Terms of reference

Calculation of Direct Land Use Change (D-LUC) Emissions Factors for coconut for specified jurisdictions

November 2024

Background and overall objective

In 2023 and 2024, the Sustainable Coconut Partnership (SCP) produced deforestation maps for coconut in 8 countries and developed a workflow (structured sequence of processes or tasks) for using these maps to calculate Land Use Change emission factors at the jurisdictional level across these countries. This workflow has been validated by SCP members. Annex 1 provides details of the spatial layers which are available following this exercise.

The Sustainable Coconut Partnership is now seeking a consultant/consulting team to run the calculation and produce an emissions factor table for Direct Land Use Change (D-LUC) Emissions Factors per ton of coconut product. The calculations will be based on the data sources and workflow outlined in Annexes 1 and 2.

These figures will be calculated for the following jurisdictions:

Countries	Subnational jurisdictions
· Indonesia · Philippines · India · Sri Lanka · Thailand · Vietnam · Papua New Guinea · Malaysia (Deforestation maps available)	· National level · First subnational jurisdictional level (for example, Regions in the Philippines) · Second subnational jurisdictional level (for example, Provinces in the Philippines)

Tasks

1. Validate workflow and result format for the calculation of D-LUC emissions factors

- Based on the data sources and high-level workflow specified in Annexe 1 and 2, validate with SCP team your calculation methodology prior to the calculations being carried out.
- Validate the result format with the SCP team
- This step is crucial to ensure that the results will meet the approved calculation methodology validated by SCP members for the D-LUC emissions factors.

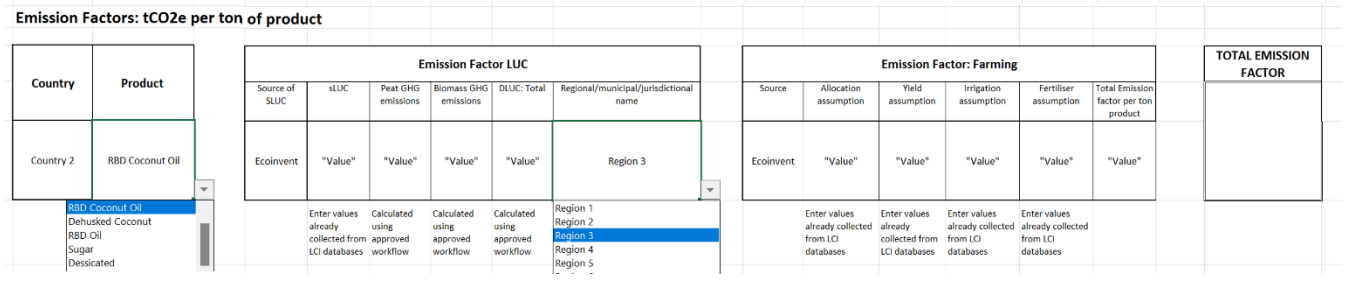
2. Calculate D-LUC Emissions Factors for coconut for specified jurisdictions

- Based on the previous step, calculate D-LUC emissions factors for the specified subnational jurisdictions.
- Carry out necessary checks to ensure the calculations have been performed accurately
- Produce an excel table which summarises the results for the specified jurisdictions.
- The excel table should be presented with a separate row for each jurisdictional level, including:
    - Country level
    - First subnational jurisdictional level
    - Second subnational jurisdictional level

- For each of the above rows, the excel table should present the results from each process step in Annexe 2 figure 2, including separate figures for:
    - Peat GHG emissions
    - Biomass GHG emissions

The excel table should be designed so that members can adjust key parameters in a way that automatically updates the end results. This should include fields/cells for yield, fertilizer and allocation (mass vs economic allocation and husked vs dehusked coconut weight. In these fields, figures should be entered from Life Cycle Inventory databases, based on data which SCP has readily available and will provide. SCP Members should then be able to use the table to update these figures if they choose to.

Overview of how results could be presented:



3. **Produce a short report summarising the methodology and results & Deliver presentation and Q&A with carbon experts from member organizations**
    - Produce a short report which provides a clear and concise summary of the methodology and results
    - Present the methodology, results and answer technical questions in a session with carbon experts from member organizations

Deliverables and deadlines

Deliverable	Deadline
1. Detailed workflow for the D-LUC Emissions Factors calculations	11 December 2024
2. Excel table: D-LUC Emissions Factors calculated for national and subnational jurisdictions	18 December 2024
3. Short Report summarising methodology and results	18 December 2024
3. Deliver presentation and Q&A with carbon experts from member organisations	TBC 2nd week of January

Timeline

- Contracting and start of work by 2 December 2024
- Delivery by **18 December 2024**

Payment terms

On completion of the deliverable to the satisfaction of the Sustainable Coconut Partnership, the contract will be paid the sum of USD 8,000, which will be the sole remuneration for this work.

