

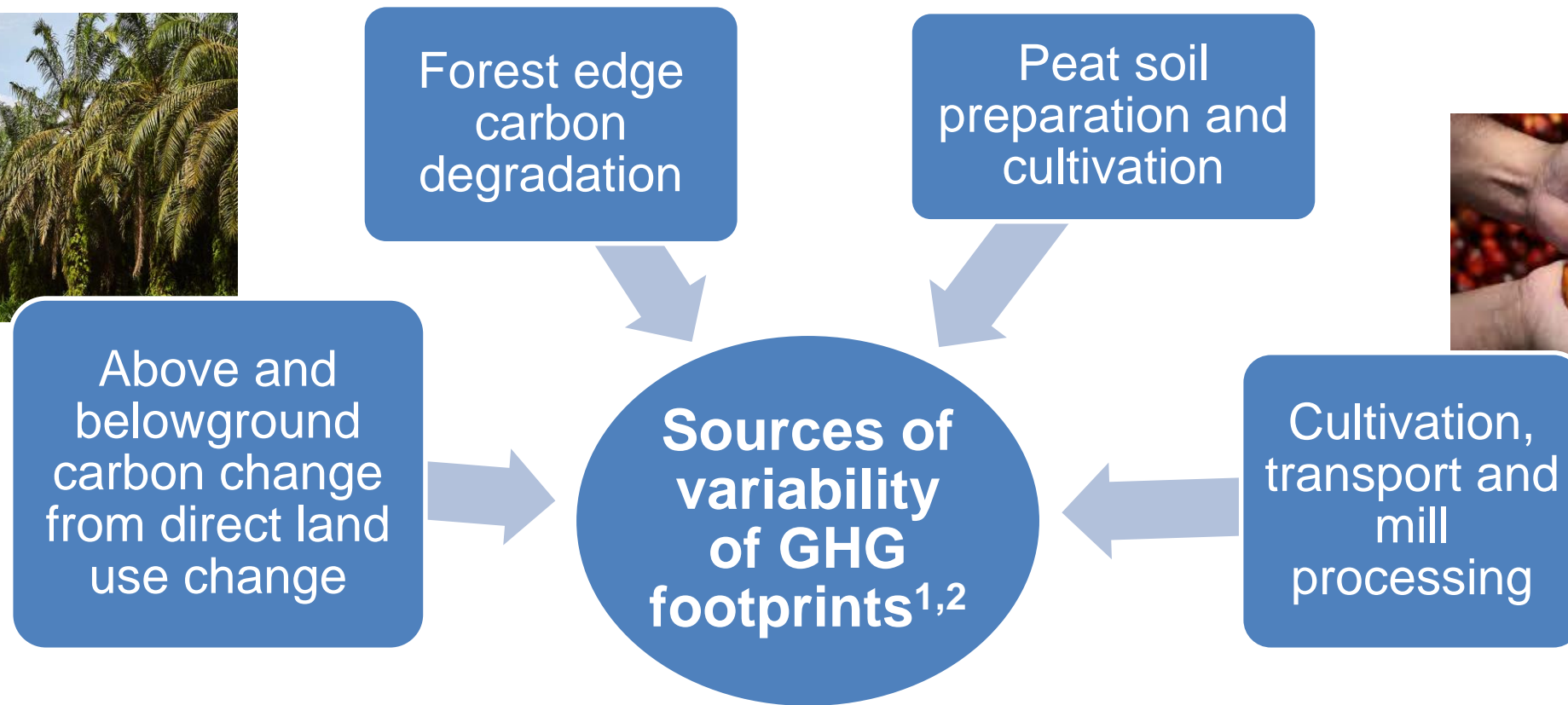
*Preliminary results – Do not quote*



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



# Sources of Variability

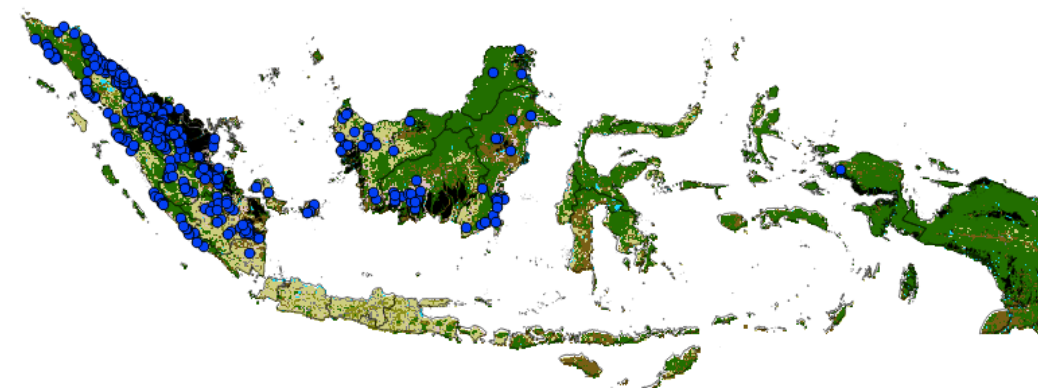




## Goal

To quantify the spatial variability of greenhouse gas (GHG) footprints of current palm oil production (year 2015) in Indonesia, expressed as  $t\ CO_2\text{-eq}\ t^{-1}$  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





# Methods

## Spatially explicit

- Land cover map (MoF)<sup>3</sup>
- Peat map (GFW)<sup>4</sup>
- Mill distribution (GFW)<sup>5</sup>
- Yield map (Earthstat)<sup>6</sup>



## 1. Carbon stock change and edge effects

- Baccini biomass map for non-forest classes<sup>7</sup>
- Forest carbon edge effect model<sup>8</sup>
- Allocating carbon loss beyond plantation area
- 25 years amortization period
- IPCC root: shoot ratios<sup>9</sup>

