Limiting deforestation from oil palm expansion in Malaysia and Indonesia

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Based on

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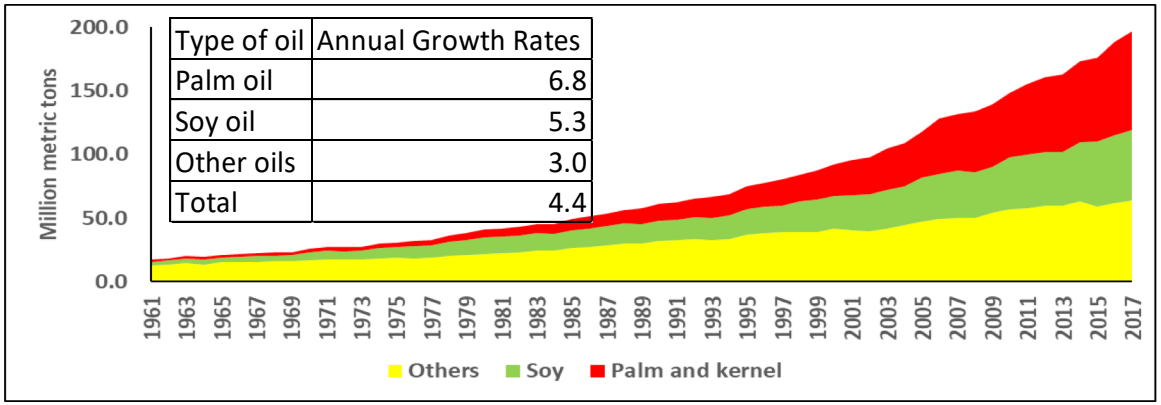
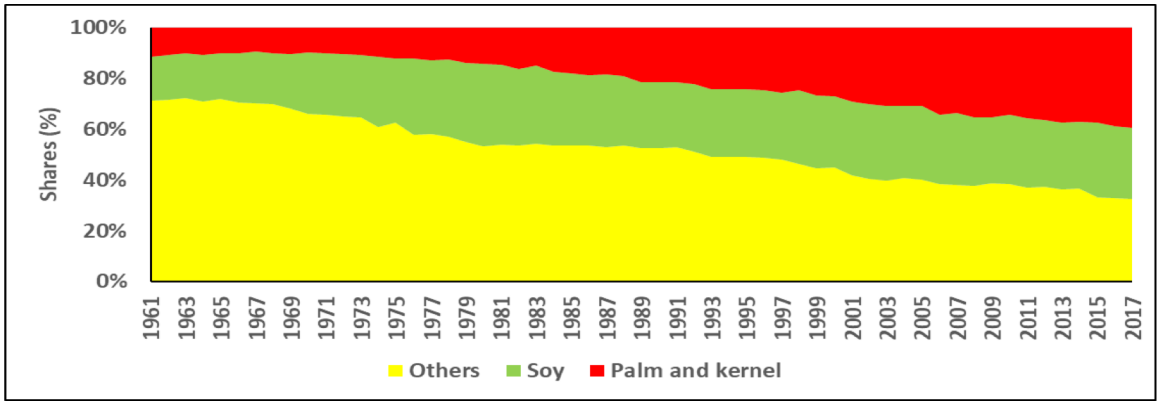
Introduction

- Motivations: Study links between market mediated responses and deforestation in Malaysia and Indonesia
- Objectives: Examine the extend to which a ban on palm oil consummation may reduce deforestation in Malaysia and Indonesia
- Outcome: Reduction in palm oil production/consumption does not halt deforestation in M&I
- Approach: A well-know computable general equilibrium model, GTAP-BIO, was used

Supplies of major vegetable oils since 1961

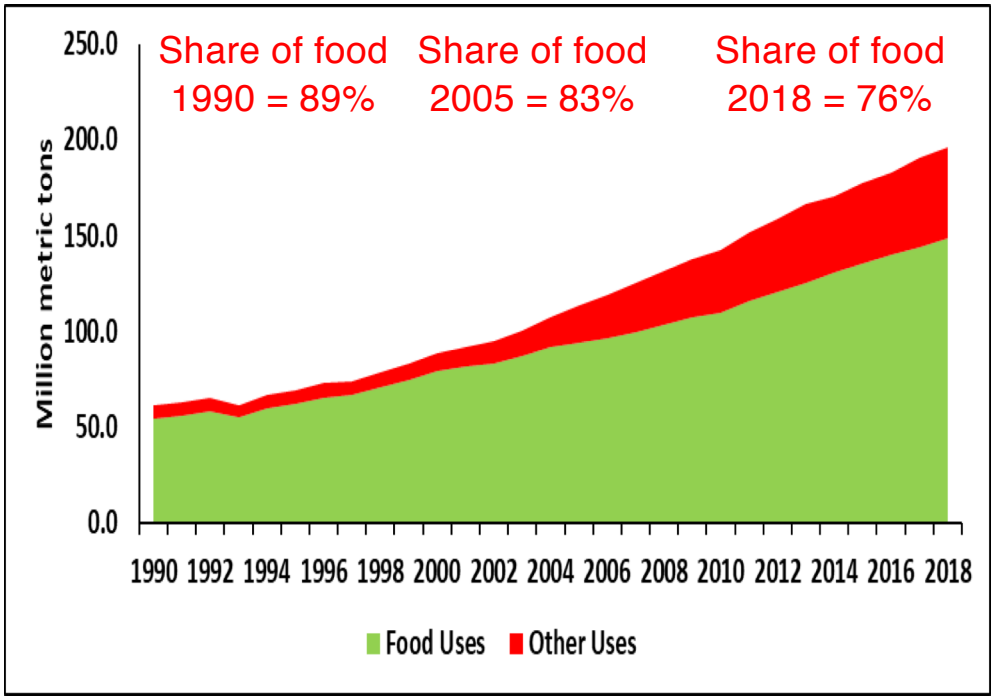


Type of oil	Annual Growth Rates
Palm oil	6.8
Soy oil	5.3
Other oils	3.0
Total	4.4

