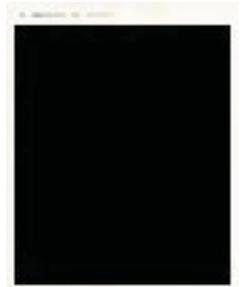


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From barren land to forest

The Forest Research Institute of Malaysia's Research Station in Bidor is a showcase afforestation project, demonstrating that a forest thriving with flora and fauna can be created even on former tin mining land

Along the Teluk Intan-Bidor road, about 10km from Bidor town in Perak, lies a 121.5ha forest so rich in plant and animal life that it is almost impossible to imagine that just over two decades ago, all that existed here were tin tailings, sand and slime.

In this part of the state, former tin mining lands are an ubiquitous sight – a reminder of Perak's tin mining history and heritage. It is estimated that a total of 60,500ha of tin tailings dot the state. These barren lands, either waterlogged or dry and lacking in nutrients, mean that tree

▲ One of the centrepieces of the FRIM Research Station Bidor is the 20ha mining pool that acts as a mitigation pond during the wet season

growth is near impossible without some form of intervention.

The greening of ex-tin mining land was a brainchild of Forest Research Institute of Malaysia (FRIM) researcher Dr Ang Lai Hoe, who mooted the idea back in 1996. Following the lease of the land from the Perak government, Ang (who retired in 2021 as head of the FRIM Forest Plantation Programme) and his team set about transforming the once barren land through various reforestation methods – paying particular attention to the choice of trees and planting location.

Today, more than two decades since the reforestation project began, the area is home to timber tree species like mahogany, kapur, chengal and nyatoh; lowland rainforest species; and a variety of herbaceous plants, climbers, ferns and woody shrubs.

Many of the trees that are now growing well on sand and slime tailings are also those on the International Union of Conservation of Nature (IUCN) Red List of Threatened Species.

Various plant species also grow unreservedly

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at the edges of the many former mining ponds. One of these also acts as a filtration pond for the overflow of Sungai Bidor, which carries agricultural wastes and sediments. The water plants that flourish in the pond serve as filters, ensuring that clean water (Class II, suitable for recreational purposes) eventually passes to the site's largest mitigation pond.

The FRIM Research Station Bidor – the only Tin Tailings Afforestation Centre (TTAC) in the world – also boasts various fauna such as sandpipers, herons, hornbills, leopards, wild boars, civets and macaques as well as amphibians and reptiles. Various insects, from honeybees and butterflies to dragonflies and beetles, are also abundant here. Amid the leaf litter of the forest floor, fungi like the bridal veil fungus and white parasol (*Macrolepiota dolichaula*), which was first recorded in Malaysia at this site, are also found.

As recounted in the FRIM publication *Rimba Bidor 2020: A Gift to Nature*, the methods applied for the greening initiative were inexpensive, with much of the land enriched with agriculture and animal wastes such as oil palm empty fruit bunches as fertiliser. Big hole planting techniques and raised-bed techniques were used to help with tree growth. FRIM also employed local youths from the area to help with the tree planting. In the sand and waterlogged slime areas where manual planting was not possible, machinery was used.

Exotic species like acacia mangium were picked for planting because they grow well on sand tailings and can tolerate heat and harsh conditions. FRIM Research Station Bidor coordinator Dr

Ho Wai Mun says more native species were introduced later because the acacia mangium was found to be susceptible to diseases. *Hopea odorata*, a dipterocarp species known locally as merawan siput jantan, became the favoured choice because of its ability to grow in open sandy areas with low soil nutrient content and poor water retention capacity. These evergreen trees, which were once tiny seedlings, now reach a majestic height of about 25m.

Over time, the presence of these fast-growing trees also changed the micro-climate of the area, creating a cooler environment. Fallen leaves and branches created a thick layer of forest litter, which gradually enriched the soil as they decomposed. And so, with a little help from humans, these trees began the process of encouraging the natural regeneration of the forest. Other plant species are now flourishing under their deep shade and in the nutrient-enriched soil.

FRIM also seeded selected plants through its biodiversity enrichment programmes to improve the area's biodiversity. For example, certain fruiting plant species were chosen to attract more birds, and the abundance of food encouraged



Clockwise from top left: Bridal veil fungus, *Macrolepiota dolichaula* or white fungus (a new fungus record for Malaysia), banded swallowtail, longtailed parakeet, and nightjar



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the birds to nest and stay at the site.