## 2. Peat fire and drainage

- Estimated from IPCC emission factors<sup>10</sup>

## 3. Cultivation, transport and mill processing

- Default technologies from Agri-footprint<sup>11</sup>
- No methane capture



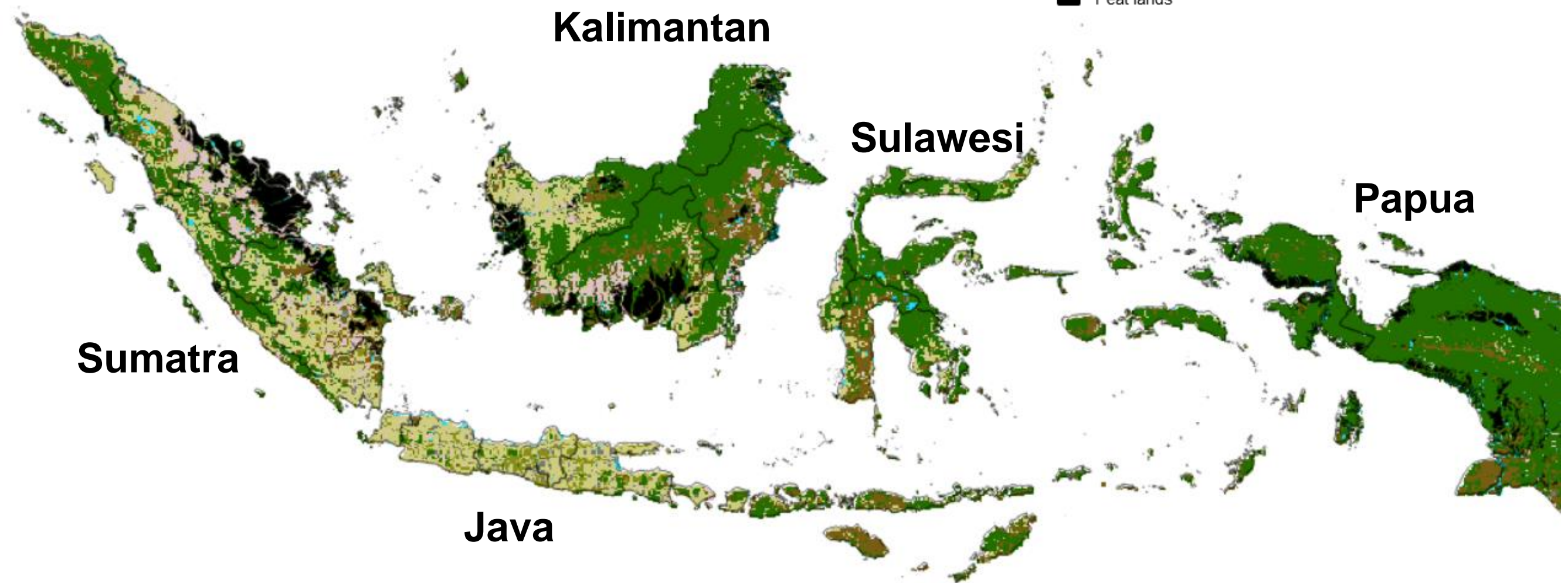