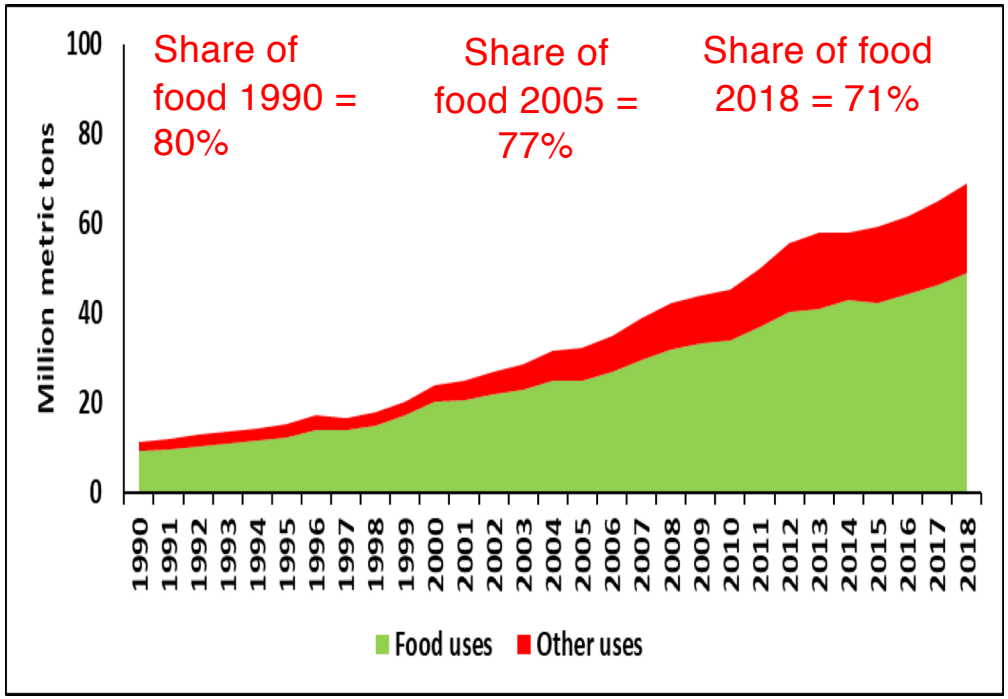


- The rapid expansion in supplies of soybeans and oil palm occurred basically in tropical areas:
  - South America (mostly Brazil)
  - Southeast Asia (mostly Malaysia and Indonesia (M&I)
- That led to deforestation in tropical areas, contributing to record levels of terrestrial carbon emissions and biodiversity loss

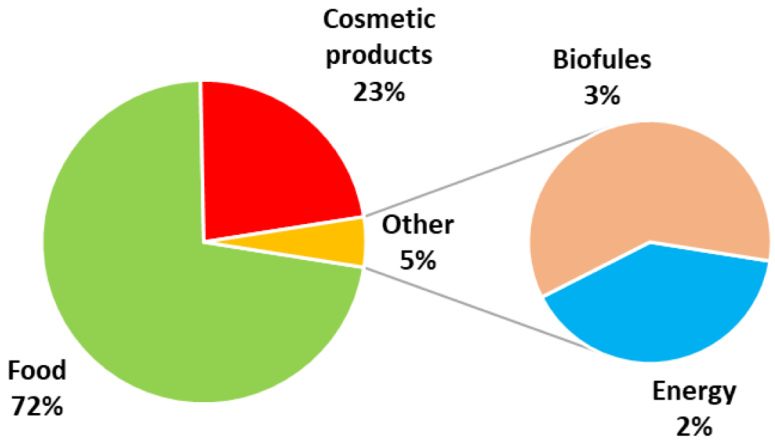
Food and non food uses of vegetable oils since 1990



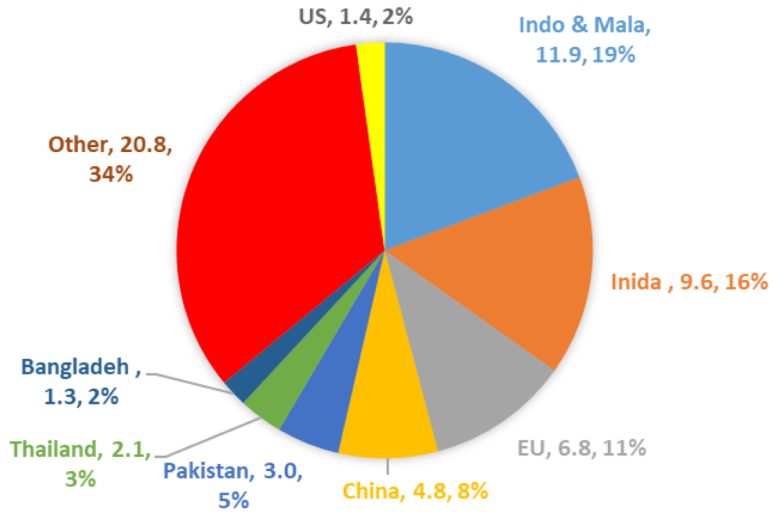
Food and non food uses of palm oils since 1990



Uses of palm oil and its geographical distribution



Major uses at the global scale in 2016



Consumption in million metric tons in 2016

Existing literature: Deforestation and expansion oil crops

- Many papers have addressed increases in soybeans oil palm in tropical area and their environmental consequences: Deforestation, biodiversity loss, and terrestrial carbon emissions
  - Southeast Asia: Agus et al. (2013); Byerlee (2014); Margono et al. (2014); Obidzinski et al. (2012); Austin et al. (2017); Alisjahbana and Busch (2017); Barthel et al. (2018); Henders et al. (2015).
  - South America: Brown et al. (2005); Morton et al. (2006); Richards et la. (2014); Walker et al. (2009); Arima et al. (2011); Barretto et al. (2013); Soares-Filho et al. (2014); Fehlenberg et al. (2017).
  - To review the literature see: Byerlee D, Falcon WP, Naylor RL (2017) The tropical oil crop revolution. Oxford Univ. Press, New York, NY.

