Preliminary results – Do not quote

Estimating the Variability of Greenhouse Gas Footprints of Crude Palm Oil production in Indonesia

Sources of Variability

Forest edge carbon degradation

Peat soil preparation and cultivation

Above and belowground carbon change from direct land use change

Sources of variability of GHG footprints[1,2]

Cultivation, transport and mill processing

Preliminary results – Do not quote

Goal

To quantify the spatial variability of greenhouse gas (GHG) footprints of current palm oil production (year 2015) in Indonesia, expressed as t CO_2-eq t^{-1} crude palm oil (CPO) for each palm oil mill.

Geographical scope	Per mill
Production area	~10.1Mha
Scenarios for analysis	1) Province 2) Country 3) Island

Preliminary results – Do not quote

Methods

Spatially explicit

- Land cover map (MoF)[3]
- Peat map (GFW)[4]
- Mill distribution (GFW)[5]
- Yield map (Earthstat)[6]

InVEST

integrated valuation of ecosystem services and tradeoffs

1. Carbon stock change and edge effects

- Baccini biomass map for non-forest classes[7]

Forest carbon edge effect model[8]

- Allocating carbon loss beyond plantation area
- 25 years amortization period
- IPCC root: shoot ratios[9]

2. Peat fire and drainage

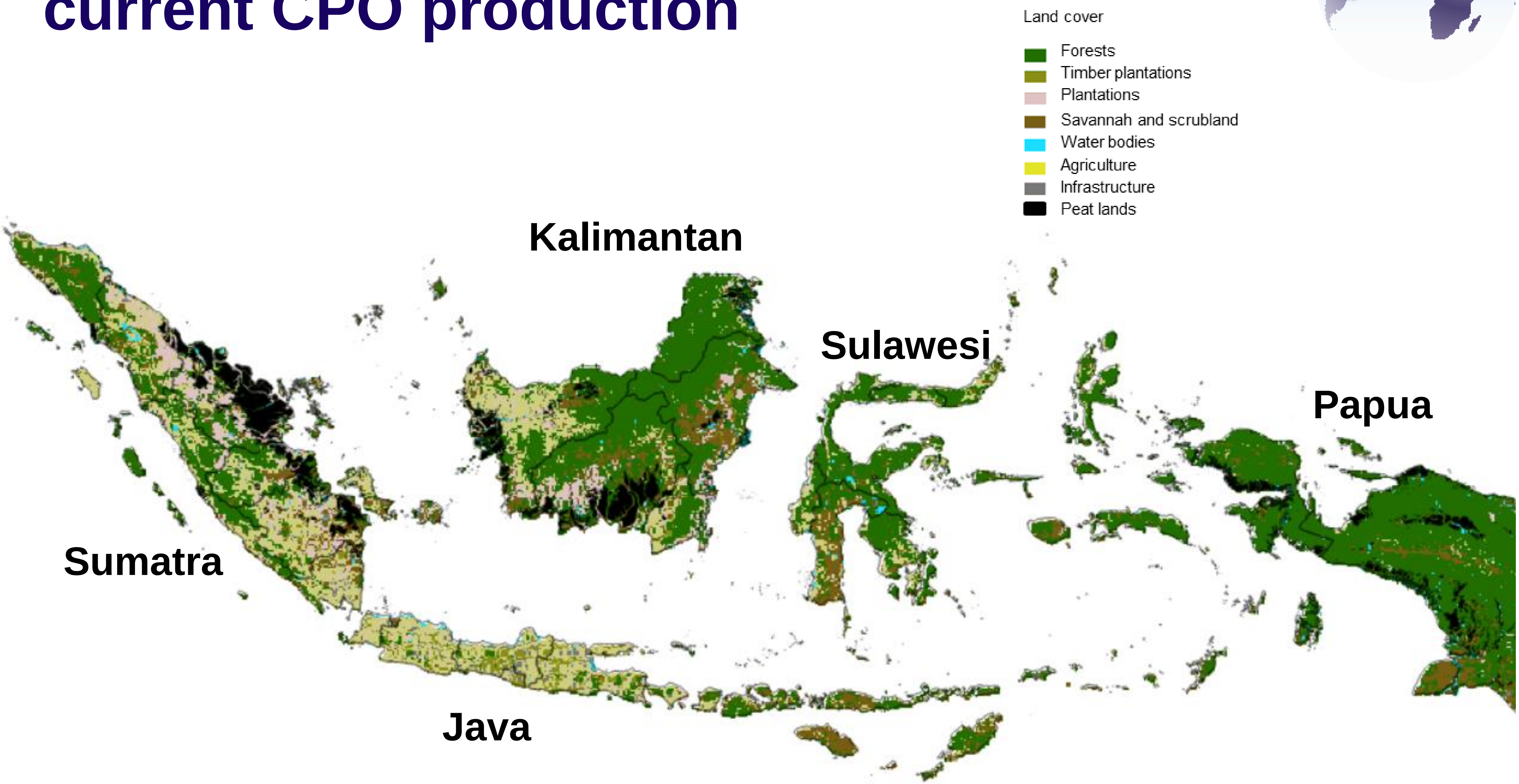
- Estimated from IPCC emission factors[10]