*Preliminary results – Do not quote*

# Estimated mill GHG footprints – current CPO production



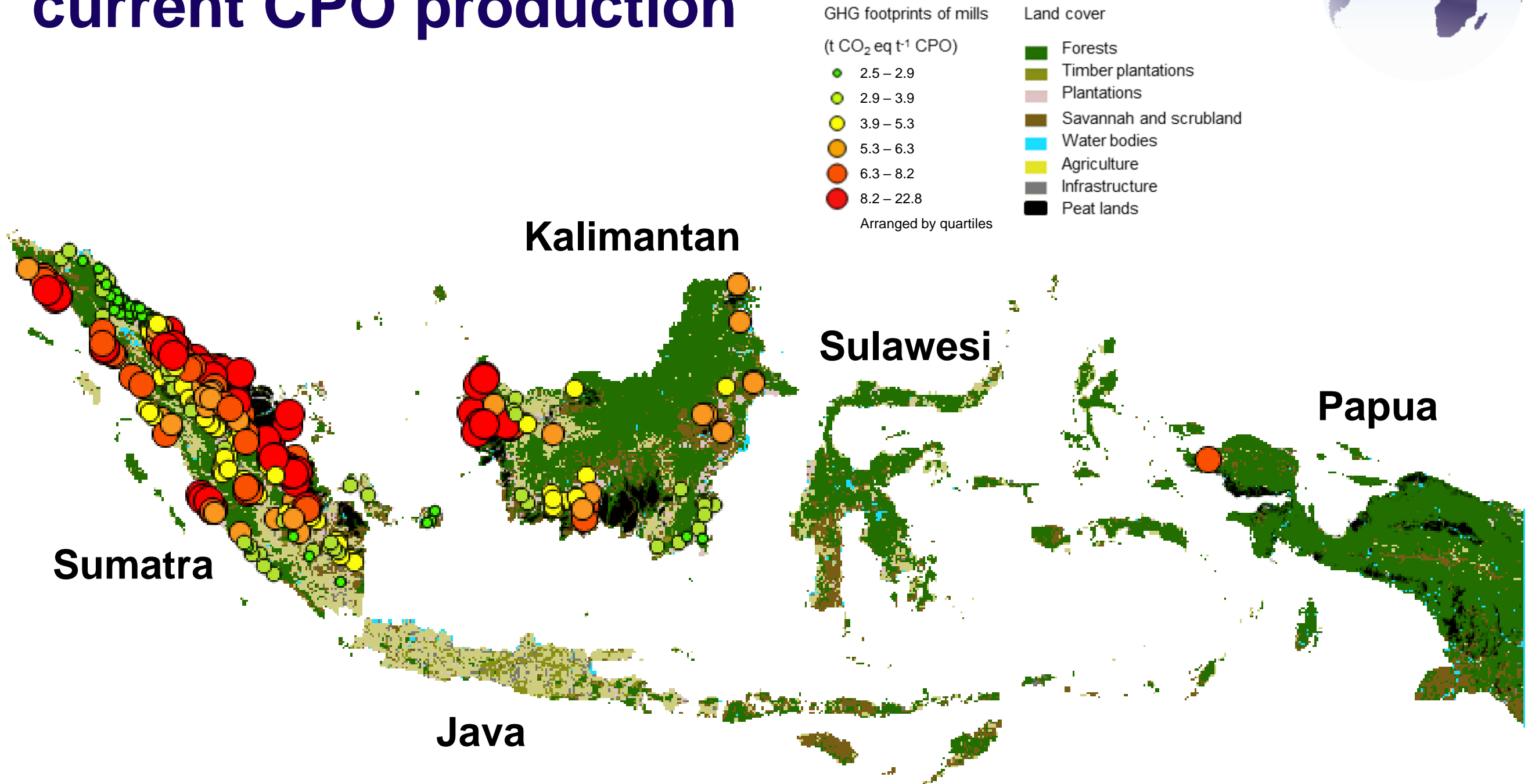
Land cover

- Forests
- Timber plantations
- Plantations
- Savannah and scrubland
- Water bodies
- Agriculture
- Infrastructure
- Peat lands