Public concerns led to efforts to cut deforestation in Brazil and M&I

- In response to public concerns, voluntary and mandatory regulations were established to limit deforestation in these areas.
- To some extent, these efforts have limited the rate of deforestation in South America, particularly in Brazil, where livestock production and soybean expansion have been major drivers of deforestation
- However, deforestation has continued at a rapid rate in the M&I region
- This has led governmental and nongovernmental regulatory actions seeking to limit the establishment of palm plantations on carbon-rich areas of M&I through:
  - Domestic moratoria on the conversion of primary forests and peatland
  - Use of sustainability certification schemes, e.g. the Roundtable on Sustainable Palm Oil (RSPO)
- However, there efforts have failed to reduce deforestation in M&I

Recent European efforts to ban consumption of palm oil

- The idea of imposing a ban on palm oil was first initiated in the European Union:
  - Amsterdam Declaration signed on December 2015 to support consumption of 100% sustainable palm in the EU region and end illegal logging and deforestation by 2020.
  - In 2016, the ENVI Directorate of the EU Commission argued that deforestation causes climate change and that generates social and economic problems. The ENVI report called for a halt to deforestation in rainforests.
  - In 2017, the members of EU Parliament passed a resolution to support halting deforestation in M&I.
  - Following this resolution several proposals offered to impose a ban on imports of non-sustainable palm oil into the EU and to stop using food-based vegetable oils for biofuel production.
  - In January 2018, the EU Parliament approved amendments for the EU Resendable Energy Directorate II and prohibited use of palm oil in biofuel production by 2021.
  - In February of 2019, France pledged to halt the importation of deforestation-related commodities by 2030

Public media, deforestation in M&I, and palm oil

- Public media, environmental groups, palm oil producers (both opponents and supporters of palm oil) have expressed their opinions and arguments against and or in favor of imposing a ban on palm oil.
  - "Fuel to the Fire", NY Times Magazine, November 25, 2018
  - How palm oil ban has made the EU a dirty world in Malaysia
  - Coalition protests EU's planned ban of palm oil
  - Palm oil: economic and environmental impacts
  - The EU's war on palm oil
  - Palm Oil Production Poses Problems for the Climate
  - Europe's palm oil ban has no basis

