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Photo: ALI SHAMSUL BAHAR

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Kelantan's cavernous Chiku Cave – with its stunning limestone formations and rare wildlife – will be history if the site is quarried. >2

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Losing a last refuge

Newly found species of wildlife and a neolithic site may be lost to quarrying.

By TAN CHENG LI
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ON maps, it shows up as a tree-covered region. The Relai Forest Reserve, to be exact. But what is seen from the air is an expanse of rubber and oil palm trees, broken up in parts by soaring limestone outcrops. Through the years, pieces of the reserve in the hinterland of Kelantan, in the area called Chiku, have been given away for agriculture or encroached upon. With the forest landscape already destroyed, the limestone hills are the only wild areas left – the only refuge for whatever flora and fauna that remain. And yet, these too, might soon be gone.

The country's biggest cement clinker plant is set to come up there, at a site some 30km from Gua Musang. The company, ASN Cement, intends to quarry the limestone karst which locals call Chiku 7, for raw materials to produce cement clinker.

The project appears to be a replacement for a similar one in Merapoh, Pahang, which was abandoned two years ago following public protests and the discovery of extensive cave systems, new species of geckos and rare plants.

The same scenario is unfolding in Chiku now. Caving enthusiasts have found unique cave formations and archaeological remnants, while scientists have found rare and new species, which all make the Chiku karsts worth preserving. But will these new information be enough to convince the Kelantan Government to pull out from the project to produce 10,000 tonnes of clinker cement a day?

In mid-February, Menteri Besar Datuk Ahmad Yakob led the ground-breaking ceremony for the cement plant. Nevertheless, the detailed environmental impact assessment on the project has yet to be approved. It is still being vetted by a panel of experts put together by the Department of Environment.

Numerous limestone hills are scattered over the Chiku area. Locals have given some of them names such as Chiku 4, Chiku 5

and Chiku 7, but many remained unnamed and none have been thoroughly explored. So when caving enthusiast Laili Basir ventured into the caves of Chiku 7, he was blown away by what he saw – huge chambers with beautiful mineral formations shaped over millions of years. In one cave, a crystal-clear stream flows through for some 800m, harbouring tiny fish and shrimps. Laili estimates there are between 40 and 50 caves in the area, and feels they should be preserved for tourism and not be destroyed.

"One of the caves is big and accessible. There is no need to crawl to reach it so it is suitable for both young and old. The forest there is gone ... the only natural and original area is the limestone hills. Some of them are connected. If you blast one, it will affect the others. So the impact will be worse."

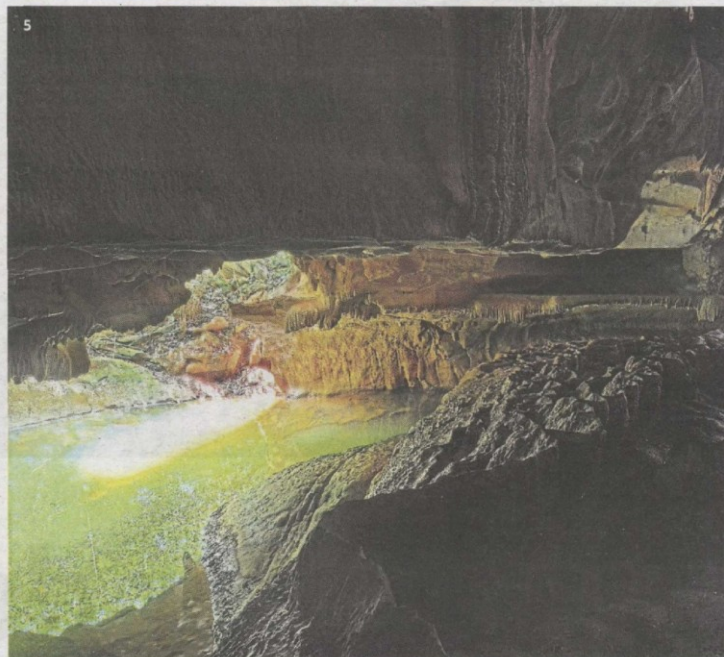
He also fears that the stream may be diverted from the cave during quarrying. "This will change the circle of life in the cave as the nerve of the cave is the river." The karsts also provide protection from flooding as they retain water during the monsoon, he adds.

