The Assessment of Relation Between Market Forces and Deforestation in Indonesia and Brazil: A Meta-analysis

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1. Introduction

- Trade activities in developing countries associated with increased agricultural exports represent the main driver of deforestation since the beginning of 2000s, along with the pressures on economic development and population growth as well as insufficient institutional capabilities to decrease the forest degradation (Leblois et al., 2017).
- High targets towards lowering emissions of GHGs set in developed markets, e.g., in the EU, and increased share of renewable resources within the energy mix or high world demand for agricultural imports of palm oil or soya beans and grains from developing countries influences the agricultural production and worsen the state of the environment resulting in further removals of tropical forests in these countries.
- Agricultural conversion in favor of food and biofuel production belongs among the main drivers for deforestation, along with too liberal approach in low-cost imports of animal feed to the EU which affects directly the land use changes and forests outside of the EU borders (Khatun, 2012).
- Deforestation in Indonesia and Brazil connected with the agricultural production still represents a significant problem (Baccini et al., 2012).

2. Objectives

- To compile scientific papers and to conduct a qualitative meta-analysis of the scientific and practical publications on the deforestation and protection of rainforest in relation to high world demand for palm oil and soya beans and grains and beef, in order to draw a relation between market forces and deforestation. (Export and Import countries, Relationship between RE Sector policy targets and production of energy crop in case study countries)

3. Materials and Methods

Framing	• Assessment of trade and deforestation regarding case study commodities in Indonesia and Brazil and high targets towards lowering emissions of GHGs set in developed markets, e.g., in the European Union, and increased share of renewable resources within the energy mix.
Data Search	• Databases used: Science Direct, Google Scholar • Keywords Indonesia: palm oil, export, trade, deforestation, Indonesia qualitative • Keywords Brazil: soybean, soya, beef, export, trade, deforestation, Brazil, qualitative
Rating	• 8 studies focused on Indonesia and 2 studies focused on Brazil, published in peer reviewed journals and containing the relevant keywords, were selected for full text review.
Synthesis	• Thematic synthesis (Thomas & Harden, 2008) was used to code the findings and group similar codes into descriptive themes and then further into analytical themes.
Reporting	• Summary of the search strategy, reviewed studies and selected key synthesis findings are presented in the results section.

Qualitative meta-analysis methodology following Newton (2015) & Thomas & Harden (2008)

4. Selected Results

Relation between Market Forces and Deforestation in Indonesia and Brazil

Key Drivers for PO Expansion
- Poverty-driven deforestation [1]
- Capital-driven deforestation [1]
- International trade [1]
- Increased global demand [2,6]
- Increased log-export industry [3]
- State-owned plantation estates (in the past) [5]
- Revenue driven change in product mix [5]

Policy Instruments
- Law no.18 [1]
- RSPO [2,8]
- European Energy Directive [2]
- President's decrees [2]
- ASEAN AATHP [2]
- REDD+ [3,10]
- Paris Agreement [3]
- No Deforestation, No Peat, No Exploitation [4]
- Sustainable production through whole supply chain [4,7]
- Non-state market driven (eco-labels, certifications) [8]
- Zero deforestation commitments [9]
- Soy Moratorium [9,10]
- Beef Moratorium [10]

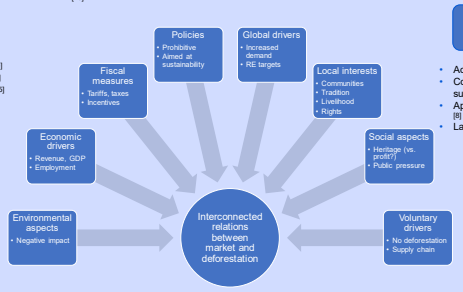
Fiscal Instruments
- Fiscal instruments aimed to lower emissions [3]
- Amazon Fund compensations [10]

Beliefs of Local People
- Indigenous people can affect conversion of their owned land (beliefs vs. promises of Agri businesses) [1]
- Public society pressure [10]

