

# Biomass feedstock production into LCA of bio-sourced chemicals: a palm oil-based surfactant case study

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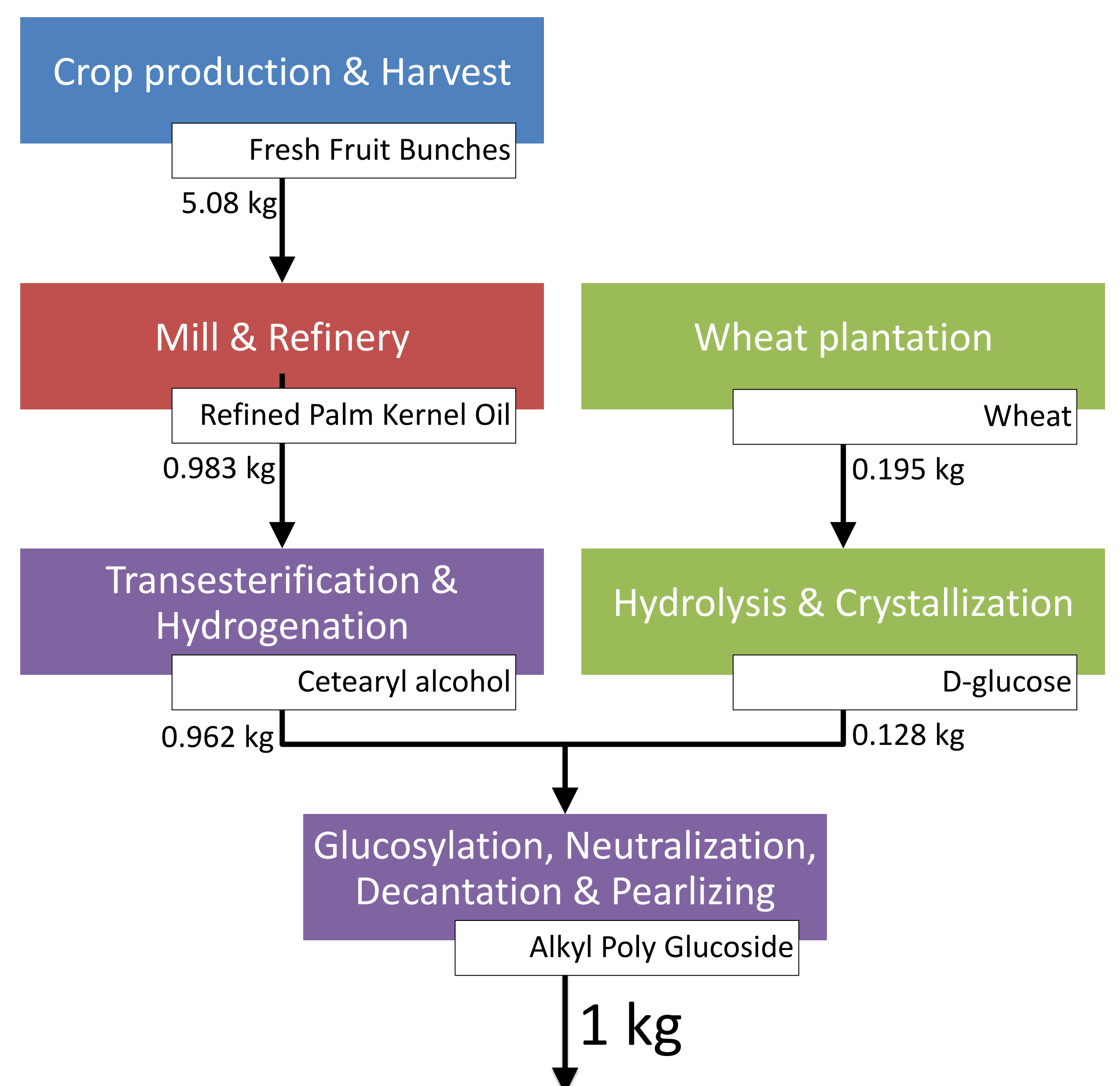
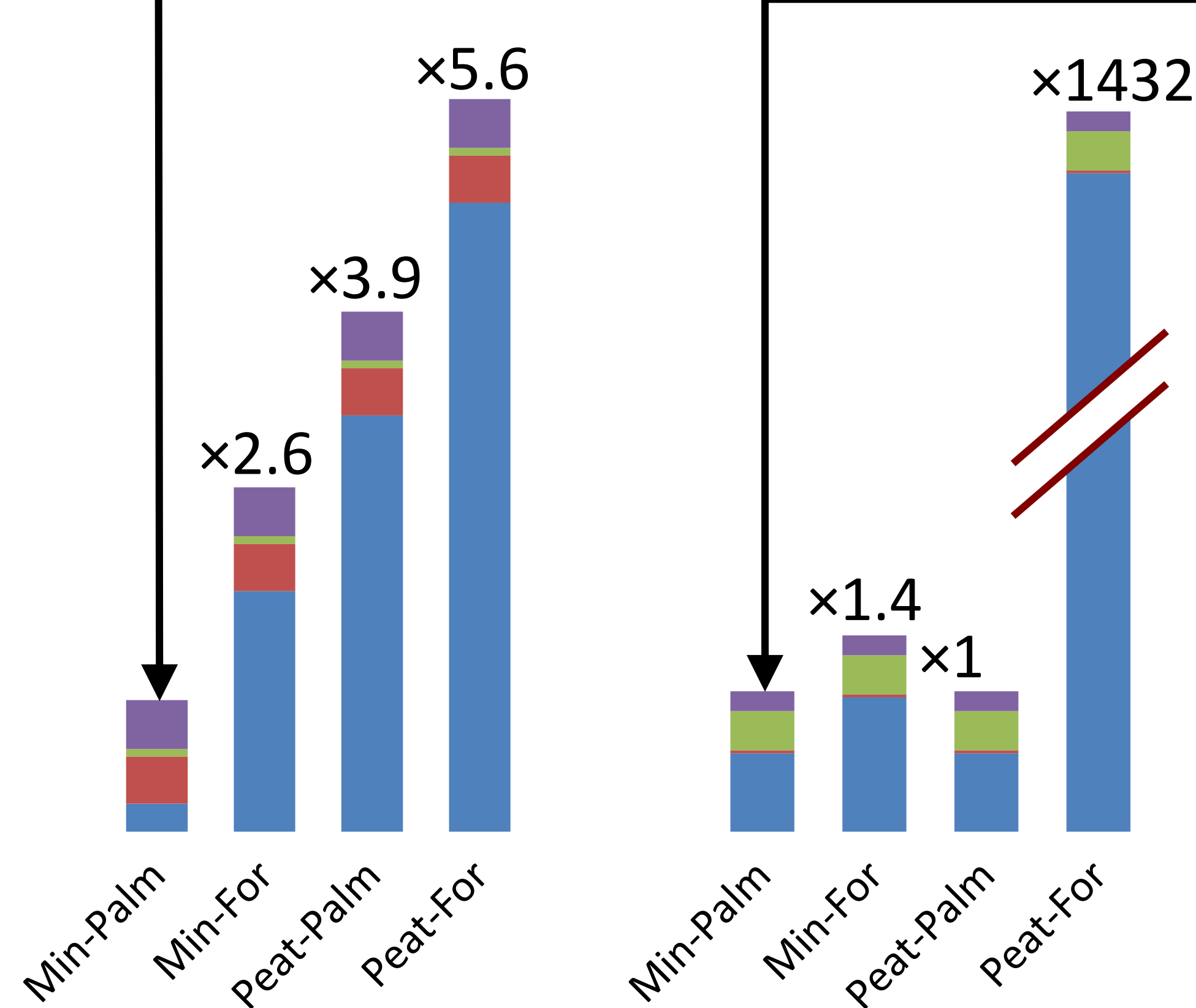
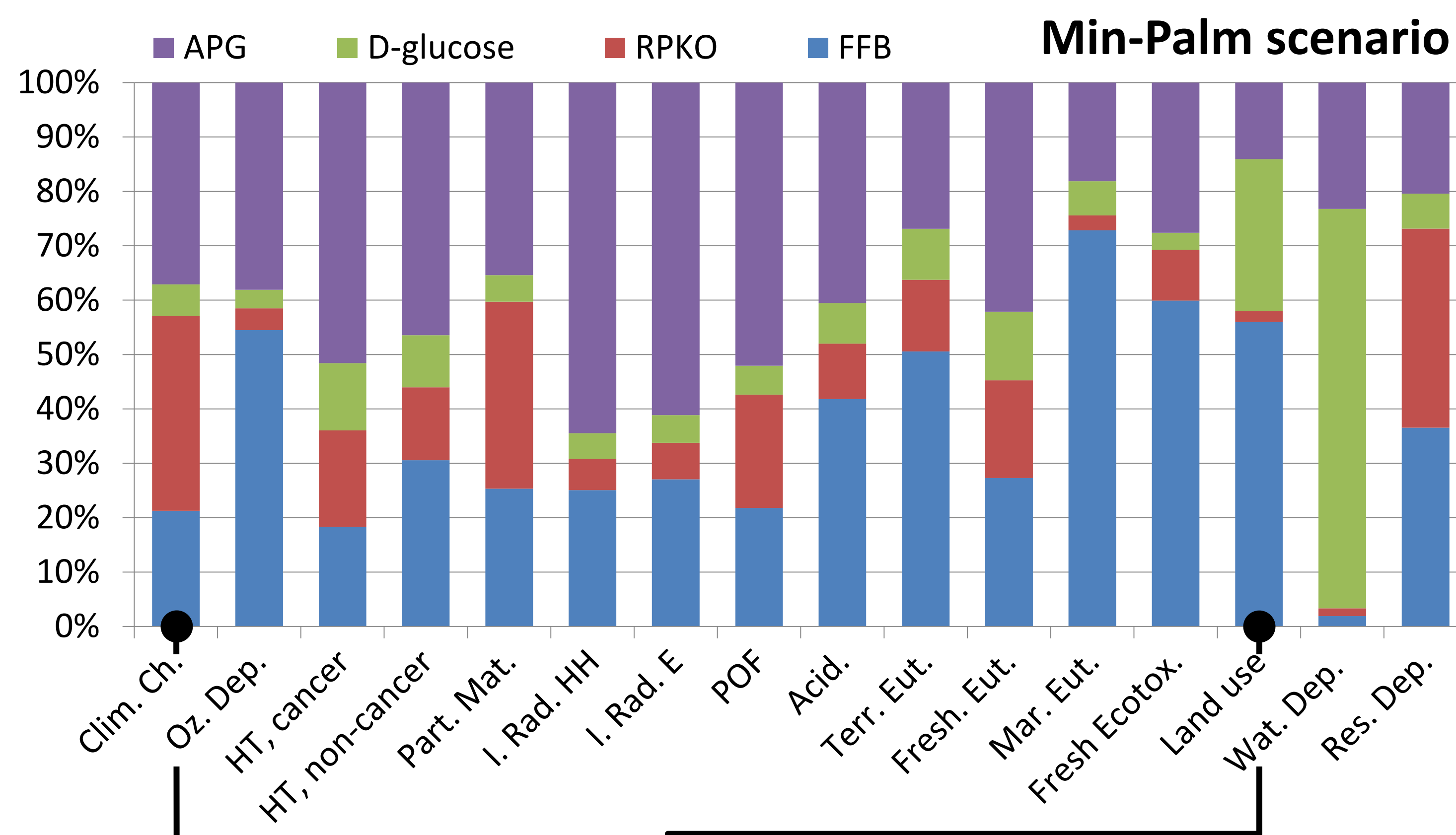
## Introduction

