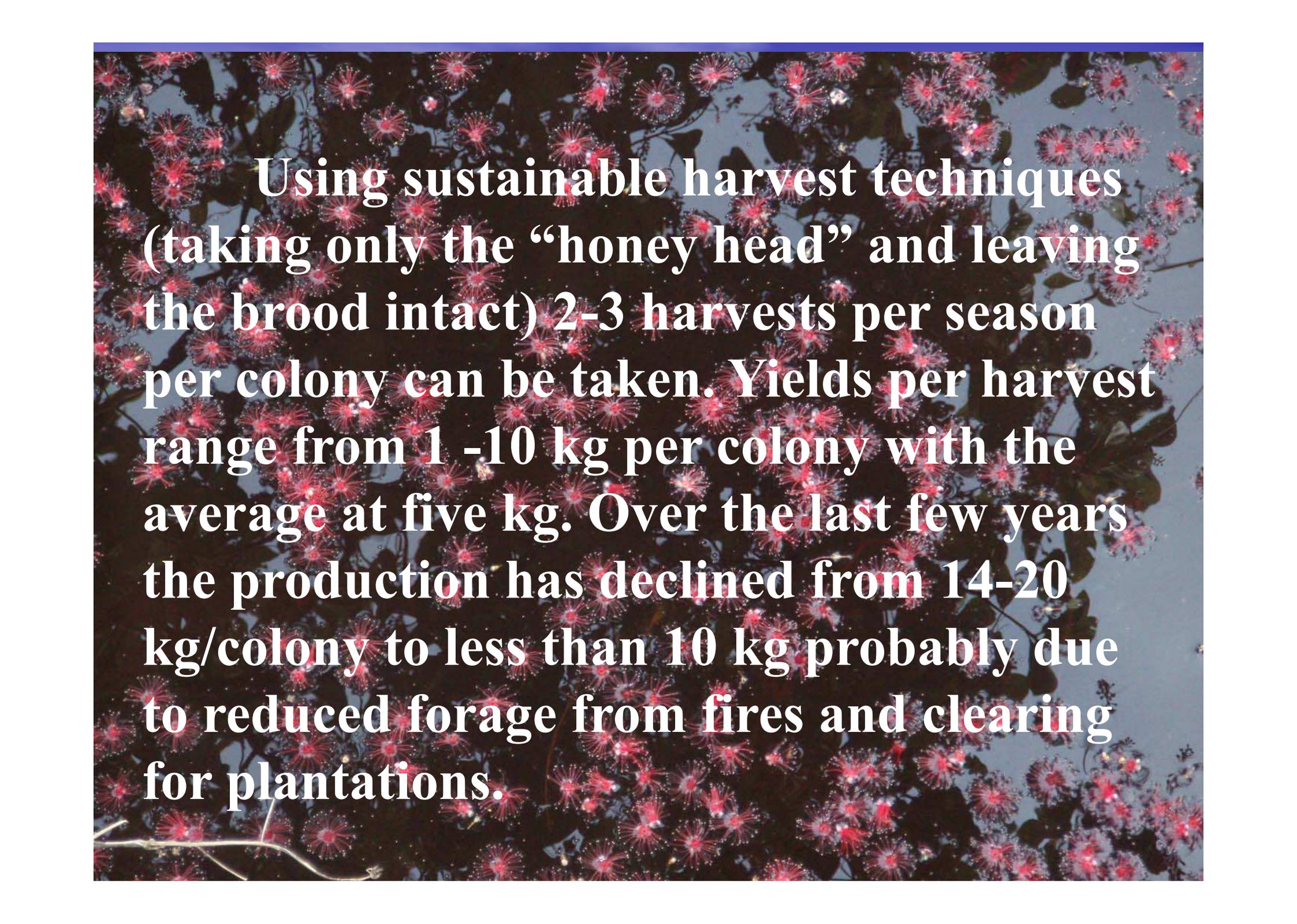




Rope or heavy twine is sometimes used to further secure the *tikung* to the surrounding branches. A slope of about 30° appears to be most favorable angle and concentrates the honey portion of the comb on the uphill side.



Harvesting honey from a *tikung*.



Using sustainable harvest techniques (taking only the “honey head” and leaving the brood intact) 2-3 harvests per season per colony can be taken. Yields per harvest range from 1 -10 kg per colony with the average at five kg. Over the last few years the production has declined from 14-20 kg/colony to less than 10 kg probably due to reduced forage from fires and clearing for plantations.

