



“Climate Change Mitigation in Organic Soils in Agricultural and Forest Land”

Projections of GHG emissions from different land uses

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EU LIFE Programme project

“Demonstration of climate change mitigation potential of nutrients rich organic soils in Baltic States and Finland”



Activity C2.4 – integration of climate scenarios and projections of GHG emissions from organic soils

One of the main activities of the LIFE OrgBalt project – performing measurements of GHG emissions in managed organic soils

Regional GHG emission factors developed and published

Calculation tool

Climate projections
(CORDEX database, RCP4.5
scenario)

Biomass carbon stock
change projections in
different land uses

Methodology included in the calculation tool (1)

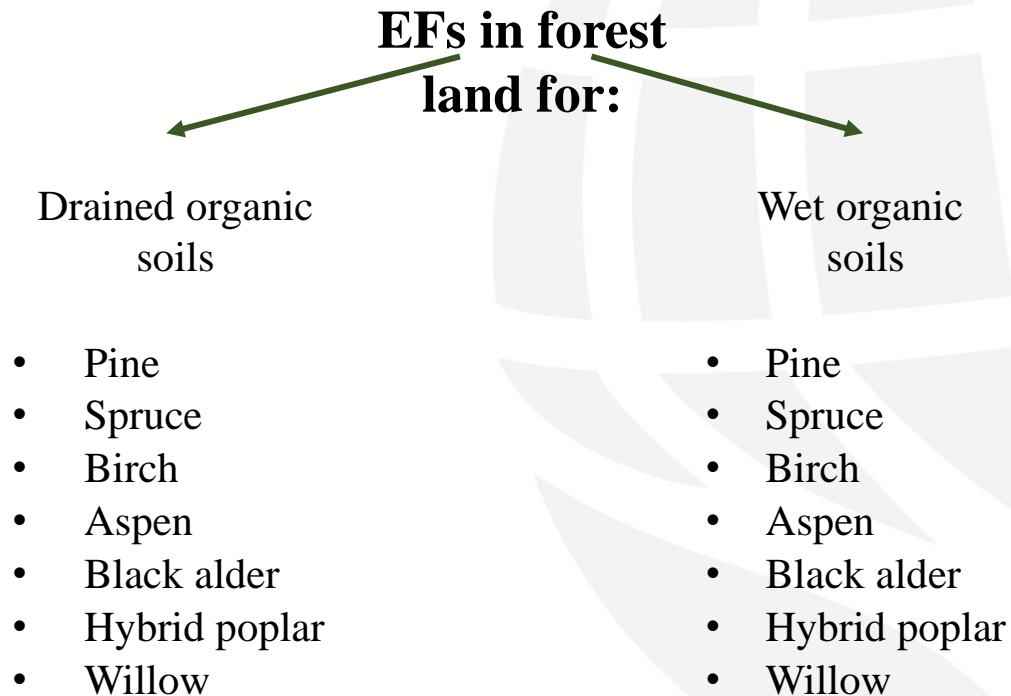
Main input data to the spreadsheet tool, common for all countries:

- Assortment structure for HWP with production losses
- Production of assortments during different management actions (thinning, regenerating)
- Polynomial equations for carbon inputs from woody litter, non-woody litter, carbon stock in non-woody plants, dead wood, sawnwood, platewood, paper and paperboard
- EFs for both drained and not drained (wet) conditions: CH_4 , N_2O , CO_2 (heterotrophic respiration) + dissolved organic carbon (DOC)

