

COMMENTARY

Cashing in palm oil for conservation

Tropical forests in southeast Asia are under threat from oil-palm growers. This is an opportunity to combine sustainable economic growth with biodiversity conservation, argue **Lian Pin Koh** and **David S. Wilcove**.

Southeast Asia harbours 11% of the world's remaining tropical forests¹, which in recent years have been under threat from the unprecedented and explosive growth in oil palm (*Elaeis guineensis*) agriculture. The increasing global demand for products derived from palm oil, particularly in China and India, can be attributed to the oil's diverse uses. It can be used as a cooking oil, a food additive, and in cosmetics, industrial lubricants and biofuels². In some Western countries greater use of palm oil in food products is being driven by a switch away from unhealthy trans-fats. Between 1980 and 2000, the global production of palm oil increased 4.6-fold from 4.5 million to 20.9 million tonnes per year, and is projected to increase to 30.4 million tonnes per year by 2010². The rapid expansion of oil-palm crops in equatorial regions has raised concerns about its potential detrimental effects on southeast Asia's biodiversity, leading to intense media debates between environmental non-governmental organizations (NGOs) and the oil-palm industry.

NGOs contend that expansion of oil-palm agriculture in southeast Asia destroys huge tracts of tropical forests and threatens the survival of many native species, including the orang-utan (*Pongo pygmaeus*). They have launched aggressive media campaigns that lobby for the boycott of oil-palm products (see for example www.cspinet.org/palm/). In response, palm oil producers have accused Western NGOs of unfairly targeting southeast Asia's oil-palm industry while ignoring agricultural activities in other regions that also harm biodiversity, such as soya bean cultivation in South America. They also argue that oil-palm cultivation is not a threat to biodiversity because disturbed forests or existing croplands are converted to plantations with minimal disturbance to pristine habitats.

We think that this debate has been fuelled, on the one hand, by the NGOs' lack of awareness of the socioeconomic realities in countries that produce palm oil, and, on the other, by the crop growers' failure to appreciate both the threat to southeast Asia's unique biodiversity, and the conservation potential of non-pristine habitats. To break this agriculture–biodiversity deadlock, we suggest a new strategy of using revenue from oil-palm agriculture to fund the acquisition of land for the establishment



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Housing benefit: many oil palm plantation companies provide housing for workers and their families.

of private nature reserves.

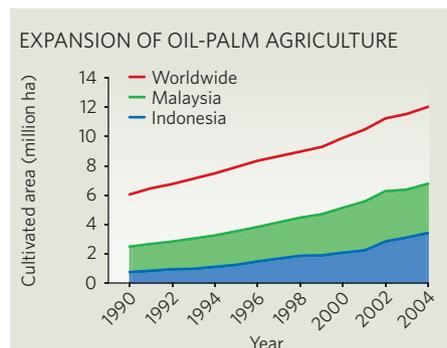
The oil palm is one of the most economically important crops in southeast Asia (see graphic below). Malaysia and Indonesia are the two largest producers of palm oil in the world, accounting for 80.5% of global production and 56.1% — 6.7 million hectares — of the oil palm-cultivated area worldwide³. In 2004, the export value of palm oil amounted to US\$6.3 billion for Malaysia and \$4.1 billion for Indonesia³, contributing to 5.6% and 1.7% of their gross national incomes respectively⁴. The two largest importers of palm oil in 2004 were China with 20.2 million tonnes, and India with 16.5 million tonnes³, most of which is used as cooking oil. If the current economic boom in China and India continues, it will be almost impossible to

halt further expansion of the oil-palm industry in southeast Asia.

Many oil-palm plantations are effectively self-sufficient villages, providing not only employment, but also housing, basic amenities such as water and electricity, and infrastructure including roads, medical care and schools for the families of their employees⁵. As such, many communities, particularly those in rural areas, rely on oil-palm agriculture for their livelihood. According to the Malaysian Palm Oil Board in Kuala Lumpur, the country's oil-palm plantations provide direct employment for over half a million people from both the local population and neighbouring countries. Any major disruption to the palm-oil industry in southeast Asia is likely to have widespread and dire socioeconomic consequences throughout the region.

Unique biodiversity

Parts of Malaysia and Indonesia are located within two hotspots of biodiversity — Sundaland and the islands of Wallacea. These areas, which are undergoing rapid deforestation, are considered biodiversity hotspots because they contain high concentrations of species found only in these regions. For example, 89 species (44.5%) of amphibians in Malaysia and 17,500 species (59.6%) of vascular plants in Indonesia do not occur anywhere else in the world⁶.



To date, four vascular plants (*Dipterocarpus cinereus*, *Mangifera casturi*, *M. rubropetala* and *Shorea cuspidata*), one bird (*Argusianus bipunctatus*) and three mammal species (*Papagomys theodorverhoeveni*, *Paulamys naso* and *Spelaeomys florensis*) in Malaysia and Indonesia have been listed as 'extinct' or 'extinct in the wild' on the World Conservation Union (IUCN) Red List⁷.

Although the number of extinct species in these regions is fairly low at this point, there are many more species facing serious threats to their survival. For example, 47 species (23.5%) of amphibians in Malaysia and 146 species (21.9%) of mammals in Indonesia are listed as threatened on the IUCN Red List⁷. Because almost all these species are unique to the region, their loss would represent global extinction.