Please note that this assignment is donor funded and there is no scope for an increase in budget in this case.

Submission Guidelines:

Please provide your proposal by **December 2nd 2024** in electronic format to **info@coconutpartnership.org**

Sincerely,
The Sustainable Coconut Partnership

Annex 1:

Spatial layers provided by Sustainable Coconut Partnership

Layer	Sources	What's in it?
CoconutExpansion_1988 -2020	Based on Descals et al. (2023).	Indicates coconut pixels with a timestamp indicating the expansion patterns since 1988, pixels value indicate year when coconut cultivation started. Resolution: about 20 meter.
CoconutAge_2020	Based on Descals et al. (2023).	Indicates the age of the coconut palm plantation
CoconutStatsPerDistrict_2001-2020	Combination of other layers & shapefile.	Contains all municipalities of India, Indonesia, Malaysia, Thailand, Vietnam, PNG, Philippines and the deforestation caused by coconuts and the area cultivated with coconut
CoconutDeforestationTotal_2001-2020 CoconutDeforestation_2001-2020	Based on Hansen et al. (2013) Tree Cover Loss (TCL) & Turubanova et al. (2018)	Annual deforestation from 2001-2020 due to coconut cultivation, in a resolution of 20 meters.

Additional layers

Tropical moist forest (TMF) layer from Vancutsem et al. (2021)

- Loss of "Undisturbed forests" as best proxy for deforestation
- Spatial coverage: tropical belt
- Resolution: 30 meter
- Limitation: conversion of other forest types (e.g. tropical dry forests) are not detected.

Global peat layer Xu et al. 2018),

- Compilation of the highest quality peat data sources.

Carbon stock data

Carbon pool	Data source (AdAstra recommendation)	Properties
Above-ground (live woody) biomass	Harris et al. 2021	30-meter, global, year 2000
Below-ground biomass	Huang et al. 2021	30-meter, global
Dead organic matter	IPCC 2019	Default ratio of 5.2 metric tons of dry biomass per hectare of tree cover lost
Soil organic carbon	IPCC 2019	Not considered for perennial tree crops
Peat	Cooper et al. 2020	*See next slide*

Annex 2: Workflow / Methodology approved by SCP members

Figure 1

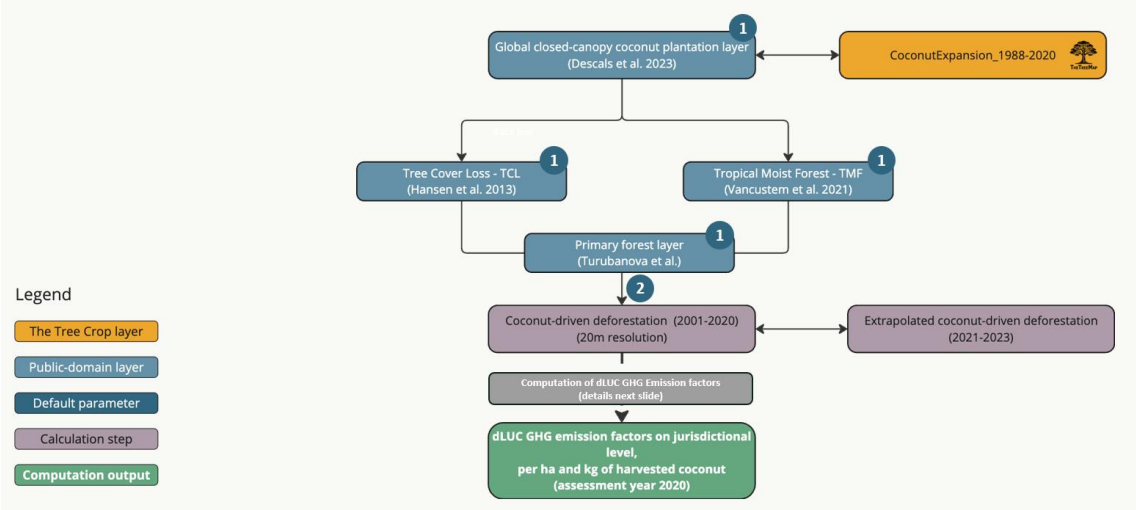
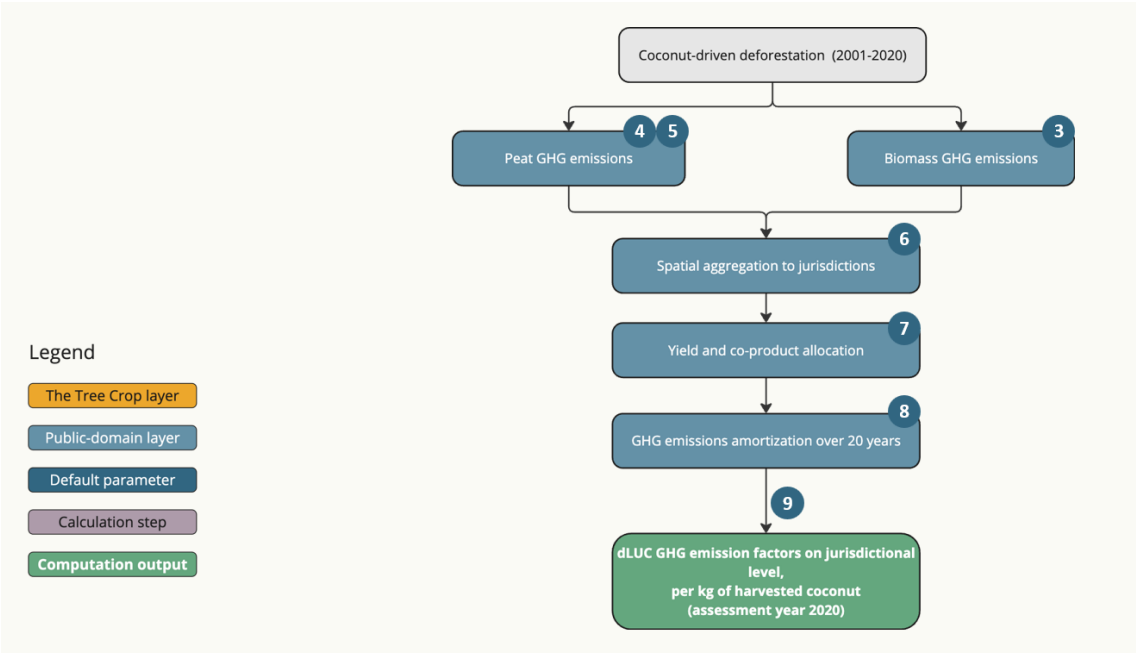