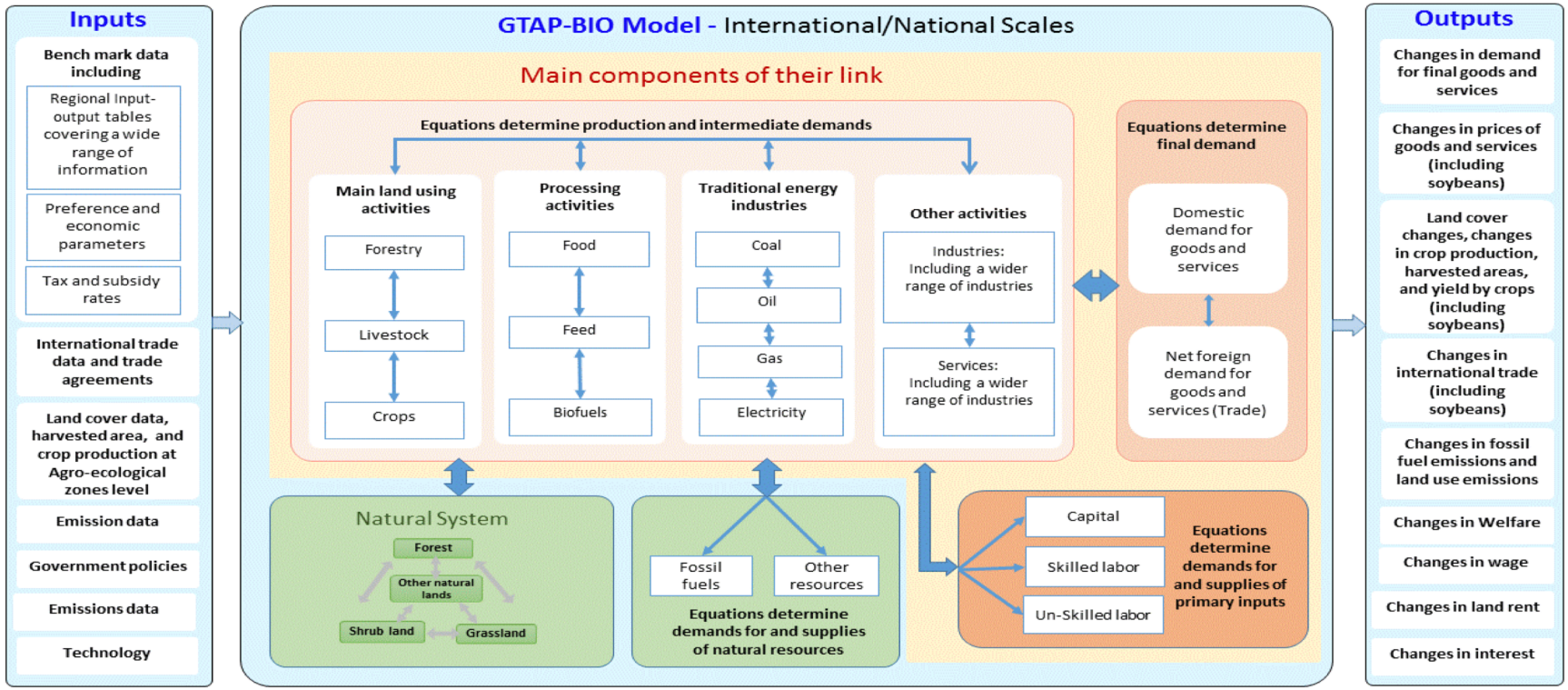
The goals of this paper

- There has been considerable debate in the public media about the pros and cons of such a ban, to the best of our knowledge,
- No major effort has been made to quantify the economic and environmental implications of limiting consumption of palm oil produced in M&I.
- This paper aims to remedy this knowledge gap by providing a rigorous evaluation of the market-mediated consequences of restrictions on both the production and the consumption of palm oil
- Acknowledging that restricting the expansion of oil palm production in M&I might not in itself eliminate deforestation in this region, as palm plantations are not the sole driver of deforestation and drainage of peatland in this region

Market mediated effects and restriction on palm oil

- Analysis of restrictions on the consumption of oil palm produced in M&I is complicated by the market-mediated effects. We need to take into account:
  - Interaction among markets for vegetable oils and crop switching at the global scale
  - Induced land use changes across the world and their corresponding emissions
  - Implications for livestock industry and markets for feed items including meals
  - Reduction in consumption of vegetable oils in food and non food uses
- Market mediate responses could have wide-ranging impacts on human and natural systems
- We used a well-known medium-run Computable General Equilibrium (CGE) model, GTAP-BIO, to assess these impacts

