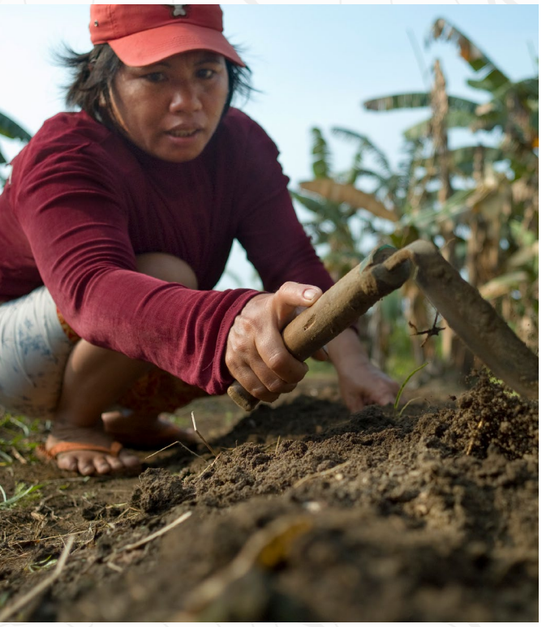

A farmer prepares a field for planting at the Nehas Liah, Indonesia
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East Kalimantan
Foodscape

Protect and enhance habitat through adaptive land use

INDONESIA

LOCATION: Borneo, Indonesia
AREA: 12.5 million ha

SYNOPSIS

The tropical forests of Borneo's East Kalimantan foodscape in Indonesia have been fragmented and degraded to meet ever-increasing global demand for logging, mining, and agricultural commodities. Additionally, the region has suffered catastrophic fires fueled in part by forest degradation. The profitable market for agricultural exports – primarily of palm oil – puts increasing pressure on unutilized or uncultivated land, like the remaining forested areas of East Kalimantan.

But even fragmented as they are, these forests serve a critical role for East Kalimantan's Indigenous cultures, biodiversity and climate stabilization.

To achieve a sustainable economic and environmental future, further deforestation must be reduced by directing cultivation away from remnant forest habitat and on to already degraded lands. Looking at potential solutions to the challenges in East Kalimantan through the frame of its foodscape could offer a path away from business-as-usual management by showing the potential shared benefits of better, more strategic land use planning partnerships between provincial government and local communities and organizations.

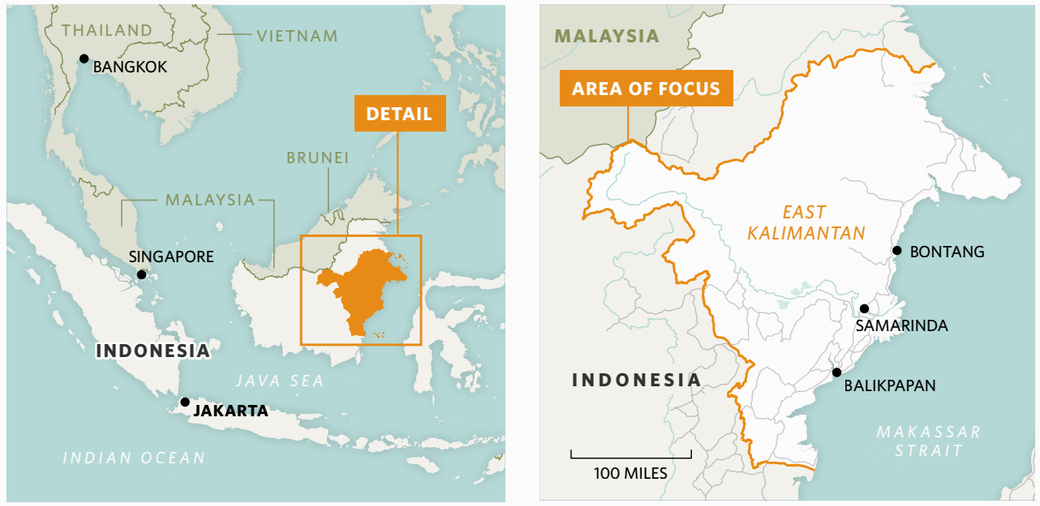


FIGURE 1. Map of East Kalimantan foodscape. The bars represent the most extensive foodscape classes within the foodscape. The color of bars indicates the intensity groups corresponding to those classes: little or only subsistence food production (beige) and mixed mosaic food cultivation (light green). The other category includes the classes that each made up <5% of the foodscape area.

DESCRIPTION OF FOODSCAPE

East Kalimantan, an Indonesian province on the equatorial island of Borneo, contains 6.8 million ha of some of the most biologically rich tropical forest in the world.

The terrain drives the different forest ecosystems and biodiversity found across East Kalimantan. Shorter montane forests are found in the mountainous, northern interior while *Dipterocarp* forests with tall hardwood trees and tidal forests, such as mangroves, occupy the lowlands. The region's climate is impacted by monsoons, creating distinct rainy and dry seasons.