Over the periods of 1990–2000 and 2000–2005, deforestation rates in Indonesia climbed from 2.3% to 2.7% per year for its primary (undisturbed) forests and from 1.2% to 1.3% per year for its secondary (naturally regenerated) forests⁸. The area of Malaysia's primary forests has remained unchanged at 3.8 million hectares since 1990 but the rate of loss of the country's secondary forests has increased from 0.3% per year during 1990–2000 to 0.8% per year in 2000–2005. Compared with the estimated extent of primary forests 8,000 years ago, before large-scale human disturbance, relatively little remains intact in Indonesia (25.6%) and Malaysia (11.6%)⁹.

A sustainable solution

Because Indonesia contains some three-quarters of southeast Asia's remaining primary forests, or 49 million hectares, the continuing loss of its primary forests would be disastrous for the region's biodiversity. The decline of secondary forests is also worrying. Secondary forests protected from human disturbance would eventually develop into old growth forests, which could complement the remaining primary forests in ensuring the survival of forest-dependent species. Therefore, oil-palm growers in southeast Asia need to realize that to conserve the region's unique biodiversity, it is crucial not only to protect the remaining primary forests but also to rehabilitate and preserve disturbed habitats, including logged forests and abandoned agricultural land.

Currently, less than 10% (1.5 million hectares) of the remaining tropical forests in Malaysia and just over 20% of those in Indonesia are under some form of protection by their national governments (IUCN protection categories I–VI)¹. Unfortunately, this situation is unlikely to improve much in the near future

because of the overwhelming emphasis in these countries on short-term economic growth over long-term natural resource conservation. An alternative conservation strategy adopted by some developing countries in sub-Saharan Africa and Latin America is the establishment of private nature reserves¹⁰.

Private reserves are flexible and substantial complements to traditional government-funded conservation initiatives, and have been shown



Rich pickings: crude palm oil is extracted from the yellow parts of oil palm fruit.

to be successful not only in protecting endangered species but also in providing employment for local communities¹⁰. But, owing to the scarcity of local conservation resources in developing countries, the success of this approach typically hinges on the participation of external stakeholders and donors, such as the Global Conservation Fund of Conservation International, Arlington, Virginia.

In our view, because the oil palm is such a high yielding and lucrative crop, a unique opportunity exists for NGOs to acquire relatively small tracts of existing oil-palm plantations in Malaysia and Indonesia and use the revenue generated to establish a network of privately owned nature reserves for biodiversity conservation. For example, a typical mature oil-palm plantation in Sabah, Malaysia, generates an annual net profit of roughly \$2,000 per hectare (see 'Supplementary information'). Based on the current price of \$12,500 per hectare for oil palm-cultivated land, the capital investment could be recovered in just 6 years. After this initial period, a 5,000-hectare oil palm plantation could generate annual profits amounting to some \$10 million, which could be used to acquire 1,800 hectares of forested land annually to be set aside as private nature reserves.

NGOs would need to collaborate with large conservation donor groups to fund the initial investments and with local oil-palm companies for their expertise in running the plantations. This could be a win-win partnership between

NGOs and oil-palm companies, because NGOs would be able to protect forests using the oil-palm revenue and the companies would be able to enhance their corporate image to satisfy environmentally-conscious consumers. And, because the companies know how to acquire land, and to create and manage plantations, the NGOs would not be faced with the daunting task of starting up their own oil-palm businesses. The governments of Malaysia and Indonesia could also offer their support — for example, by leasing government-owned plantation land to these NGOs, which would facilitate the NGO's acquisition of oil-palm plantations in an increasingly competitive market.

Through such joint ventures, NGOs could both generate the funds needed for land preservation and improve the livelihoods of local communities in southeast Asia. Furthermore, because such oil-palm plantations would be motivated mainly by conservation objectives, they could provide the industry with leadership for the sustainable production of palm oil through environmentally-friendly management practices⁵. This could also drive the development of a premium market for sustainable oil-palm products and thereby generate economic incentives for more palm-oil producers to adopt sustainable practices. Through this and other novel approaches, NGOs and oil palm producers could work together to break the agriculture–biodiversity deadlock to preserve southeast Asia's last remaining tracts of tropical forests and biodiversity for future generations. ■

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1. Iremonger, S., Ravilious, C. & Quinlan, T. (eds) *A Global Overview of Forest Conservation* CD-ROM, Center for International Forestry Research and World Conservation Monitoring Centre, Cambridge (1997).
2. Corley, R. H. V. & Tinker, P. B. *The Oil Palm*. Fourth Edition (Blackwell, Oxford, 2003).
3. FAOSTAT Online Statistical Service (FAO, Rome, 2006).
4. The World Bank 2006 World Development Indicators Online, www.worldbank.org/data
5. Corley, R. H. V. *Planter* **82**, 121–143 (2006).
6. UNEP-WCMC Species Data, www.unep-wcmc.org/species/data/
7. IUCN (World Conservation Union) *2006 IUCN Red List of Threatened Species* (IUCN, Gland, Switzerland, 2006).
8. *Global Forest Resources Assessment 2005: Progress Towards Sustainable Forest Management*. FAO Forestry Paper 147 (FAO, Rome, 2005).
9. Billington, C. et al. *Estimated Original Forest Cover Map — A First Attempt* (WCMC, Cambridge, 1996).
10. Langholz, J. *Conserv. Biol.* **10**, 271 (1996).

Supplementary Information is linked to the online version of this article at www.nature.com/nature