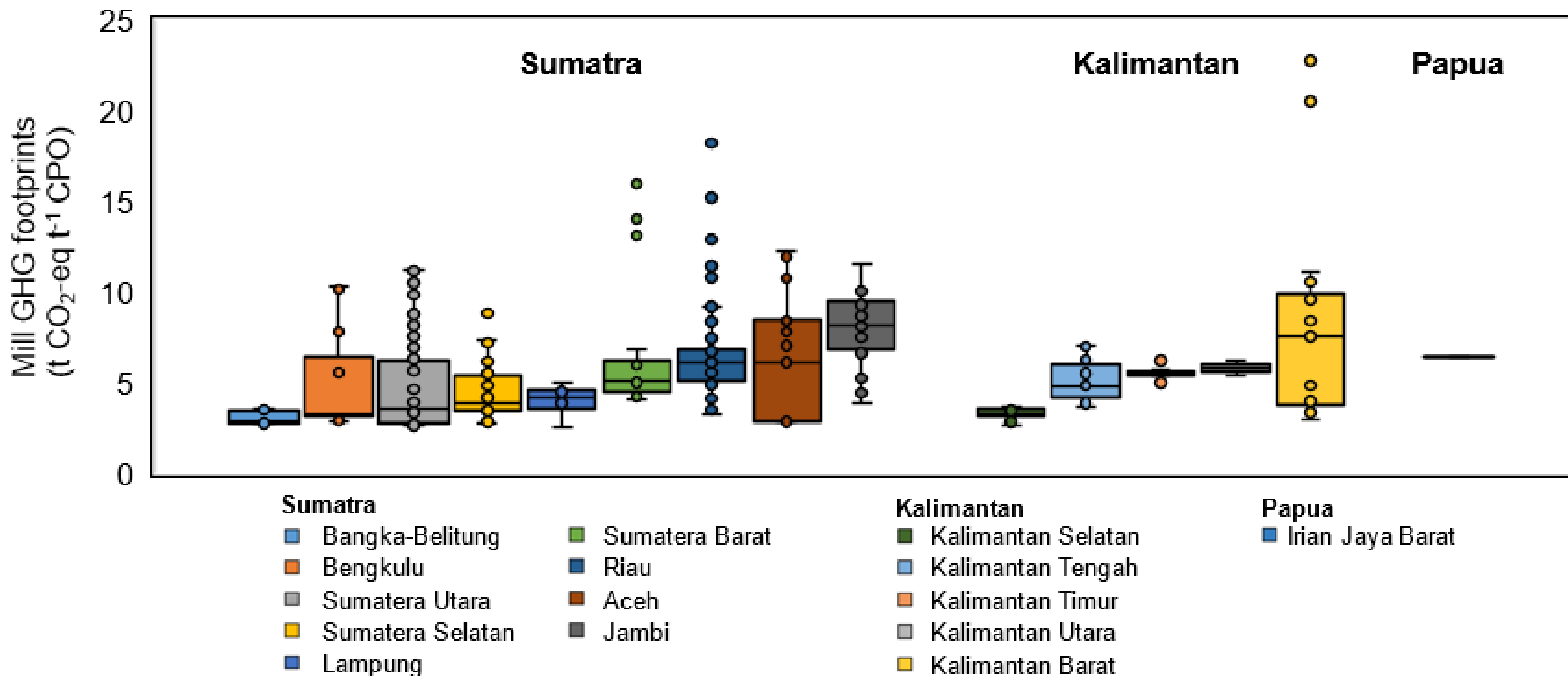


*Preliminary results – Do not quote*

# Estimated mill GHG footprints – current CPO production

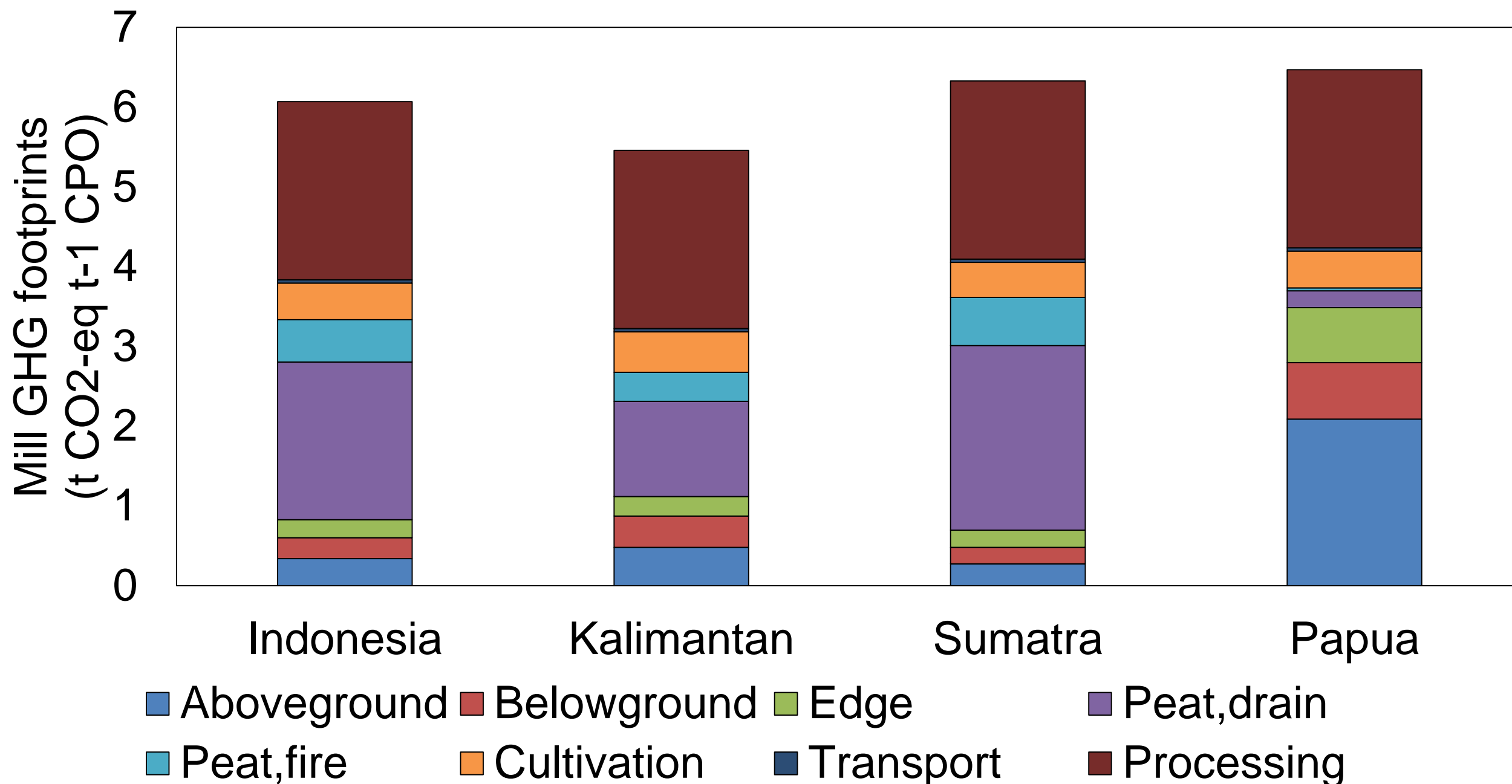


# Variability of estimated mill GHG footprints – by province





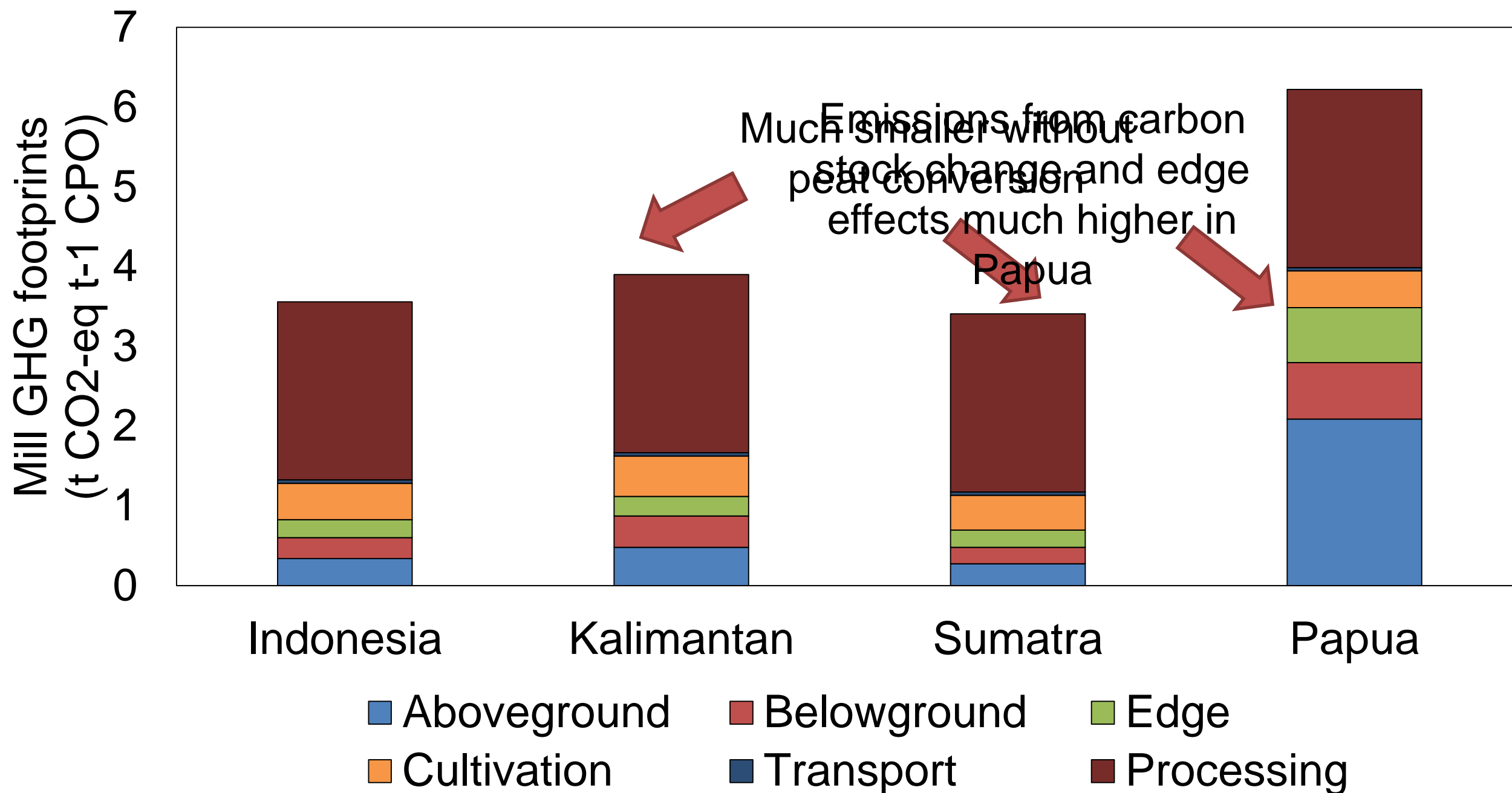
# Contributors to average mill GHG footprint





