LETTERS

Edited by **Jennifer Sills**

EU deforestation law overlooks emerging crops

The new European Union (EU) deforestation law, for which a provisional political agreement has been reached (*1*), aims to limit imported commodities identified as the main drivers of deforestation, such as cocoa, coffee, oil palm, and soya (*2*). According to the current proposal, none of these products "would be allowed to enter or exit the EU market if they were produced on land subject to deforestation or forest degradation" after 31 December 2020 (*3*). Because production and consumption patterns can shift rapidly as global markets fluctuate, legislation should also allow for limits on emerging commodities that degrade forests; cashew-driven deforestation in the Afrotropics is a poignant example.

Cultivation of cashew (*Anacardium occidentale L.*) has grown seven-fold in recent decades, from 1.1 million ha in 1988 to 7.1 million ha in 2020, and demand continues to rise (*4*). As of 2020, the total area covered by cashew was still much lower than oil palm (29 million ha) and soybeans (127 million ha), but it has quickly reached the scale of coffee (11 million ha) and cocoa (12 million ha) (*5*). Furthermore, compared with cashew, coffee and cocoa are increasing at a much slower rate; since 1988, coffee has seen little change, and cocoa has doubled (*5*). Cashew, like other crops that have devastated tropical forests worldwide (*2*), is grown in full sun monocultures at vast scales. Although cashew research remains scant, there is mounting evidence that plantations offer little habitat for native species and encroach upon biodiverse forests inhabited by African forest elephants (*Loxodonta cyclotis*), chimpanzees (*Pan troglodytes*), and other endangered species (*6–10*).

The new deforestation law is an important step to prevent the EU-driven loss of forest, carbon stocks, and biodiversity, particularly in megadiverse tropical regions (*11*). However, to meet these goals, the list of commodities regulated by the EU law needs to build in the option to add emerging crops with high deforestation potential. Without that flexibility, crops such as cashew will remain unregulated as they increasingly drive forest destruction across the tropics.

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PHOTO: DE ROUVROY/NITIDAE, 2021

The effects of emerging crops such as cashew (shown here in Mozambique) could soon rival the deforestation caused by coffee and cocoa.

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Hidden costs of Europe's deforestation policy

The European Union (EU) soon plans to implement a law that would limit the importation of products known to drive deforestation (*1*), including Brazilian products originating from deforested areas in the Amazon. The law's goal of removing incentives that lead to forest degradation is laudable, given the rate of deforestation (*2*). However, by focusing on forests alone, the law is potentially putting other ecosystems at greater risk, as well as overlooking the reliance of forests on adjacent regions. To prevent unintended consequences, the EU should expand the law to include ecosystems other than forests.

In response to the law, agribusinesses in the Amazon will likely search for a way to continue exporting their products to the EU. One strategy could be to move their operations to nearby regions that are not primarily forests, such as the Cerrado. Located adjacent to the Amazon, the Cerrado spans more than 2 million km² and is the most diverse savanna in the world (*6*). However, more than 46% of the land in the region has been converted to pasture (*6, 7*), and local water sources have been depleted (*8*). If agribusinesses moved to the Cerrado, they would convert additional land to agriculture or pastures, increasing vegetation loss (*3*–*5*). The resulting water and energy shortages (*5*, *6*, *8*) would affect everyone in the region, including agribusinesses (*9*), and potentially disrupt supply chains for Cerrado products such as almonds and pequi (*10*).

In addition to providing needed protection to ecosystems other than forests, broadening the EU law could better protect forests. The Amazon and the Cerrado interact through atmospheric water circulation (*10*, *11*). By indirectly causing further land degradation in the Cerrado, the law could disrupt the atmospheric dynamics that support biodiversity in the Amazon. To protect other ecosystems and the full spectrum of forests' needs, the EU should expand its policy as soon as possible, and legislation across the globe should aim to protect every type of vulnerable ecosystem.