Cons of PO Expansion
- Environmental impact – deforestation, biodiversity and land loss, fires, increased emissions of CO_2 emissions [1,2,6,7,8]
- Land teleconnections [1,6]
- Conflicts over land rights [2,8]
- Illegal logging [3]

Pros of PO Expansion
- Employment opportunities [1,2,7]
- Revenue generation [1,7]
- Rural areas economic development [2]
- Suitable cooking oil and biodiesel production [2]
- GDP contribution [7]

Possible Solutions
- Enforced regulation [1,2,10]
- Information awareness [1]
- Improved PO varieties [2,5]
- Sustainable land use [2]
- Alternatives to PO [3]
- Land reform [3]
- Investments from developed countries [3]
- Better social and environmental conditions (private & public sectors) [4]
- Sustainable PO production via RSPO certification [8]
- Zero deforestation [9]



Hindering Factors
- Access to technology [2]
- Cost related to sustainable production [2]
- Approach of government [8]
- Lacking transparency [9]

Article number	Articles studied in relation to Indonesia & Brazil case study	Authors
1	Forest or oil palm plantation? Interpretation of local responses to the oil palm promises in Kalimantan, Indonesia	Yuliani et al. (2020)
2	Indonesia palm oil production without deforestation and peat conversionby 2050	Afriyanti et al. (2016)
3	The role of fiscal instruments in encouraging the private sector and smallholders to reduceemissions from deforestation and forest degradation: Evidence from Indonesia	Cadman et al. (2019)
4	Hybrid governance in agricultural commodity chains: Insights fromimplementation of 'No Deforestation, No Peat, No Exploitation' (NDPE) policies in the oil palm industry	Klöcker Larsen et al. (2018)
5	Palm oil intensification and expansion in Indonesia and Malaysia: Environmental and socio-political factors influencing policy	Varkkey et al. (2018)

Article number	Articles studied in relation to Indonesia & Brazil case study	Authors
6	Do eco-labels prevent deforestation? Lessons from non-state market driven governance in the soy, palm oil, and cocoa sectors	van der Ven et al. (2018)
7	Towards sustainable palm oil production: The positive and negative impacts on ecosystem services and human wellbeing	Ayompe et al. (2021)
8	Sustainable production and consumption of palm oil inIndonesia: What can stakeholder perceptions offer to the debate?	Moreno-Peñaranda et al. (2015)
9	Using supply chain data to monitor zero deforestation commitments: an assessment of progress in the Brazilian soy sector	Ermgassen et al. (2020)
10	Brazil's Success in Reducing Deforestation	Boucher et al. (2013)

5. Selected Conclusion

- Global demand and trade with the case study commodities had a considerable impact on land conversion and agricultural expansion, leading to deforestation and related environmental degradation.
- Policies and policy instruments are crucial in the pledge to cease deforestation and its resulting environmental impact (e.g., sustainable production, certification, ban of deforestation related imports) and so is their enforcement.
- This study aimed to analyze and understand key relations between market forces and deforestation and identified the environmental, economic, fiscal, policy, global, local and voluntary aspects as the key relations. Considering all these related aspects might benefit further research.

6. References

- Baccini et al. (2012) Estimated carbon dioxide emissions from tropical deforestation improved by carbon-density maps. Nature Climate Change, Volume 2, Issue 3, pp. 182-185.
- Khatun, K (2012), Reform or reversal: implications of the Common Agricultural Policy (CAP) on land use, land use change, and forestry (LULUCF) in developing countries. Conservation Letters, Vol. 5, pp. 99-106
- Leblois, A, Damette, O, Wolfersberger, J (2017) What has Driven Deforestation in Developing Countries Since the 2000s? Evidence from New Remote-Sensing Data. World Development, Vol. 92, pp. 82-102.
- Newton J (2015) Qualitative Meta-synthesis. Deakin University.
- Thomas, J, Harden, A (2008) Methods for the Thematic Synthesis of Qualitative Research in Systematic Reviews. BMC medical research methodology. Vol. 8, p. 45.
- Citations of studies used in the meta-synthesis presented in the results section of this poster.

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