Traditional planting of fruit trees promotes animal diversity in the Mala

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Traditional fruit gardens planted by indigenous communities in the Malaysian rainforest increase the diversity of the animals who make it their home, research has found.

The study, led by researchers at The University of Nottingham's campuses in the UK and Malaysia, has shown that the impact of humans can have positive outcomes for the conservation of this precious ecosystem when managed effectively.

The research, published this month (February) in the journal *Biological Conservation*, suggests that traditional agroforestry systems introduced by the indigenous human population could be useful in supporting endangered and vulnerable species of animals.

Dr Markus Eichhorn, forest ecologist in the University's School of Life

Sciences in the UK, said: "There has been a long history of misunderstanding between managers of nature reserves and the people who continue to live inside them. In this wildlife reserve we have found that the traditional practices of the local indigenous people can have some benefits for animal conservation. This means that it is possible for both groups to work together for common goals."

Rainforests throughout the world have a long history of human habitation - indigenous people have occupied and cultivated Southeast Asian forests for more than 11,000 years.

Conflicts often arise between conservation practitioners and indigenous communities living in the forest because of a lack of understanding of how their traditional agricultural methods impact on the conservation management of the rainforest.

Jon Moore, MRes student and first author of the study said: "The rainforests of Southeast Asia are often described as food deserts because they contain relatively few trees with fleshy fruits and these don't produce fruit every year - making fruit a very unreliable food resource for fruit-eating animals, compared with most other tropical forests. As a consequence, Southeast Asian forests have lower densities of frugivorous animals, which are also very vulnerable to changes and loss of their natural habitat."

To overcome this problem indigenous people have used their own methods to increase the amount and variety of fruit available to them.

The Chewong is an indigenous group of around 400 people who have lived in the rainforest in the central peninsular of Malaysia since Krau Wildlife Reserve was established as a reserve in 1923. Some of them continue to use traditional methods of cultivation, hunting, fishing and gathering wild fruits, herbs and plants for medicines.

Their agricultural practices include thinning small patches of the rainforest maintaining some of the naturally occurring tree species and planting additional native trees that provide them with fruit including durian, mango and rambutan. They lightly tend their gardens, harvesting their fruit during the months of June, July and August.

Hunting, habitat fragmentation, and human-wildlife conflicts have led to the total loss in the area of some animals including the Asian elephant and Sumatran rhino and a sharp fall in the number of others such as the Malayan tiger, the gaur, and the sambar deer.

The Chewong fruit gardens involve minimal forest clearance and the new trees thrive alongside the existing vegetation.

Dr Eichhorn worked with colleagues in the University's School of Geography at The University of Nottingham Malaysia Campus, led by Dr Ahimsa Campos-Arceiz to investigate whether these fruit gardens enhanced the number and diversity of animals in the ecosystem.

They placed cameras alongside active animal trails in a total of 15 plots in the Krau Wildlife Reserve, Pahang - seven fruit gardens and eight control plots - baiting them with fruit including langsat and mango, then recording the animals that triggered the cameras.

The study recorded more than 1,670 animals from 21 species including one endangered (Malayan tapir), five vulnerable (Asian small-clawed otter, southern pig-tailed macaque, sun bear, sambar deer and Malayan Peacock Pheasant) and two near-threatened (Crested Fireback and the Great Argus). This compared to just six species of conservation concern in the control areas.

Fruit gardens did not differ significantly in terms of the overall number of mammals but were found to attract larger species of animals

compared to the other areas of the rainforest.

Dr Ahimsa Campos-Arceiz said: "Over the generations, the Chewong developed a life style that avoids conflict with wildlife such as tigers and elephants. Their fruit gardens increase the concentration of native fruits in the forest, and these fruits can be shared with wildlife because fruiting trees produce larger crops than what Chewong can eat."

While fruit gardens were found to encourage the diversity of animals in the rainforest, this is just one way in which the activities of indigenous people impact on its environment.

The researchers say it needs to be considered as part of a wider range of activities including hunting, gathering forestry materials for building, making medicines and planting other crops including rice and cassava when integrating conservation management schemes alongside indigenous communities.

The paper, Fruit Gardens Enhance Mammal Diversity and Biomass in a Southeast Asian Rainforest, is published in the journal *Biological Conservation*.

More information: *Biological Conservation*, www.sciencedirect.com/science/ … ii/S0006320715301968

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