Birds and mammals have also lent a helping hand with the forest's regeneration, scattering the seeds that pass through their digestive tracts, which are then germinated and add to the diversity of plant life.

PARTNERSHIPS, FUNDING AND LOCAL COMMUNITY INVOLVEMENT

Over the years, funding for the greening activities has come from FRIM's collaboration with several agencies such as the Forestry and Forest Products Research Institute of Japan, the Asean-Korea Environmental Cooperation Project and the Asian Forestry Cooperation Organisation as well as companies like AEON Co (M) Bhd.

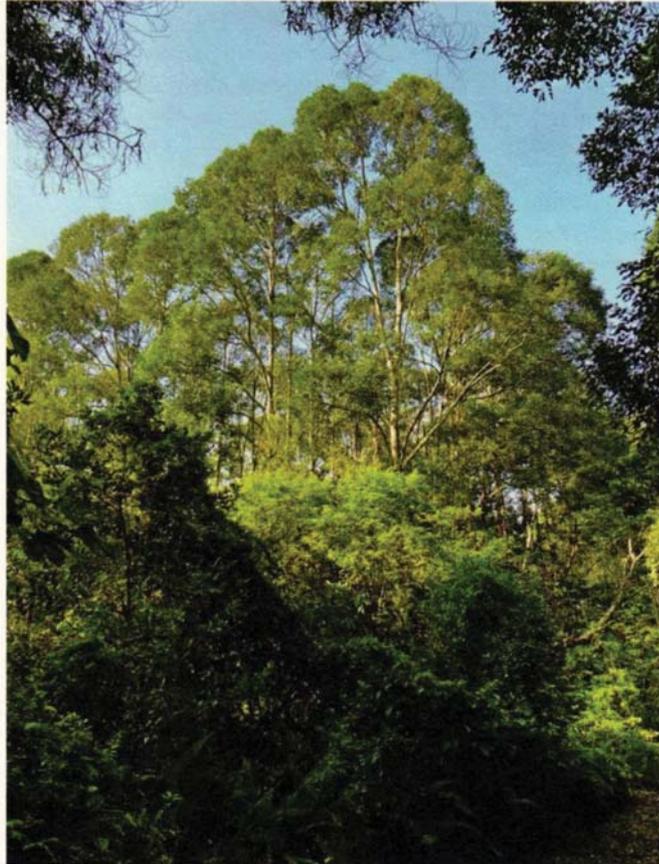
The success at FRIM Research Station Bidor has also led to afforestation projects with mining companies such as Rahman Hydraulic Tin Sdn Bhd (RHT).

FRIM's forestry biotechnology division director Dr Mohd Zaki Abdullah says the first phase of the project back in 2011 encompassed the reforestation of 20ha of ex-tin mine land at RHT Klian Intan in Gerik, Perak. This was then followed up in 2017 with the rehabilitation of Sungai Kijang with riverine and bamboo species as well as the rehabilitation of the former slime storage area of Sungai Kepayang with dipterocarp species.

In addition, FRIM is collaborating with Specific Resources Sdn Bhd to rehabilitate 5ha within the latter's Penjom gold mine in Pahang.

The reforestation that has taken place in Bidor has piqued the interest of the Mineral and Geoscience Department,

Soaring to a majestic height of some 20m, the *Hopea odorata* is a favoured choice for reforestation because of its ability to grow on denuded land. Under their dense shade and soil enriched by fallen leaves and branches, other plant species are now flourishing.



leading to a memorandum of understanding with FRIM in 2020 to collaborate on the greening and rehabilitation of the department's Stesen Ujian Galian in Malim Nawar.

The success in Bidor aside, Ho says that it has not been without challenges. Apart from funding constraints, there was intrusion by farm animals and encroachment from those entering the area to fish from the ponds. She points out that farm animals damage the young plants that are artificially or naturally regenerated, necessitating the erection of an anti-climb fence around the boundary, which spans 3km.

Education and raising the awareness of the local community about the project's importance are critical to its success. "For many of them, these are just trees. So, as is the case with the work that we do at other research stations, getting the local community involved is important," she adds. Ecotourism activities, which were planned prior to the pandemic, are meant to benefit the local community by providing job opportunities such as nature guides.

Plans to open the research station to the public are still on the drawing board, as funding for the building of visitor facilities and infrastructure is a key consideration. But when it does welcome visitors, the story of the FRIM Research Station Bidor will surely be an inspiration. 🌿 By Sreerema Banoo