More recently, El Niño events have contributed to extreme climatic conditions fueling severe drought and destructive fires. These more erratic events have also coincided with increased forest degradation from commercial land use within the foodscape.

Monitoring for wildlife in the Wehea forest, Kalimantan, Borneo, Indonesia
© Bridget Besaw

> Across the island of Borneo, which also contains the Kingdom of Brunei as well as two states governed by Malaysia, there are more than 1,200 species of mammals, birds, amphibians, and fish, many of which are endemic, including the proboscis monkey, Müller's gibbon, and Bornean orangutan. Efforts around orangutan protection are especially prioritized in East Kalimantan as it contains 5% of the world's remaining wild population.

East Kalimantan has one of the lowest provincial population densities in Indonesia, due in part to the poor soil fertility and inaccessibility. Rich in raw materials, East Kalimantan's economy has prospered through mining and forestry exports. To accommodate the sloped terrain and poor soils, agriculture has been dominated primarily by plantations of rubber, coconut, and oil palm trees.

Of the three types of plantations within the foodscape, oil palm has been most heavily supported by the central government, and plantation areas have steadily expanded since the 1990s alongside global demand. Palm oil, the vegetable oil pressed from fresh oil palm fruit bunches, remains the region's main agricultural export.

To accommodate land conversion needs, the land is divided into designated forest and non-forest zones. The non-forest zones, which amount to roughly one-third of the total area of the East Kalimantan foodscape, account for all commercial and urban land use. Groups of smallholders and private companies are often organized into concessions within these non-forest zones for the production of the foodscape's major commodities.

Oil palm concessions account for 16% of the total non-forest land allocation in East Kalimantan. The remaining 8 million ha of designated forest zones ave varying levels of protection and are meant to remain natural forest. However, there is still a considerable amount of loss and degradation within forest zones from fire, illegal logging, and conversion outside concession boundaries, all of which continue to damage habitat quality and connectivity.

CHALLENGES

East Kalimantan has strengthened its economy through forest conversion for commodity production, but the losses and degradation complicate the future of this foodscape. More than 5 million ha of natural ecosystems here have been lost and around 13% of the remaining natural ecosystems are endangered.

While technological advances and resources are improving forest monitoring and enforcement, the remaining fragmented habitat areas are not cleanly organized within legally protected forest zones in the East Kalimantan foodscape. Orangutans have been spotted within oil palm and timber concessions, where it is legal to extract timber. Without a more complete picture of important conservation areas within non-forest zones, the onus lies on land managers to identify these habitats and manage for biodiversity conservation. Unfortunately, this reliance on land use managers creates disincentives for conservation because there is a significant and disproportionate opportunity cost associated with conservation actions within concession boundaries.

The remaining patches of forest degraded by intensive logging are another important consideration for the future of this foodscape. This forest system as a whole has some resilience, and non-isolated heterogeneous patches of degraded forest can recover with sufficient time; however, historic fires linked to El Niño events have shown there can be severe short-term consequences of increased forest degradation. The precise relationship between fire and El Niño is not yet fully understood, but as El Niño events bring warmer and drier conditions to Borneo, deforested and degraded areas appear to experience greater extremes, increasing the flammability of the forest and potential for tree mortality.

Beyond potential habitat and economic losses linked to fire, continued forest loss is a primary source of carbon emissions for East Kalimantan. Mitigating further losses is the region's most effective route to combatting climate change. The vulnerability of remaining degraded forest puts the province at risk for future consequential fire events without proper mitigation strategies.

BENEFITS AND VALUE OF NATURE-BASED SOLUTIONS IN THE EAST KALIMANTAN FOODSCAPE

In response to environmental concerns, several industries are making use of the high conversation value (HCV) definitions set by the HCV Resource Network in regions with land conversion pressures. These definitions provide a framework for identifying and protecting land from conversion if it is important for biodiversity, climate, culture, or other related values. Efforts are underway in East Kalimantan to map existing HCV areas, a critical tool for protecting remaining endangered habitats, particularly within non-forest zone concession boundaries.