3. Cultivation, transport and mill processing

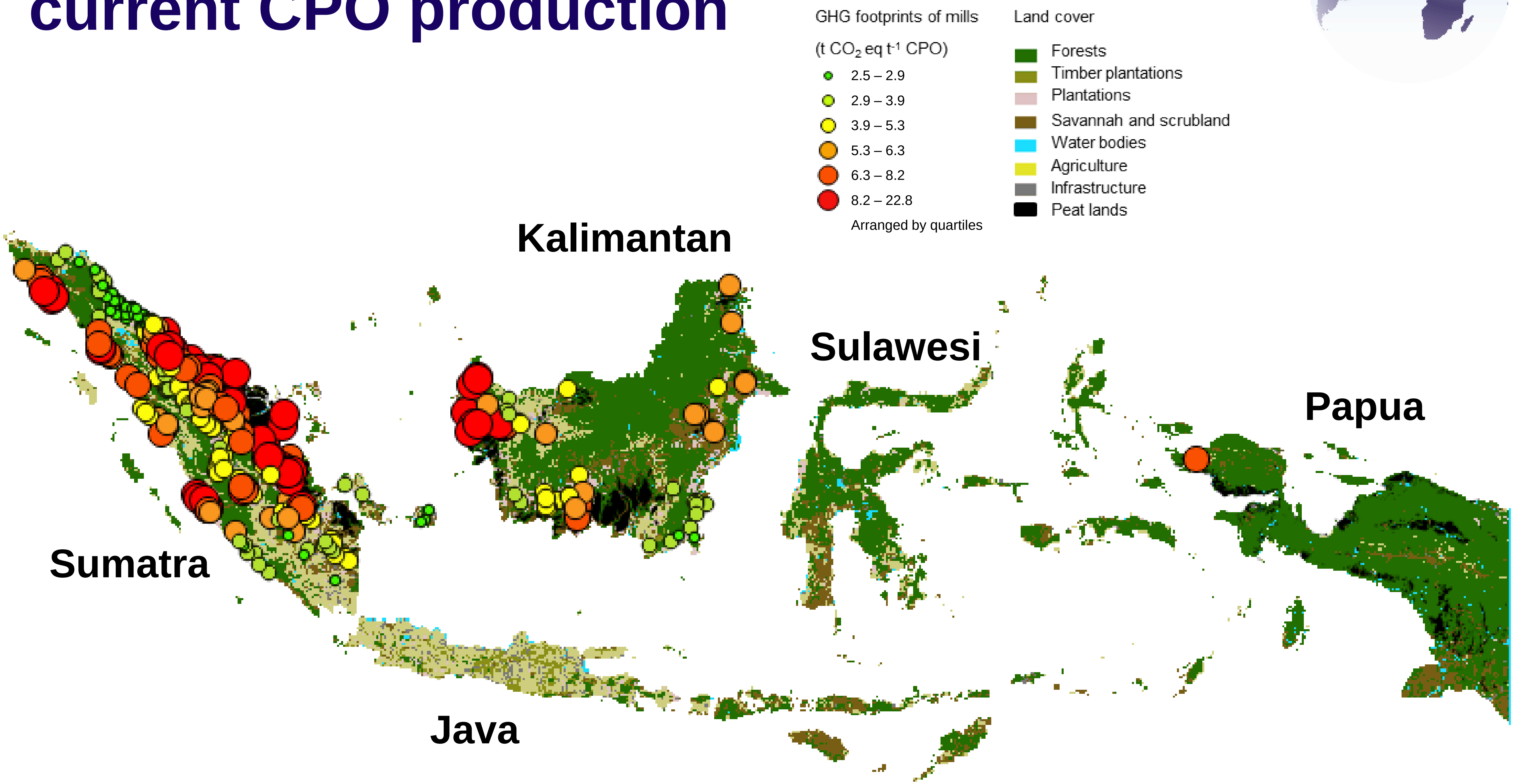
- Default technologies from Agri-footprint[11]
- No methane capture