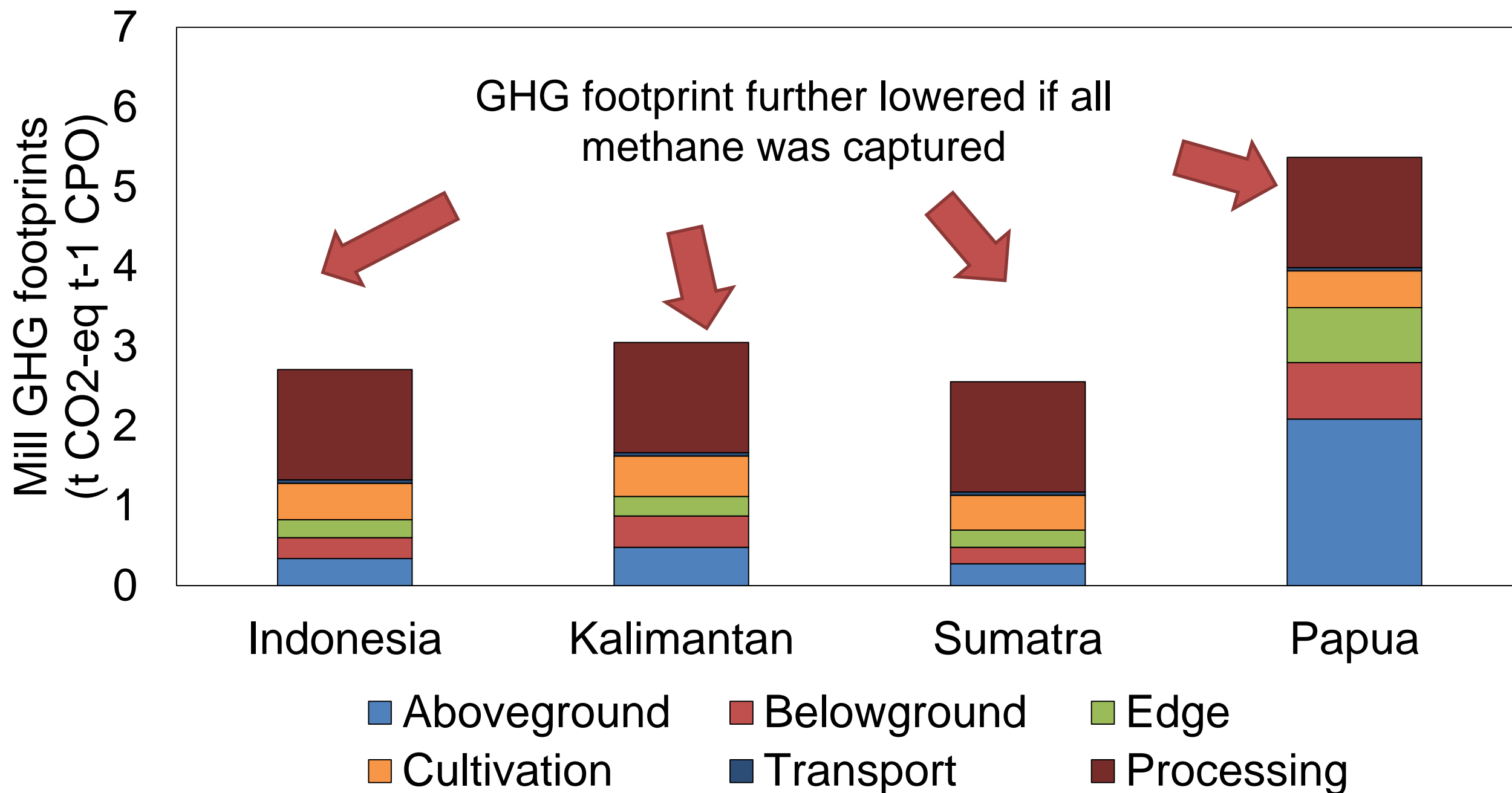


# Contributors to average mill GHG footprint





# Contributors to average mill GHG footprint





## Take home messages

- GHG footprints of CPO production are characterized by high variability: from 2.5 t CO<sub>2</sub> eq t<sup>-1</sup> CPO in Lampung to 22.8 t CO<sub>2</sub> eq t<sup>-1</sup> 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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Sarah Sim

**Radboud University**



Mark AJ Huijbregts



Rebecca Chaplin-Kramer



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**Thank you for your attention.**



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