Research webinars on standards’ impacts
No.24: Causes of forest fires and RSPO certification effect on deforestation and fires in Indonesia.
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Causes of forest fires and RSPO certification effect on deforestation and fires in Indonesia.

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Where There is Fire There is Haze: The Economic and Political Causes of Indonesia’s Forest Fires

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based on research with James MacDonald
The fires and haze have many costs

- **Environmental**: Indonesia 3rd largest carbon polluter in 2015, emitting more carbon than the entire European Union. Forest fires contributed up to 69% of this pollution.
- **International relations**: Near annual conflicts between Indonesia, and Singapore and Malaysia, over the haze.
- **Health**: 100,000 premature deaths across equatorial Asia in 2015 as a result of the unusually severe haze event, and ongoing morbidity and infant mortality.
- **Economic**: Estimated cost of the 2015 fires $16.1 Billion USD or 1.9% of Indonesian GDP (World Bank, 2016). Costs rise when considering Singapore, Malaysia.
We find that fires are an important driver of deforestation (just under half)

– Alongside Amazon and Congo basins, Indonesia has one of three largest tropical forest stands in the world.
– Rely on deforestation data from Matthew Hansen et al.
  – Underestimates deforestation due to not picking up selective forest destruction.
  – This approach measures forest loss from 2000-2008 of 48,940 square kilometres, about twice the size of Vermont (Burgess et al, 2013).
– Find that, focusing on the islands with significant forest cover, a little under half of deforestation is attributable to fires.
  – Effects particularly large for Papua.
The fires are mainly seen as a palm oil story

– Land deliberately slashed and burnt to clear land for palm oil.
  – Burning is often the cheapest way to clear land.
  – Land dedicated to palm tripled in size between 2000 and 2014 and it is expected to double in size by 2020
– Burning is largely illegal, however enforcement is difficult given the spatial scope of the illegal activity.
– Not fully clear how much is due to smallholders, and how much due to plantations and large-scale agriculture.
Fires tend to happen in areas suited to palm
Fires concentrated in the dry season from June to October
Supply and demand: causal estimates on what generates the fires

It is difficult to generate causal estimates on the factors behind the fires – many factors which might cause fires are also correlated with other social, economic, cultural, and other processes.

What is the role of governance in preventing fires?
Following Burgess et al (2013), use district splits over 2000s as a source of variation in district capacity and incentives for corruption.

What is role of palm oil demand in incentivizing fires?
Interact the global palm oil price with a measure of district-level suitability for palm oil.
Data on fires and other spatially-disaggregated variables

– Remote sensing data from two NASA satellites (Terra and Aqua), from the Fire Information for Resource Managements System (FIRMs) to detect occurrence of fires at 1km pixels.
  – Light signatures assigned likelihood of being a fire, on 0-1 index
  – 1.2 million observations between 2001-2016

– Use spatially disaggregated data on: forest cover, rainfall, suitability for palm oil, district splits, macroeconomic variables, palm oil and rubber prices.
Results on governance: capacity rather than corruption

– We find that an **extra district per province leads to a 4.3-6.7% increase in fires per province.**
– In addition:
  – This effect is very short-lived (about a year)
  – This effect is concentrated in “child” districts (the parent district keeps the district capital)

→ In contrast to Burgess et al (2013), suggests that **effects are more about capacity rather than corruption**
Results on palm oil demand

– We consider the role of global palm oil price at a number of time lags.
– Results can be expressed in terms of counterfactual outcomes based on hypothetical price changes
  – E.g., the average marginal effect of a rise in global palm oil prices of 10 percent at a quarterly lag within twelve months of the fire season is a 9 percent rise in monthly fire activity in the average district.
– We do a similar exercise for rubber (2\textsuperscript{nd} fastest growing forest crop in recent years) and effects are much smaller. Corroborates idea that this is mainly a palm oil story.
Take-aways

1. Fires play a critical role in overall deforestation in Indonesia;
2. While illegal logging seems to go unchecked significantly due to corruption, weak capacity seems to be a significant part of the story for the fires;
3. Global palm oil prices movements play a substantial role in driving fire activity.
   • Suggests possibility to develop a predictive model of fire activity, that could help to aid better targeting or prevention efforts.
Thank you

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Paper available at:
https://sites.google.com/a/cornell.edu/russelltoth/home/research
Does Oil Palm Sustainability Certification Reduce Deforestation or Fire in Indonesia?

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No primary forest clearing after 2005

Preservation of High Conservation Value areas

Riparian buffer protection

Why would certification reduce deforestation?

No use of fire for land clearing

No primary forest clearing after 2005
Data Collection
Oil Palm Plantations

Certified plantations now available from Global Forest Watch: http://data.globalforestwatch.org

- RSPO Certified (n = 163)
- Noncertified RSPO Member (n = 228)
- Noncertified Non-Member (n = 1,940)
Active Fire, 2002-2015

Source: MOD14 V6 – MODIS global monthly fire location product

- Active Fire Detection
Certified plantations were **older and had less forest** in 2000 than non-certified areas.
About 91 km² of deforestation and 1,810 fires occurred in certified plantations after certification.
Certification reduced deforestation rates by about 30%, but had no apparent impact on fire.
Matching through 2003 revealed a 36% increase in deforestation 4-8 years before certification, but this could be selection bias.
Key Findings & Recommendations

• Certification led to 20 km\(^2\) of “avoided” deforestation in high tree cover areas, but had no apparent effect on fire.

• Certified palm oil is associated with lower recent loss of high tree cover forests and fire, mostly due to certification skewed toward plantations with few forests.

• Certified palm oil is not sufficient for most corporate zero-deforestation commitments.

• A remote-sensing capable definition of deforestation is needed to demonstrate “deforestation-free” certified palm oil.

• Producers have few incentives to expand area of forest under their control, so positive incentives may be needed to support forest conservation.

• Controlling for selection bias is critical for studies of voluntary certification.
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Discussion with Elizabeth Kennedy

Photo: Cotton field on a sunny day © Better Cotton Initiative
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17th May 2018: Where are commodity crops certified, and what does it mean for conservation and poverty alleviation?

14th June 2018: Evaluation of UTZ certification contribution to the socio-economic situation of cocoa famers in Ivory Coast

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Thank You!

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