

A Disappearing BRIS Ecosystem and Coastal Freshwater Wetland on the Coastal Plain of Terengganu, East Coast of Peninsular Malaysia

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Opinion

Coastal of Terengganu dominated with sandy soil that originated from marine deposit and contributing to the soil system of locally addressed as *bris* or *beris*, of which is a abbreviation of Beach Ridges Interspersed with Swales. Technically it is a coastal plain that has gone through geological processes over time resulted in the formation of an alternate of ridge (dry sandy area) and swales (shallow linear depression area usually being waterlogged) [1]. Thus, we coined the term BRIS ecosystem to refer to the natural ecosystem on this dry and waterlogged areas on the coastal plain of Terengganu, in the east coast of Peninsular Malaysia. The waterlogged part on BRIS ecosystem area forms a pocket of palustrine wetland, a seasonal freshwater swamp, mainly occupied by *Melaleuca cajuputi* or locally known as Gelam (in Malay). It is a seasonal freshwater wetland as it is mostly rainfed, being totally dry in non-monsoon months and otherwise during the monsoon months. Sometimes the swales area is connected to a small river tributary, thus the water from the river may contribute to swamp water body. Even though growing better in waterlogged condition, Gelam also grow well but in a more stunted stature on the dry ridge areas forming a unique near coast dune landscape. Besides Gelam, this swamp is also inhabited by adapted plant species such as carnivorous plants, *Nepenthes* spp., *Drosera* sp. and *Utricularia* spp. [2]. The swamp ecosystem is also inhabited by a number of freshwater ornamental fishes, which can potentially be commercialized [3]. Some of these freshwater fishes, such as *Channa* spp. (Haruan and Toman in Malay), *Clarias* spp. (Keli) and *Notopterus notopterus* (Belida) are very much sought after, caught and sold during the monsoon period. Thus, conservation of this swamp could provision the local community in its vicinity with a side income opportunity and more importantly at the same time playing roles in providing ecosystem services as a wetland.

In contrast to swales part of BRIS ecosystem, the soil on the ridge part is characterized by low water retention hence this part of BRIS soil is supporting plants which are adapted to dry and sandy conditions. In this area, low stature and shrubby *M. cajuputi* is associated with other common tropical coastal plant species such as *Syzygium grande* (Jambu Laut in Malay), *Syzygium gratum* (Gelam Tikus), *Syzygium palembanicum* (Kelat Samak), *Garcinia hombroinia* (Beruas), *Rhodomyrtus tomentosa* (Kemunting), *Baekkea frutescens* (Cucur Atap), *Ficus deltoidea* (Mas cotek) and other small herbs like orchids, ferns and aroids [4]. During the dry part of the year usually from May to September, wild orchid can be observed blooming in the heath vegetation. More than 40 species of wild orchids and their variance are recorded [5]. Low soil nutrients and a harsh physical environment on the ridge part of

BRIS soil resulted in stunted and clumping dispersion of plant. This distinct view is typical for 'heath' type of vegetation which is common and abundant in temperate region like Europe and Australia. In the tropics, heath vegetation is usually confined to high elevation such as at the mountain top and on specific poor soil type like ultramafic and limestone area. Thus, the occurrence of heath vegetation on BRIS soil is particularly unique and deserved to be conserved for its aesthetic and ecological values. More recent modelling study has indicated that the habitat suitability of Gelam, a keystone plant species of BRIS ecosystem of Terengganu would be reduced greatly [6]. BRIS ecosystem coverage is obviously reduced greatly, mainly cleared for agriculture and aquaculture activities or reclaimed for settlements [7]. Land use change for this ecosystem is inevitable as many of these areas are privately owned and are not legally protected. More research needs to be conducted with a hope that we could convince and further justify the conservation of this disappearing ecosystem.

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