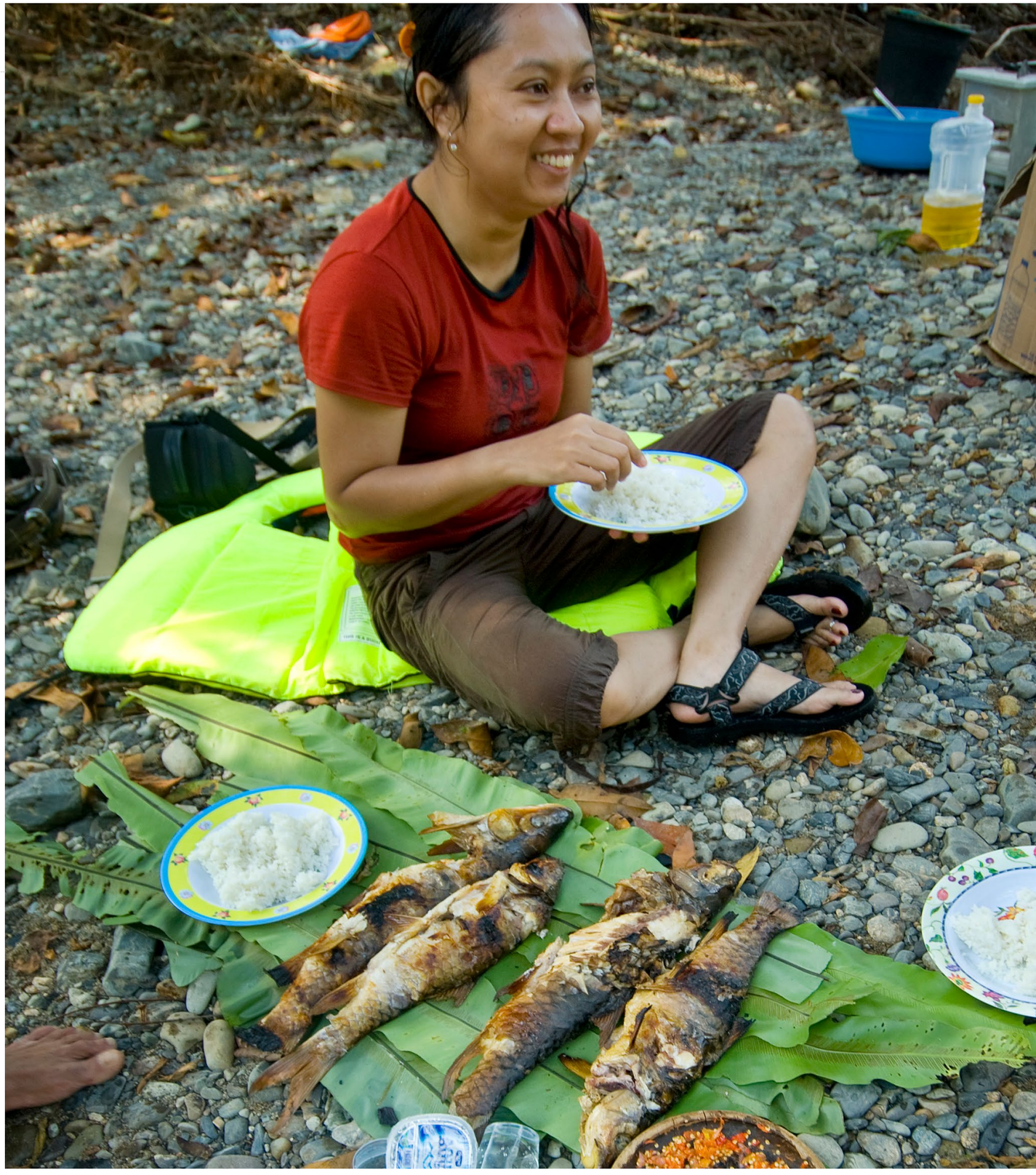
To address accelerating cultivation pressures within the foodscape, the provincial government of East Kalimantan is looking within forest zones for opportunities to use nature-based solutions, such as agroforestry. Restoring unproductive forest patches using agroforestry practices rebuilds carbon stocks and makes the landscape more resilient to climate events, while allowing cultivation areas to expand.

Shade-friendly crops cultivated within the foodscape, such as konjac and coffee, grow and thrive in the understory of taller trees. While agroforestry will not provide the biological richness of natural forest ecosystems, this nature-based approach can help effectively balance conservation, restoration, and economic goals. Such practices also help mitigate potential carbon emissions through less-intensive conversion.

To support land use planning adjustments, the East Kalimantan Provincial Government has worked in collaboration with a number of local authorities, NGOs, experts, and companies to create the Green Growth Compact. The goals of this group are to reduce deforestation by 80% by 2025 (and overall emissions) while growing the economy, and highlighting the importance of diverse representation and commitment within the members of the compact. In addition to conservation and agroforestry, the compact is linking its efforts to REDD+ to unlock more compelling incentives.

Planning for the future of the foodscape could help focus and enhance already ongoing efforts to evaluate, manage, and improve land use decisions. Looking at the members of the compact within the context of the foodscape could also help ensure it includes all stakeholders necessary to achieve environmental and economic goals in a way that sustains the East Kalimantan foodscape for years to come.

A meal of freshly caught, stir-fried freshwater fish with local vegetables on the banks of the Sagah River, East Kalimatan, Borneo, Indonesia



This is a case study excerpted from the report *Foodscapes: Toward Food System Transition*. Please access the entire global report at nature.org/foodscapes.

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