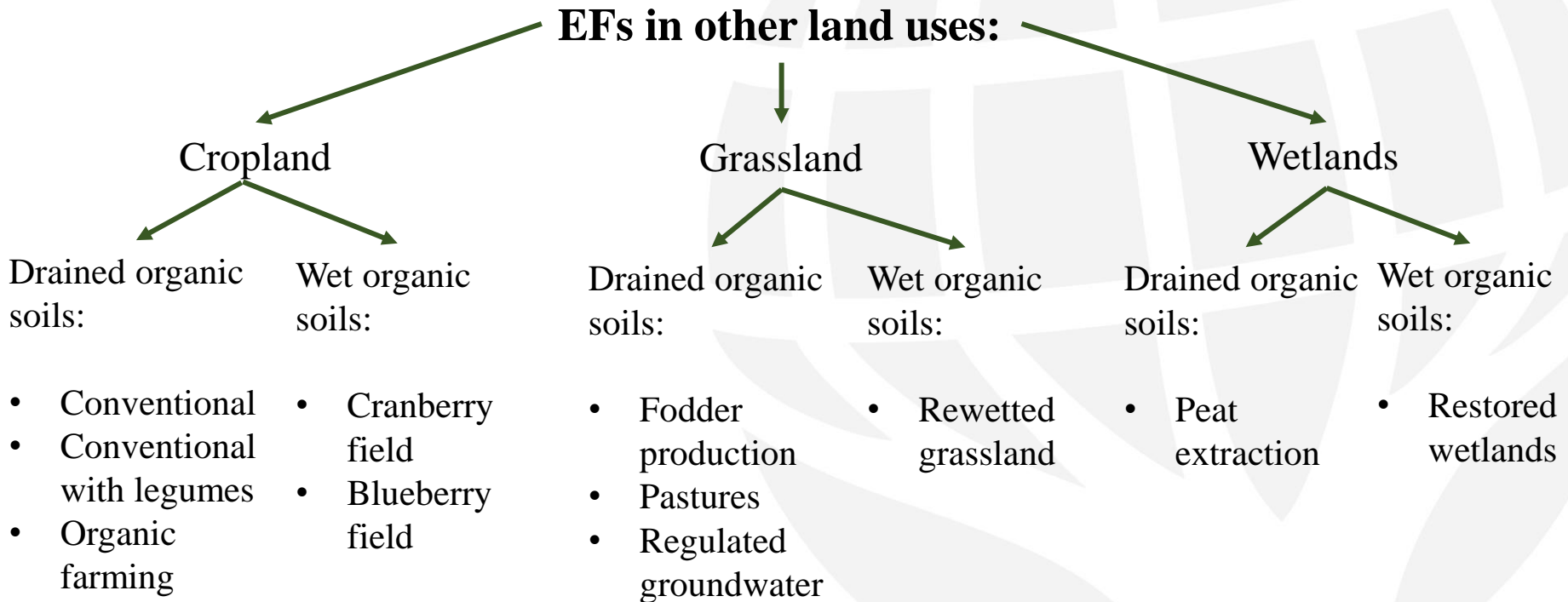
Country specific input data (if available):

- Forest stand data – age, height, diameter, basal area, N of living, harvested and dead trees
 - Temperature projections (correlation with CO_2)
 - Carbon stock in litter, carbon stock in agricultural biomass, soil carbon input in agricultural land (due to decay of biomass)
 - *EFs for both drained and not drained (wet) conditions: CH_4 , N_2O , CO_2 (heterotrophic respiration) + dissolved organic carbon (DOC)*
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Methodology included in the calculation tool (2)



Methodology included in the calculation tool (3)



Outcomes provided by the calculation tool

Outcomes consists of all carbon sinks and pools, as required for national greenhouse gas inventory report under the 2006 IPCC Guidelines, adopted by the decision 2.CMP/7, C ha⁻¹, for all different land use/management type options:

- Carbon stock and stock changes & emissions/removals in:
 - living biomass
 - dead wood
 - harvested wood products
 - woody and non-woody litter
- GHG emissions from soil due to drainage – CH₄, N₂O, DOC (in CO₂)

Additionally to the required:

- GHG emissions from soil due to drainage and heterotrophic respiration (CO₂)
- GHG emission savings due to biofuel substitution

Climate change mitigation measures included in tool

	Brief description of CCM included
1	LVC301 Transformation of arable land with drained organic soil into grassland
2	LVC302 Afforestation of grassland with drained organic soil
3	LVC303 Forest paludiculture - afforestation with black alder and birch
4	LVC304 Use of papilionaceous plants in plant rotation in arable land with drained organic soil
5	LVC305 Controlled drainage in grassland with drained organic soil
6	LVC306 Agro-forestry – plantation of woody plants in arable land with drained organic soil
7	LVC307 Use of wood ash in a spruce stand with improved peat soil after maintenance felling
8	LVC308 Selective felling of fir trees with improved organic soil
9	LVC309 Regeneration with black alder in a forest stand with naturally moist peat soil using deep furrow netting
10	LVC310 Planting of fast-growing tree species in the protection zone of drainage systems
11	LVC311 Black alder plantation in an area with naturally moist organic soil adjacent to the forest coastal protection belt
12	LVC312 Paludiculture - regeneration of spruce stands with naturally moist organic soil using deep furrow nets
13	LVC313 Strip felling in a pine plantation with improved organic soil