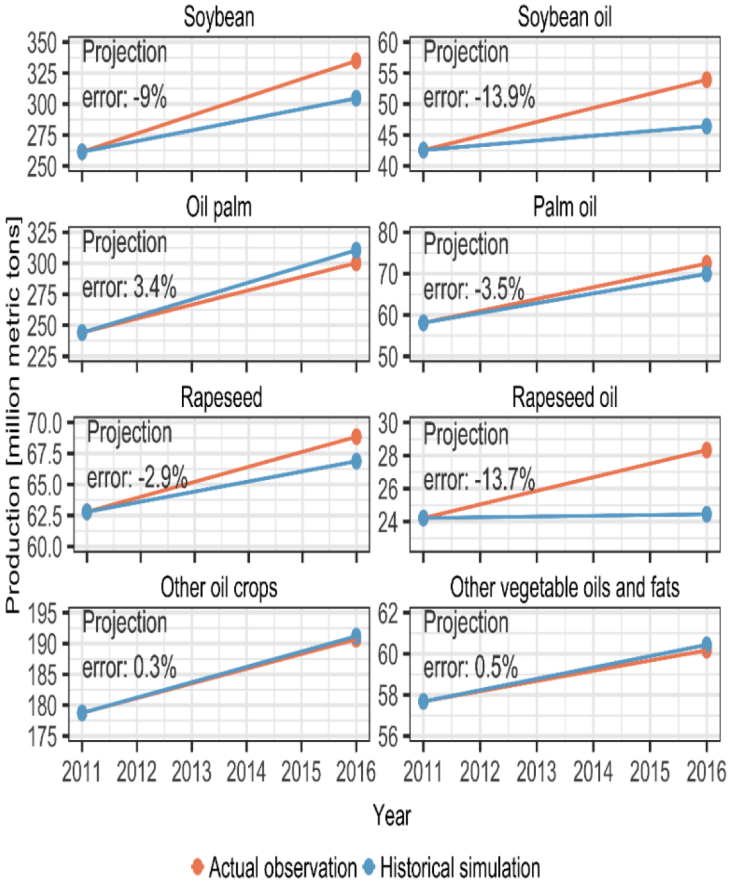
Structure of GTAP-BIO model

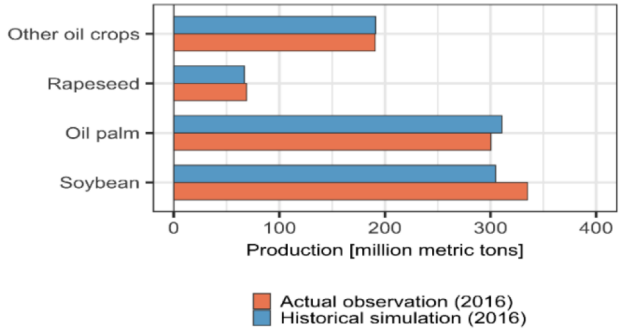


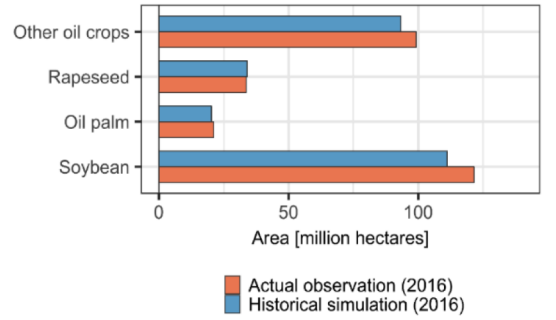
Examined scenarios

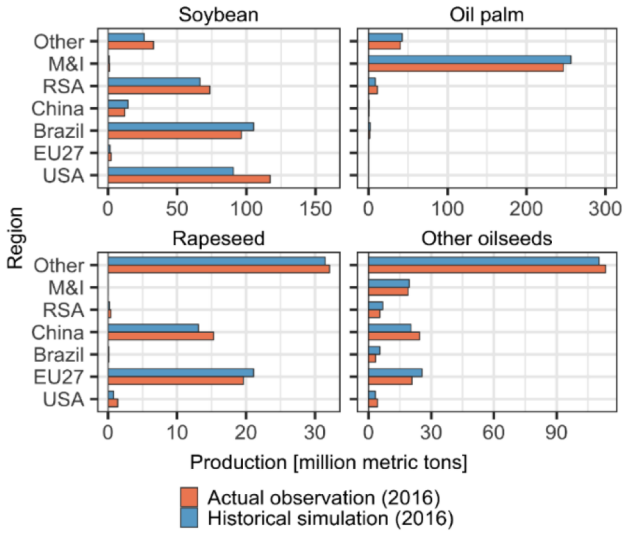
- To assess the potential medium-run impacts of limiting consumption of palm oil, a historical simulation and 3 counterfactual policy experiments were developed
- The historical simulation captures changes in the global economy over the period 2011 to 2016
- The examined counterfactual policies were:
  - Experiment I: Baseline combined with a regulation policy that freezes production of oil palm in M&I at its 2011 level via a domestic production tax (TAX)
  - Experiment II: Baseline plus TAX supported by an economic incentive (subsidy) to freeze forest area in M&I at its 2011 level (TAXAREA)
  - Experiment III: Baseline plus a uniform international tariff on the world imports of palm oil from M&I that freezes production of palm oil in this region at its 2011 level, along with the freeze on forest area in M&I (TARIFFAREA)

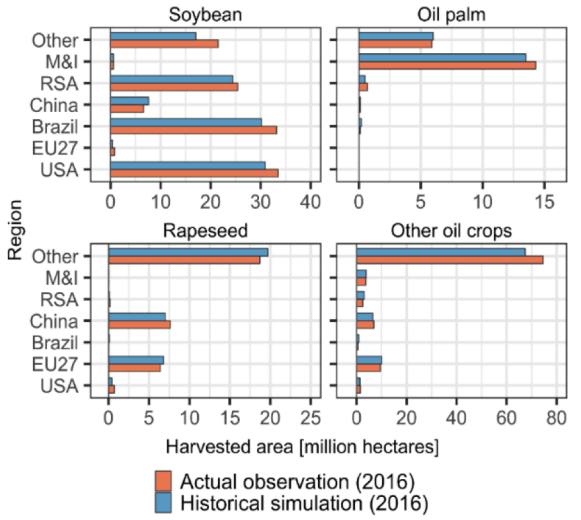
Results: Baseline results and validation