The use of bio-sourced compounds is often encouraged/fostered (renewable aspect and the independence from oil), although the environmental burden of the biomass feedstock may highly vary from negative to positive. Only a LCA from the biomass feedstock production up to the downstream transformation steps of chemicals can allow for ascertaining whether bio-sourced chemicals are better for the environment than their fossil equivalents.

## Objectives & Method

We carried out the LCA (following ILCD guidelines) of a surfactant (1 kg of alkyl polyglucoside) partially produced from palm oil with a focus on the Fresh Fruit Bunch (FFB) production in Malaysia with 4 scenarios:

- **Min-Palm:** mineral soil, **palm** replanting
- **Min-For:** mineral soil, after **deforestation**
- **Peat-Palm:** drained **peatland**, **palm** replanting
- **Peat-For:** drained **peatland**, after **deforestation**



## Results & Discussion

For the reference scenario “**Min-Palm**”, the contribution of FFB production varies across the impact categories from 2% (water resource depletion) to 73% (marine eutrophication); the median value is 36%. It contributes to 21% of the Climate Change impact and to 56% of the Land Use. Only two impact categories are influenced by the scenario (Climate Change and Land Use).

○ For **climate change**, CO<sub>2</sub> emissions from **deforestation** are of the **same order** of magnitude than CO<sub>2</sub> emissions from the **oxidation** of peatland carbon linked to drainage and the worst scenario (Peat-For) is 5.6 times worse than the reference scenario (Min-Palm).

○ The ILCD guidelines use soil organic carbon as indicator for **Land Use**. For this impact category, the **consequences** of a land transformation from **peatland** are **huge** (1432 times higher)

## Conclusion

Agricultural step is one of the main contributors of the environmental burden of the studied surfactant and agricultural alternatives have a strong influence on Climate Change and Land Use impacts. Additional aspects can also be decisive, notably the crop inputs, the waste and co-product managements, the geographic location, the yield, and the plantation lifespan.