Preliminary results – Do not quote

Estimated mill GHG footprints – current CPO production

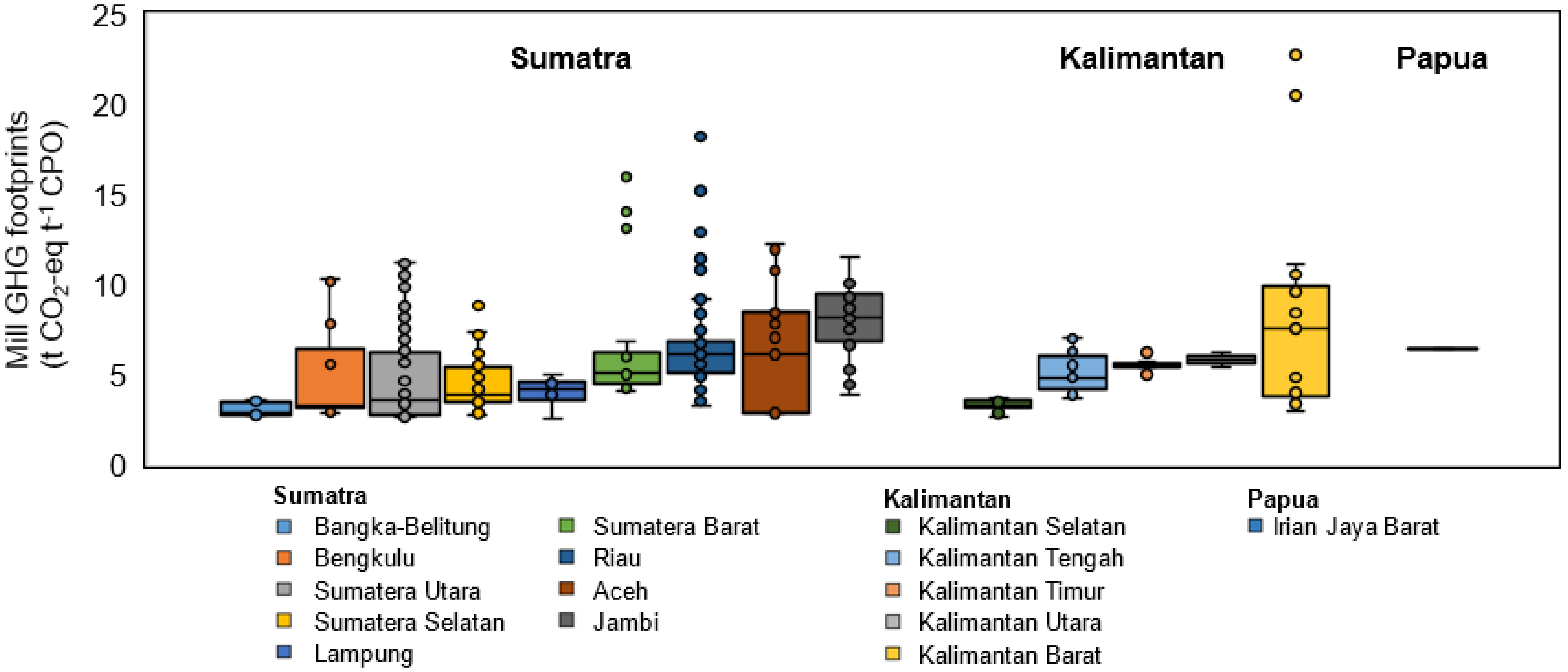


Estimated mill GHG footprints – current CPO production

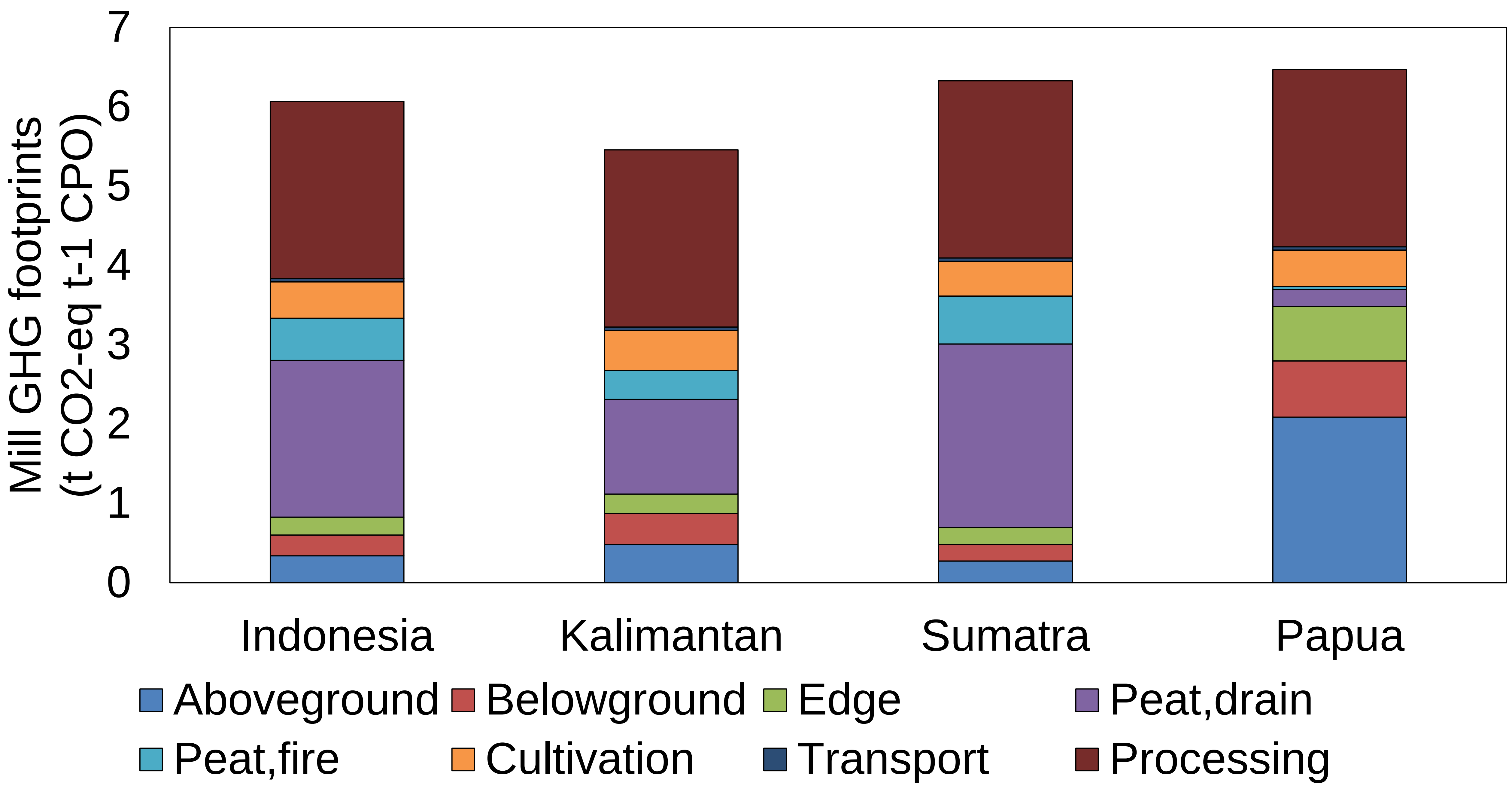


Preliminary results – Do not quote

Variability of estimated mill GHG footprints – by province