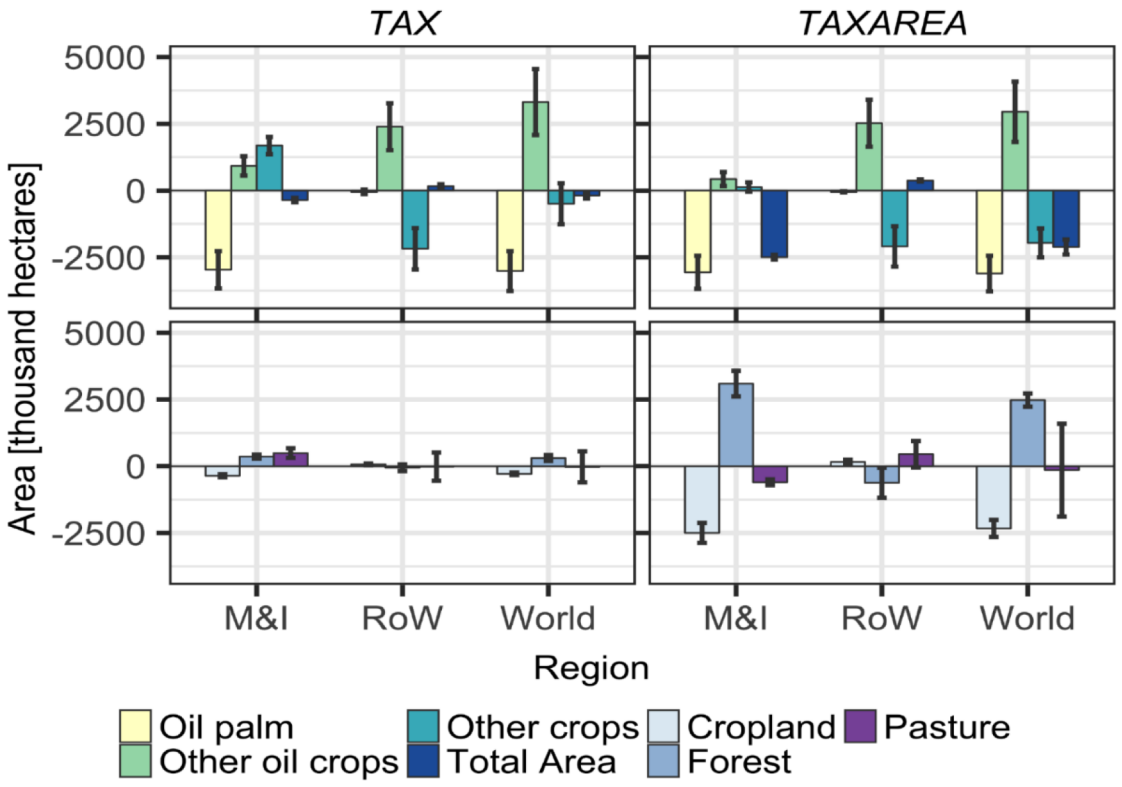






Results: Land use impacts

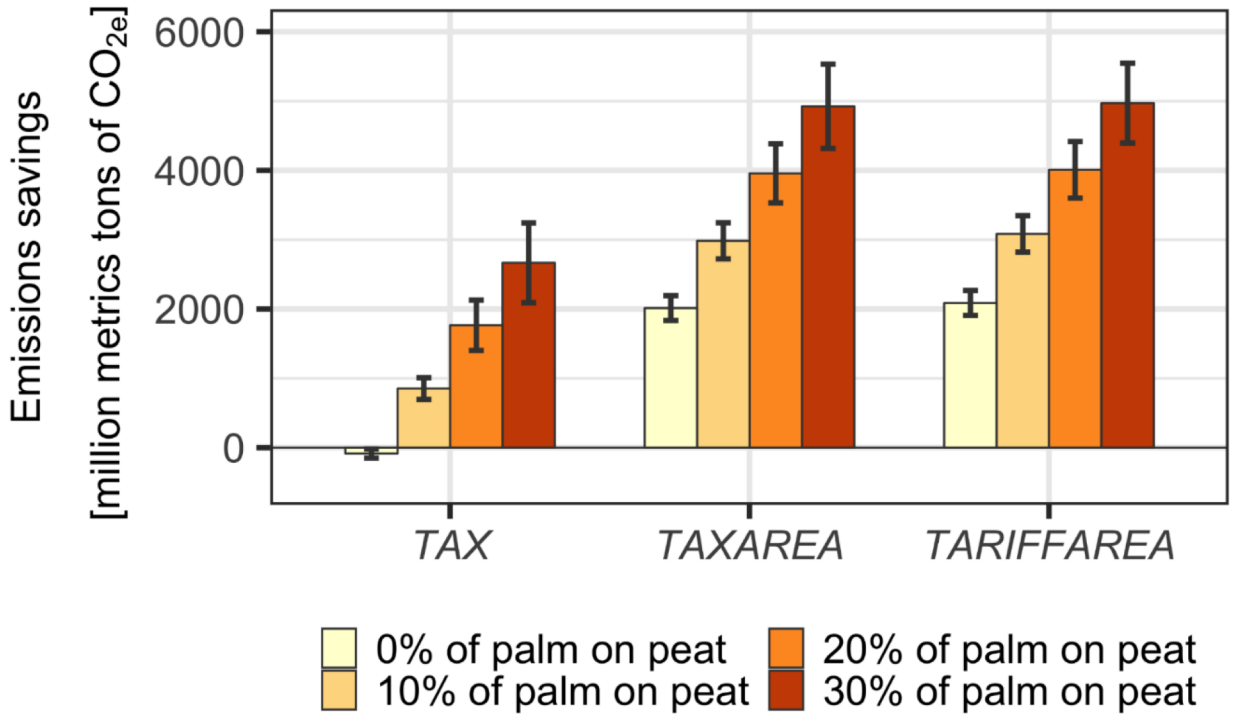
Preserving tropical forests requires direct intervention into the land market



- Under the TAX policy:
  - Other oilseeds expands
  - Palm oil drops
  - No reduction in oilseed area
  - Other crops expand in M&I and drop in RoW
  - No major saving in deforestation in M&I
- Under the TAXAREA policy:
  - Other oil crops and other crops does not grow in M&I
  - A major saving in deforestation by 3 million hectares in M&I
  - A major saving in deforestation by 2.5 million hectares at the global scale

Results: Land use emissions

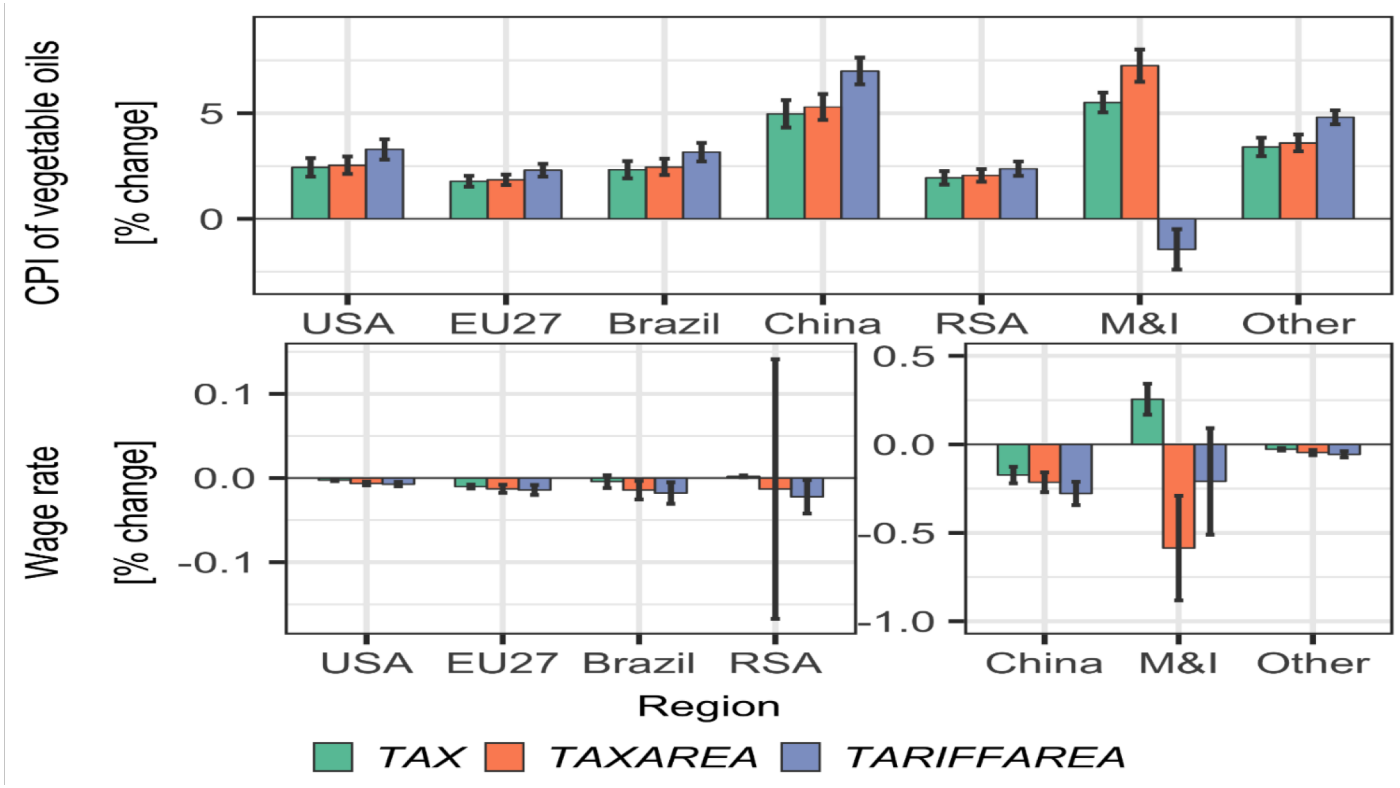
Restricting consumption of palm oil produced in M&I reduces terrestrial carbon emissions