Harvesting honey from a *tikung*



Traditional smokers called *tebauk* are made from the bark of a liana locally called “*akar miadin*”.





Lots of cool white smoke provides protection from stings; note the rafter ownership code – this is part of the quality control process.

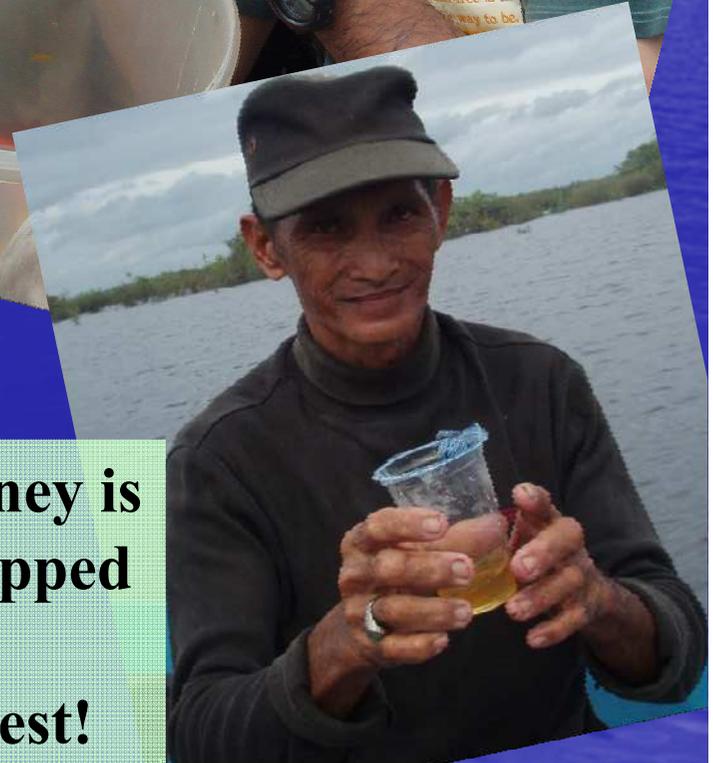
Honey is harvested during daylight hours; prior to an exchange visit with rafter beekeepers in Vietnam (1994) honey was harvested at night resulting in the loss of many bees and many more stings. The current method is far more “bee friendly” as few bees are killed.



Harvesters must scramble up 3-4 meters from the boat to secure the honey.

Every care is taken to prevent leaves and debris from contaminating the honey.

Only the “honey head” is taken – the brood is left intact to stimulate further honey production by the bees.



Using sanitary handling techniques the honey is field-graded separating the pollen and uncapped honey from the capped #1 quality honey. It provides a chance for an instant field taste test!



Back in Kampong Semangit the training in proper processing and handling of honey takes place. The comb is cut and allowed to drain thus eliminating introduction of pollen or contaminants that result from squeezing the comb.



Asosiasi Periau Danau Sentarum (APDS)

Riak Bumi – Local NGO assisting with training, local markets and organization. 1.5 tons of honey marketed.

Dian Niaga (Indonesian Forest Honey Network) - National and international marketing of products. 4 tons of honey marketed.

What is sustainable harvesting?

Honeybee colonies may be sustainably removed from a population if the rate at which they are harvested is less than the ability of the population to replace them
(Asian Honeybees, Harvard University Press, Oldroyd & Wongsiri 2006)

To know the natural rate of increase of a population of honeybees we need to know-

- its size and distribution,
- rates of immigration and emigration,
- the number of swarms produced by a typical colony each year,
- and the natural longevity of colonies.

The natural reproductive rate is not static but strongly influenced by the density of the population relative to the available floral and nesting site resources.

How APDS can help monitor the sustainability index.

- Keep accurate records as to the *number of occupied* tikung in the area. This will provide baseline data for population studies.
- Take note of *time of year and frequency* of reproductive swarms (noted by queen cells on periphery of brood comb).
- Record *dates of migratory activity* – are the bees coming from the hills or nearby “lalau” trees?
- Record *harvest yields, bloom times* of local bee flora, and *weather* data.



**The question of sustainability can only
be answered by monitoring, data
collection, and processing over time.**

Thank you - سَيِّدُ النَّحْلِ