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Animal agriculture's potential financial risks

With a contribution of 16.5% to global greenhouse gas emissions (*1*), animal agriculture is a key driver of climate change, second only to fossil fuels. Soy production—three-quarters of which is used as livestock feed (*2*)—and beef production are the top two drivers of deforestation in the Amazon (*3*). Livestock farming poses a risk to more than 17,900 species listed on the International Union for Conservation of Nature's Red List of Threatened Species (*4*). Because the

environmental threats posed by animal agriculture can translate into a range of business risks for animal protein suppliers, environmentally responsible businesses are safer investments than those that cause harm (*5*). Therefore, businesses within the animal agriculture industry should measure and disclose their environmental impacts, and financial institutions should protect themselves from losses by investing in businesses that are good environmental stewards.

Business practices that degrade the environment can lead to business risks in the form of trade restrictions, stricter environmental regulations (for which compliance is costly), and litigation. The resulting financial losses can spill over to investors, who are then left with loan defaults and stranded assets (*5*). For example, the European Union (EU) recently agreed on a new law that bans the import of deforestation-linked commodities such as beef and soy. To maintain eligibility to import to the EU, suppliers face strict due diligence and traceability requirements with potential implications for investors (*6*). Similarly, New Zealand is set to become one of the first countries to tax greenhouse gas emissions from the animal agriculture sector (*7*). Meanwhile, American pork producer Smithfield Foods has been forced to pay millions in damages due to pollution from its animal waste lagoons (*8*).

Despite the potential financial risks resulting from environmental impacts, businesses and investors are not closely monitoring or attempting to mitigate the damage they cause. A recent survey of 60 of the largest meat, fish, and dairy producers with combined assets of US$324 billion found that 77% of them did not measure their greenhouse gas emissions or have targets in place to mitigate them. In addition, none of the 50 surveyed meat and milk producers had a comprehensive deforestation policy in place (*9*).

So far, the finance sector is not adequately taking environment-related financial risks into account when making investment decisions within the animal agriculture space. Between 2015 and 2020, 2500 investment firms, banks, and pension funds invested more than $478 billion in meat and dairy companies globally (*10*). Over the past decade, the International Finance Corporation (IFC), the private-sector lending arm of the World Bank, channeled more than $1.8 billion into mostly large-scale livestock and factory farming corporations (*11*).

Given that the World Bank Group is seen as a benchmark in environmentally responsible investment (*12*), it should address animal agriculture–related risks through its safeguard systems and exclusion lists. Currently, however, the World Bank and IFC only require their borrowers to improve resource and emissions efficiency (*13*), which may not be enough to prevent investments in environmentally—and thus financially—risky projects. Instead, the World Bank Group should establish strict investment criteria for large-scale livestock and factory farming operations. It should lead by example and avoid financing businesses that pose unacceptable greenhouse gas emission and deforestation risk.

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TECHNICAL COMMENT ABSTRACTS

Comment on "Interspecific competition limits bird species' ranges in tropical mountains"

Dingliang Xing, Jian Zhang, Fangliang He

Freeman *et al*. (Reports, 22 July 2022, p. 416) argue that interspecific competition rather than climate is the leading driver of bird species' elevational ranges. A reanalysis of their data shows no support for the competition hypothesis, but a strong effect of climate seasonality on species ranges. Their results are artifacts arising from a suboptimal model that misses important variables.

Full text: dx.doi.org/10.1126/science.ade2109

Response to comment on "Interspecific competition limits bird species' ranges on tropical mountains"

Benjamin G. Freeman, Matthew Strimas-Mackey, Eliot T. Miller

Xing *et al*. create new variables and fit models to argue against the hypothesis that interspecific competition shapes species' elevational ranges. However, their key newly created variable is best interpreted as a proxy for the important variable of the interspecific competition hypothesis. Thus, their reanalysis uncovers the patterns we already described that are consistent with the interspecific competition hypothesis.

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