- To examine the extent to which these land use changes affect terrestrial carbon emissions, we used the land use emissions model developed by Plevin et al. - adopted by the CARB
- Palm expansion on peat land assumption:
  - Pleven model assumes 30%
  - Recent evidence supports lower than 30%

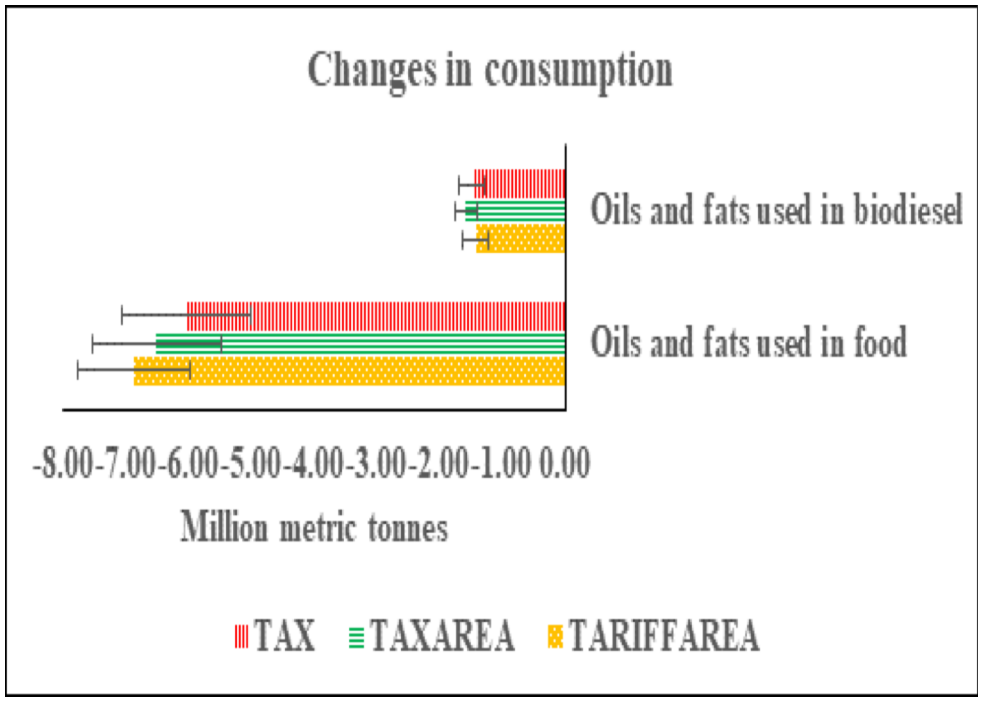
Results: Wage and price impacts

Asia, in particular China, will pay higher prices for vegetable oils under the policy scenarios