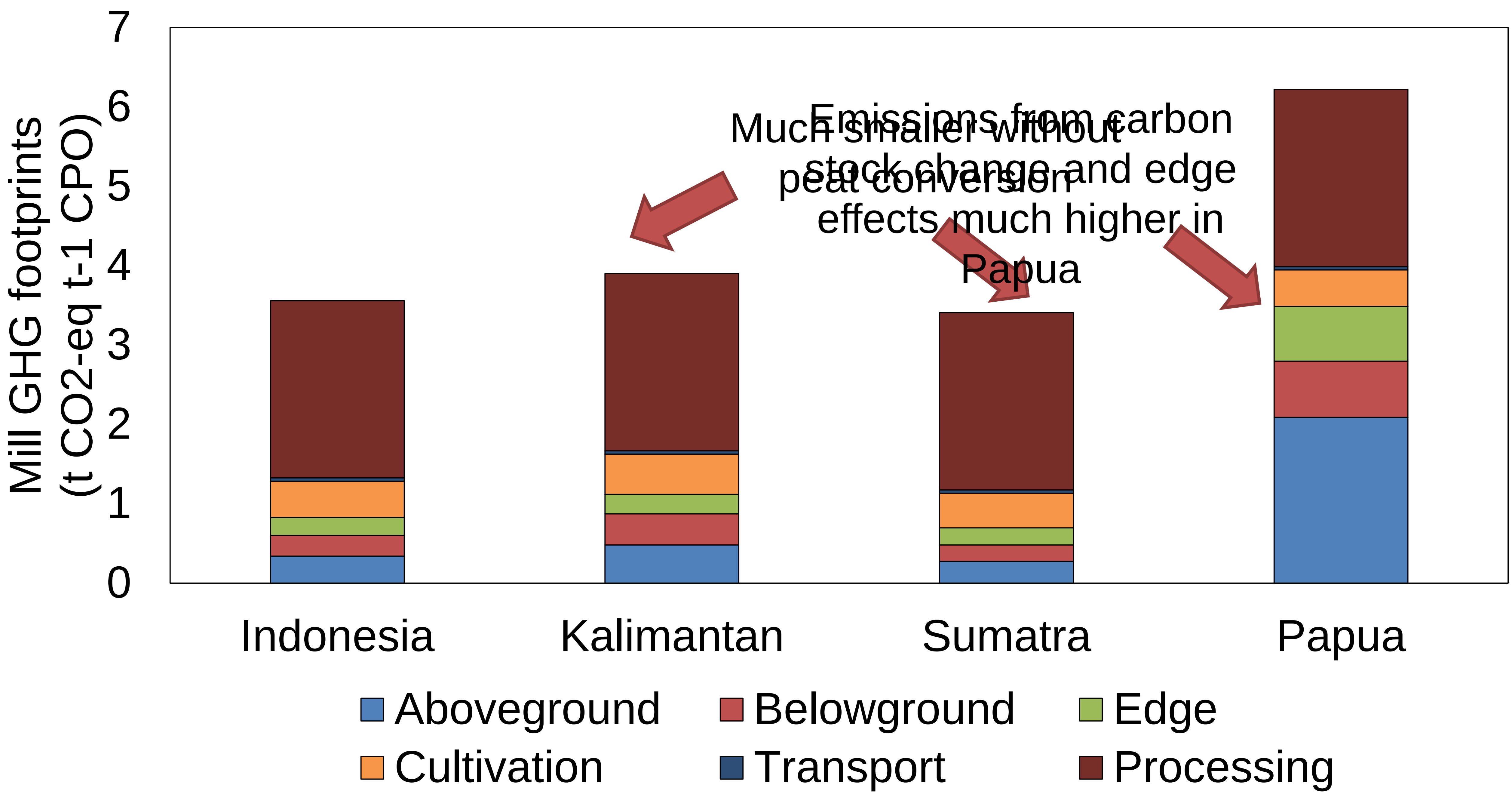


Contributors to average mill GHG footprint



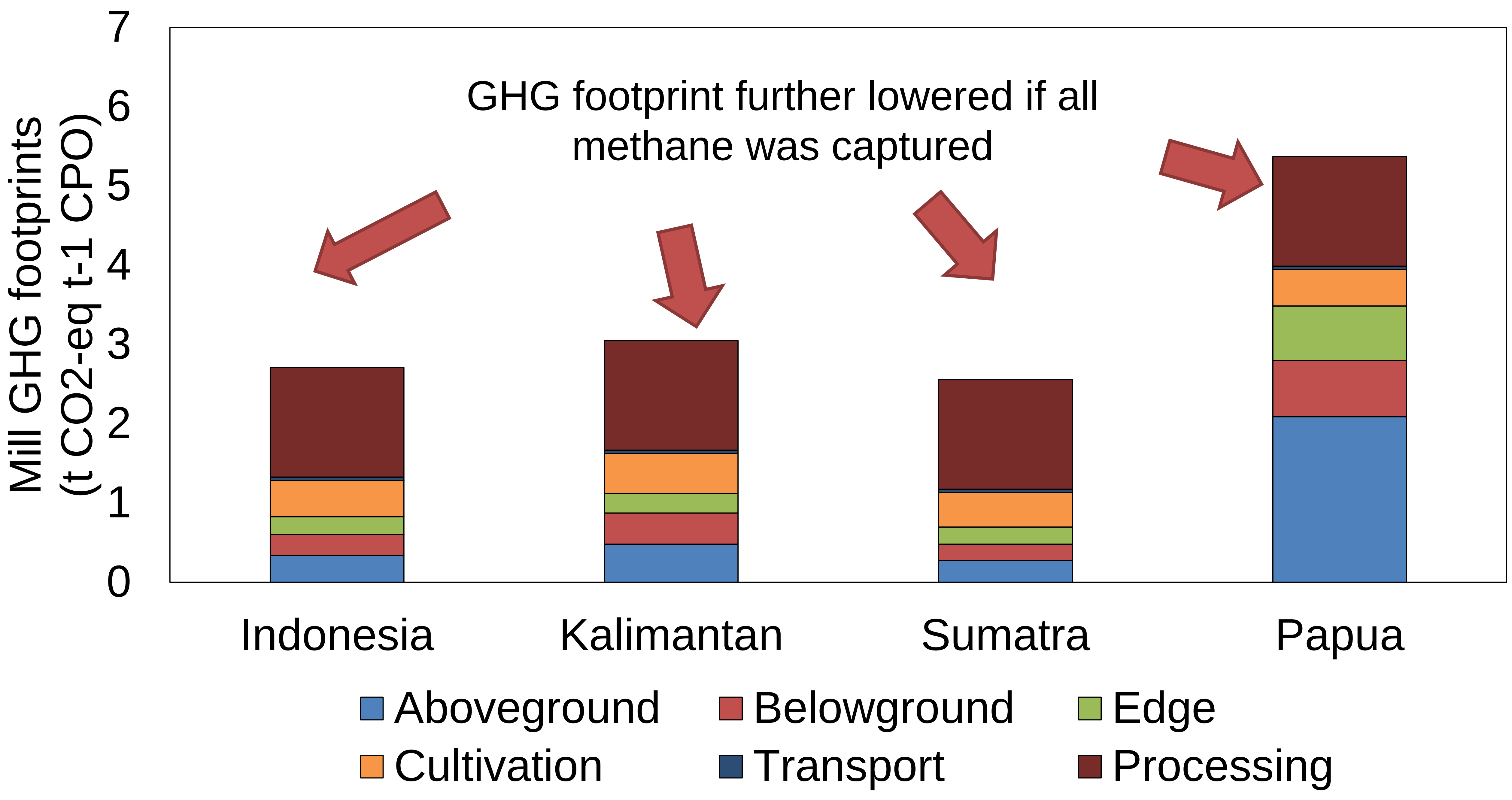
Preliminary results – Do not quote

Contributors to average mill GHG footprint



Preliminary results – Do not quote

Contributors to average mill GHG footprint



Preliminary results – Do not quote

Take home messages

- GHG footprints of CPO production are characterized by high variability: from 2.5 t CO_2 eq t^{-1} CPO in Lampung to 22.8 t CO_2 eq t^{-1} CPO in Kalimantan Barat.
- Highlights importance of peat soils and historical land use change
- Opportunities for improvement: methane capture, peat management
- Need mill level data (RSPO)
- Sourcing location matters!

Acknowledgements

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Preliminary results – Do not quote

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Thank you for your attention.