Neolithic artefacts

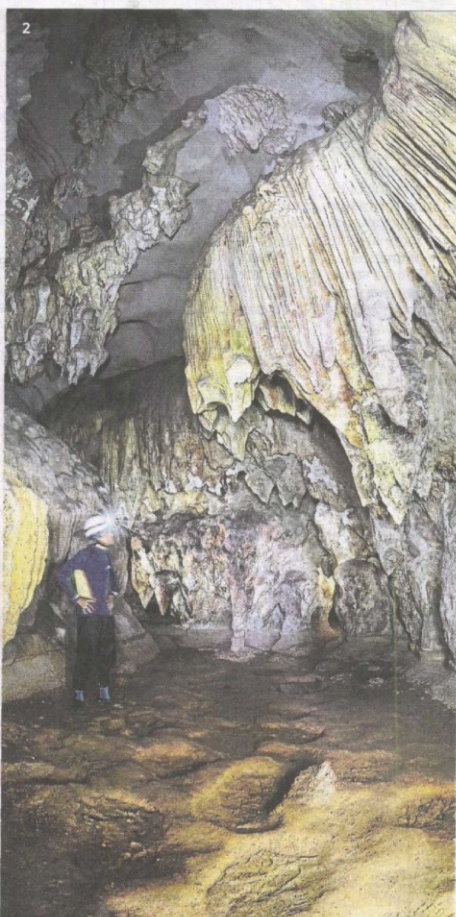
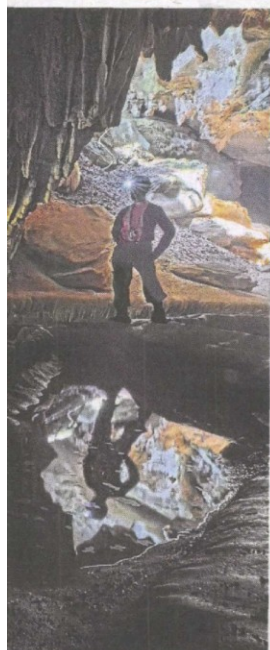
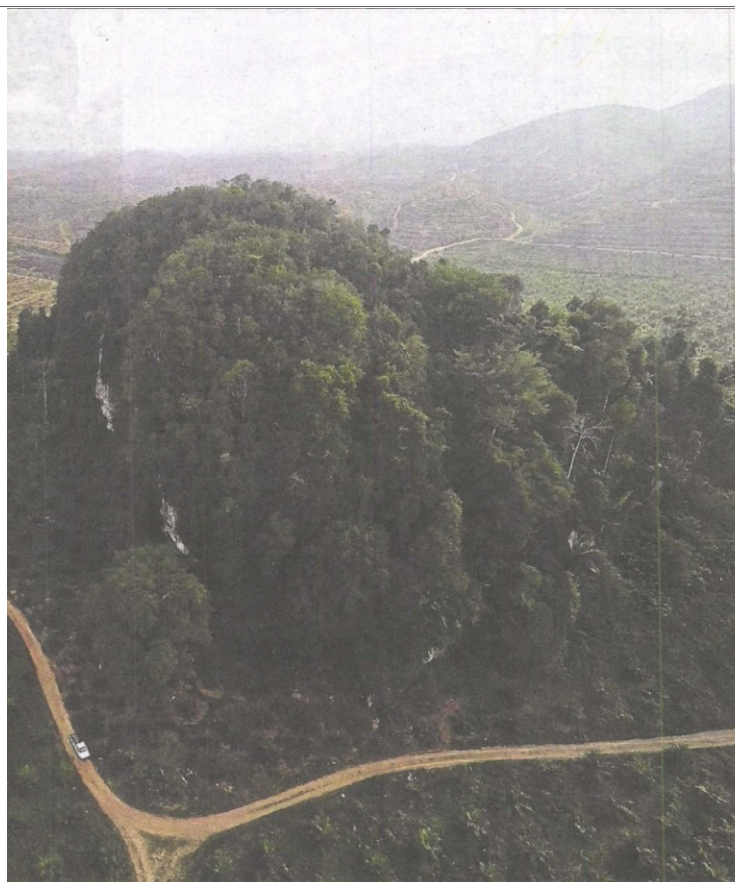
While mapping the caves, Laili's team made an important discovery – a Neolithic archaeological site. They found fossils of snails eaten by Stone Age people and pottery shards. From the snail species and pottery patterns, vertebrate palaeontologist Lim Tze Tshen estimates the site to be about 10,000 years old. Fossils of the muntjac and porcupine also littered the floor of another cave. Lim says a 1990 report on the flora and fauna of limestone hills in Kelantan by the World Wide Fund for Nature (WWF) had described the archaeological importance of Chiku as "significant" but there has been no systematic survey since then.

He points out that the detailed environmental impact assessment (DEIA) submitted by ASN Cement did not have any archaeological study. "If we hadn't gone there and surveyed the cave, all these will be mined for cement and everything will be destroyed. There will be no history recorded for the area."

Now, we can push back the history of the Chiku area back to the Neolithic period. This part of our country's history is relatively unknown, so with every spot that we find, we fill the gap and get a better understanding of our history," says Lim, a research associate at the Museum of Zoology in Universiti Malaya. He has informed the Museum Department of the discovery,



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1 These tree-clad limestone karsts are the only remaining wild areas in Chiku but they may soon be quarried for cement production. — MOHD FAIZAL SHAUPI

2 Unique cave formations, shaped over millions of years, can be a tourism-draw. — ALI SHAMSUL BAHAR

3 This bent-toed gecko, seen here cleaning its eye with its tongue, is a new species found in a cave in Chiku 7. — DR LEE GRISMER

4 Pottery shards reveal the existence of a Neolithic settlement in the cave. — LAILI BASIR

5 A stream runs through one of the caves in Chiku 7 limestone. — ALI SHAMSUL BAHAR

and hopes proper excavations will be carried out.