Figure 2



Further details on workflow

Numbers below correspond to steps in the workflow diagrams above

1. **Assess forest layers suitability**: Systematic spatial comparison of the TCL, TMF and global coconut plantation layers, to evaluate which forest layer is suitable where. For example, TCL definition of "tree cover" may not be a good proxy for deforestation driven by perennial tree crop plantations. This assessment will result in a clear recommendation as to the forest layer to be used in different geographies and in relation to their ecozone, in order to provide the best accuracy of LUC GHG calculations. The primary forest layer by Turubanova could inform the fraction of total deforestation affecting primary forests.
2. **Calculation of coconut-driven deforestation worldwide**: the global closed-canopy coconut plantation layer (Descals et al. 2023) will be used to derive coconut-driven deforestation worldwide on a resolution of 20 (or 30 meters), year to year, from 2001 to 2020. Deforestation in more recent years (2021-2023) will be extrapolated from national or sub-national statistics, to enable LUC GHG reporting for these years.
3. **Calculation of GHG emissions from biomass loss:** coconut-driven deforestation will be overlayed with the 30-m resolution aboveground biomass (AGB) and belowground biomass (BGB) layers to calculate pixel-specific and year-specific GHG emissions from biomass loss. GHG emissions from the loss of dead organic matter (DOM) will be calculated with a default factor from the IPCC.
4. **Global deployment of the peat layer:** Overlay the coconut cropping mask with the global peat layer (Xu et al. 2018), i.e. a compilation of the highest quality data sources.
5. **Consideration of the coconut plantation establishment year**: the CoconutAge_2020 layer by SCP is an important ingredient to produce accurate estimates of peat oxidation emissions.
6. **GHG emissions aggregation on jurisdictional level:** emissions calculated on the pixel level will be aggregated to 3 jurisdictional levels (country and the first 2 subnational jurisdictional levels) across all countries.
7. **Consideration of yield, allocation and production volume:** coconut yield data on national (from official statistics or FAOSTAT) or sub-national level will be collected over 4 years to convert GHG emissions per hectare to equivalents per ton of harvested coconut. Data on co-product allocation will be used to distribute emissions between coconut and husks.
8. **GHG emissions amortisation:** apply linear depreciation over the 20 years time window prior to the assessment year, in line with the draft Greenhouse Gas Protocol Land Sector and Removals Guidance.
9. **LUC GHG emissions on product level**: coconut processing and allocation data (possibly from LCI databases or other accurate sources) will be collected to convert GHG emissions per ton of coconut (respectively husk) to equivalents per ton of processed coconut products.