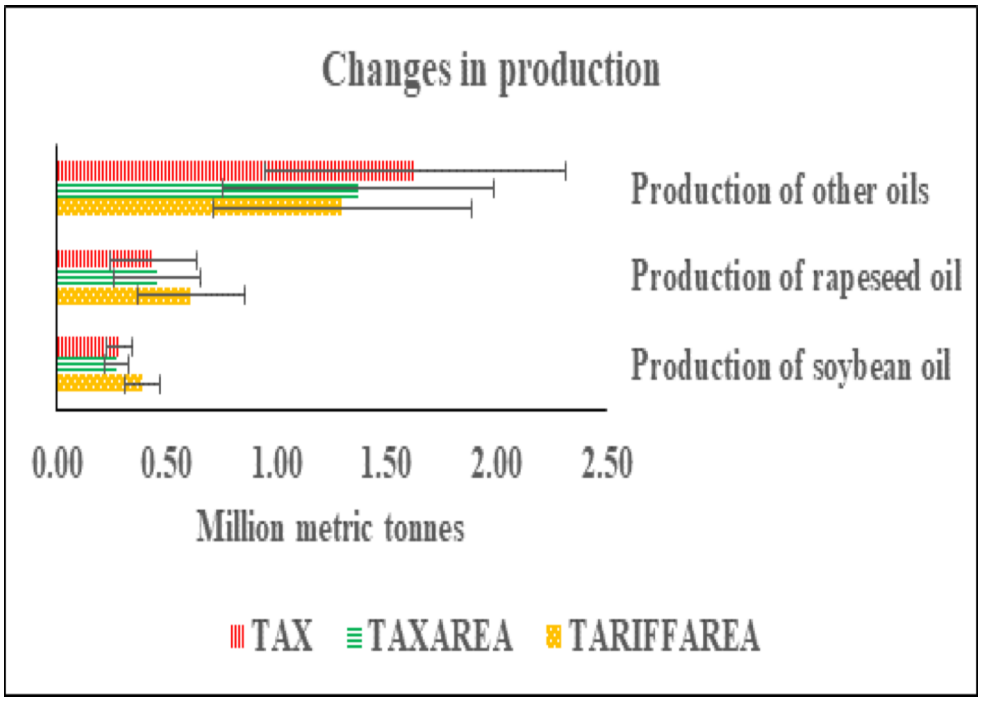


Results: Production and consumption

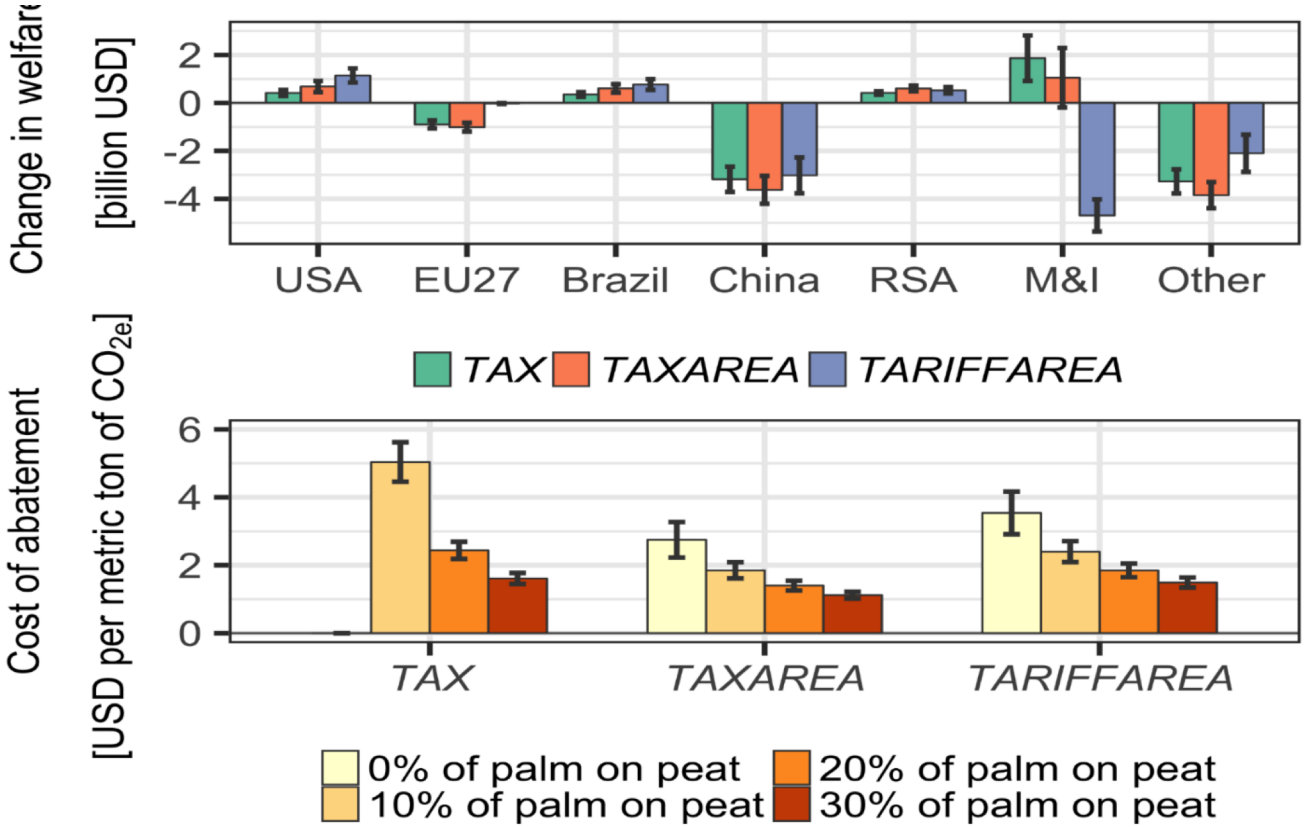
Global consumption of vegetable oils and fats is reduced



A restriction on palm oil increases production of other vegetable oils & fats



Results: Welfare and costs of emissions reduction



- Importers of vegetable oils and oilseeds bear the costs of limiting consumption of palm oil produced in M&I
- M&I will be worse off under the third policy
- Targeting deforestation directly is required for a cost effective policy package

Conclusions

- Reduction in palm oil production/consumption does not halt deforestation in M&I
- Targeting just one driver of deforestation in M&I opens room for other drivers of deforestation to operate more actively in the absence of a forest protection plan
- A restriction on consumption of palm oil produced in M&I supported by an initiative that directly limits deforestation is required to prevent additional deforestation
- Importers of vegetable oils and oilseeds bear the costs of limiting consumption of palm oil produced in M&I
- An international regulation that limits consumption of palm oil produced in M&I using a restriction on trade of this product (e.g., imposing a tariff on palm oil imported from M&I) is far more costly for the M&I region compared to effective domestic regulations

Thanks

Questions and Comments

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