Rare finds

With most of the lowland forest in Chiku gone, wildlife such as elephants, tigers, sun bears and deer are gone, too. What's left are small animals such as serows, wild boars, mousedeer, black giant squirrels and porcupines. But on the harsh environment of the limestone hills, lizards and snails survive.

Herpetologist Dr Lee Grismer, who has discovered several new species of gecko throughout Peninsular Malaysia, has added another one to the list – a bent-toed gecko which lives in a cave in Chiku 7. He says DNA analyses and anatomical comparisons indicate there is no other species like it in South-East Asia. Grismer, of La Sierra University in California, is currently describing the species.

"Its only suitable habitat is in the cave. It does not primarily inhabit the surrounding vegetation. Its long limbs and toes, flat body and head, make it highly adapted for moving about only on the cave walls of the limestone hill it lives in. If this hill is quarried and this species is found nowhere else which at this point is what we believe, it will go extinct."

Tiny land snails flourish on karsts because the calcium-rich soil favours their growth and reproduction. Conservation scientist Dr Reuben Clements says limestone hills in Kelantan are likely to harbour undiscovered species of micro-snails as they have never been adequately surveyed. He has found a new species of the tiny mollusc at Chiku 7, yet undescribed.

Unique snails

Three species new to science have also emerged in karsts close to Chiku 7: one *Diplommatina* species from Chiku 4, another one from Felda Paloh, and a *Philalanka* species from both hills.

Mohammad Effendi Marzuki, who had collected the snails, are describing them. "Every hill will have one or two different species," says the plantation management researcher with a keen interest in malacology (the study of molluscs). "Even on hills near each other, I found very different species. Chiku 7 has not been thoroughly studied, so it is likely to have new species as micro-snails are highly specialised. The *Diplommatina* for example, lives only on limestone walls. If Chiku 7 is destroyed, any information on its diversity of species will be lost."

Clements has found some 40 species of snails in the Chiku area. Most no bigger than a pinhead, these snails are often ignored but they are ecologically important – they recycle nutrients when they feed on plants, and are themselves food for other animals. "These snails require humid conditions to survive. When you clear the forest for plantations, the environment dries up and the micro-climate of the hill is disrupted, so all these endemic species cannot survive," he explains.

Karsts generally have high flo-

ral richness. In Peninsular Malaysia, some 130 plants grow only on them. Botanists from the Forest Research Institute Malaysia have surveyed Chiku 7 recently but they declined to be interviewed. It is learnt that they have found some rare plants which are representative of the north-eastern region.

In the 1990 report, the authors Dr Geoffrey W.H. Davison and Dr Ruth Kiew wrote that limestone flora often have different morphs. In Chiku, they said the balsam *Impatiens opinata* has blooms of pale yellow with red spots and white. Elsewhere in Kelantan, the colours range from canary yellow with red spots to peachy orange and claret-red. "These populations represent evolution in action and conservation of the various forms is necessary to conserve their full genetic complement," they wrote.

Foul air

Universiti Teknologi Malaysia professor Dr Maketab Mohamed says the main pollution problem from cement plants is dust. He says particularly worrying is minute particles which can be inhaled, which can cause lung diseases in the young, old and sick. Such plants also discharge mercury. Though the amounts will be low, Maketab points out that the cement plant is located beside Sungai Chiku, a tributary of Sungai Galas which is tapped for public water supply. According to the DEIA, the project sits upstream of several water supply schemes, so discharges will have to meet strict rules.

For the villagers of Felda Chiku 7, it is not just their health that is at risk, but also their livelihoods.

"Dust pollution can reduce the yield of oil palms," says smallholder Che Asfaizul Che Rahim. "This has happened in the quarrying of Bukit Sagu near Kuantan. It affected the Felda plantations nearby."

He says over three-quarters of the 1,400 villagers disagree with the project due to concerns over air, noise and water pollution, the anticipated influx of migrant workers and interruptions to the tranquil village environment. "During dialogues with ASN Cement and the local authorities, we have asked for assurance that there will be no pollution, but they cannot give us that guarantee."

There is another point to consider: carbon dioxide is generated during cement production and this will inflate the country's carbon footprint. Based on the production of 3,100,000 tonnes of clinker a year, the DEIA states that the plant will emit 1,581,000 tonnes of carbon dioxide annually. So the question arises: should we allow an industry that threatens the climate?

The landscape of Chiku has changed drastically from forests to farms, so much have already been lost. Let's not allow for more losses.

"There is more reason now to preserve the limestone hills as they are the only natural areas left," says Laili.

A better place to quarry – P4