Projection results - Latvia

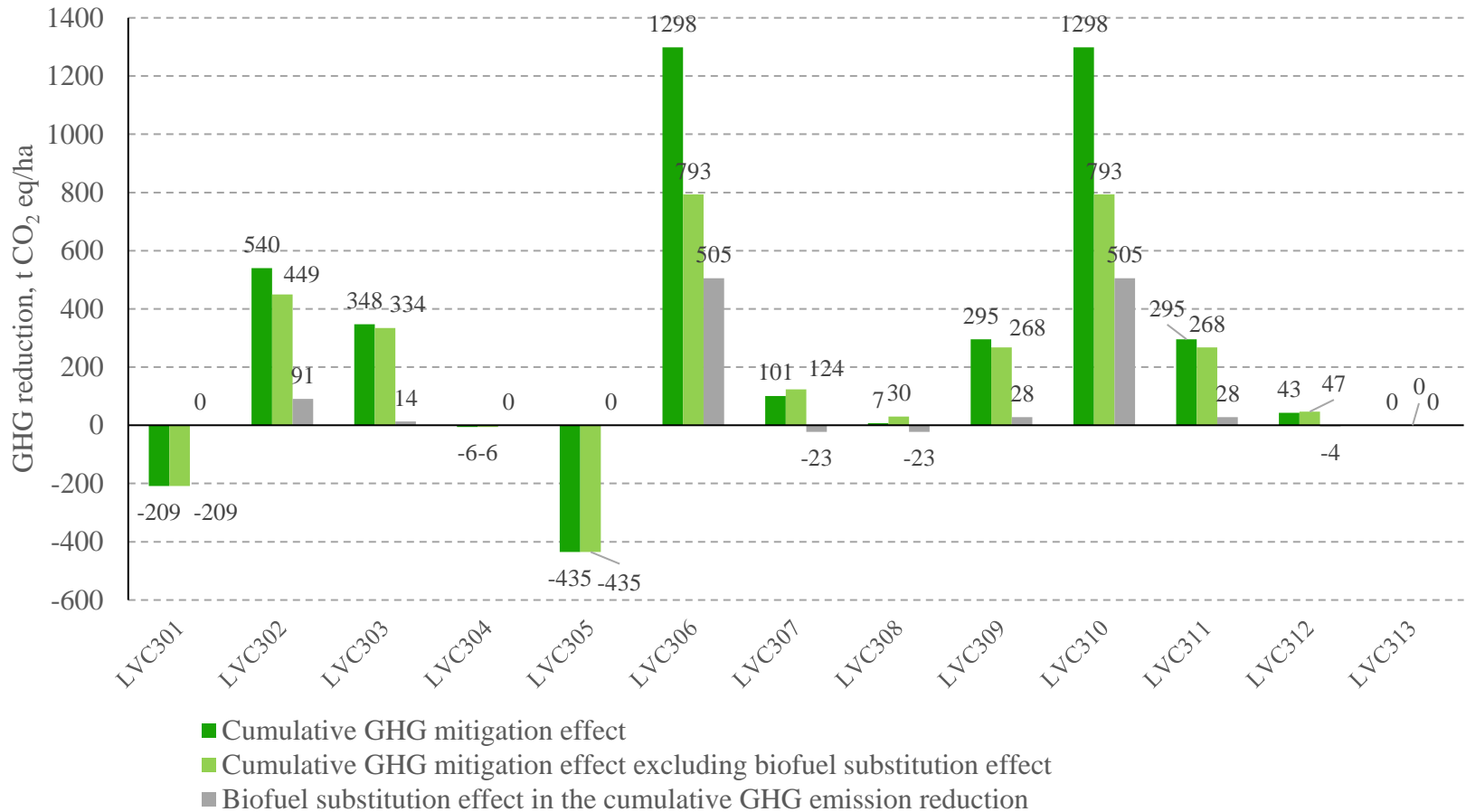


Figure 1. Comparison of the effect of different climate change mitigation measures in Latvia, tonnes CO₂ eq ha⁻¹ in 50 years

Projection results – Lithuania (1)

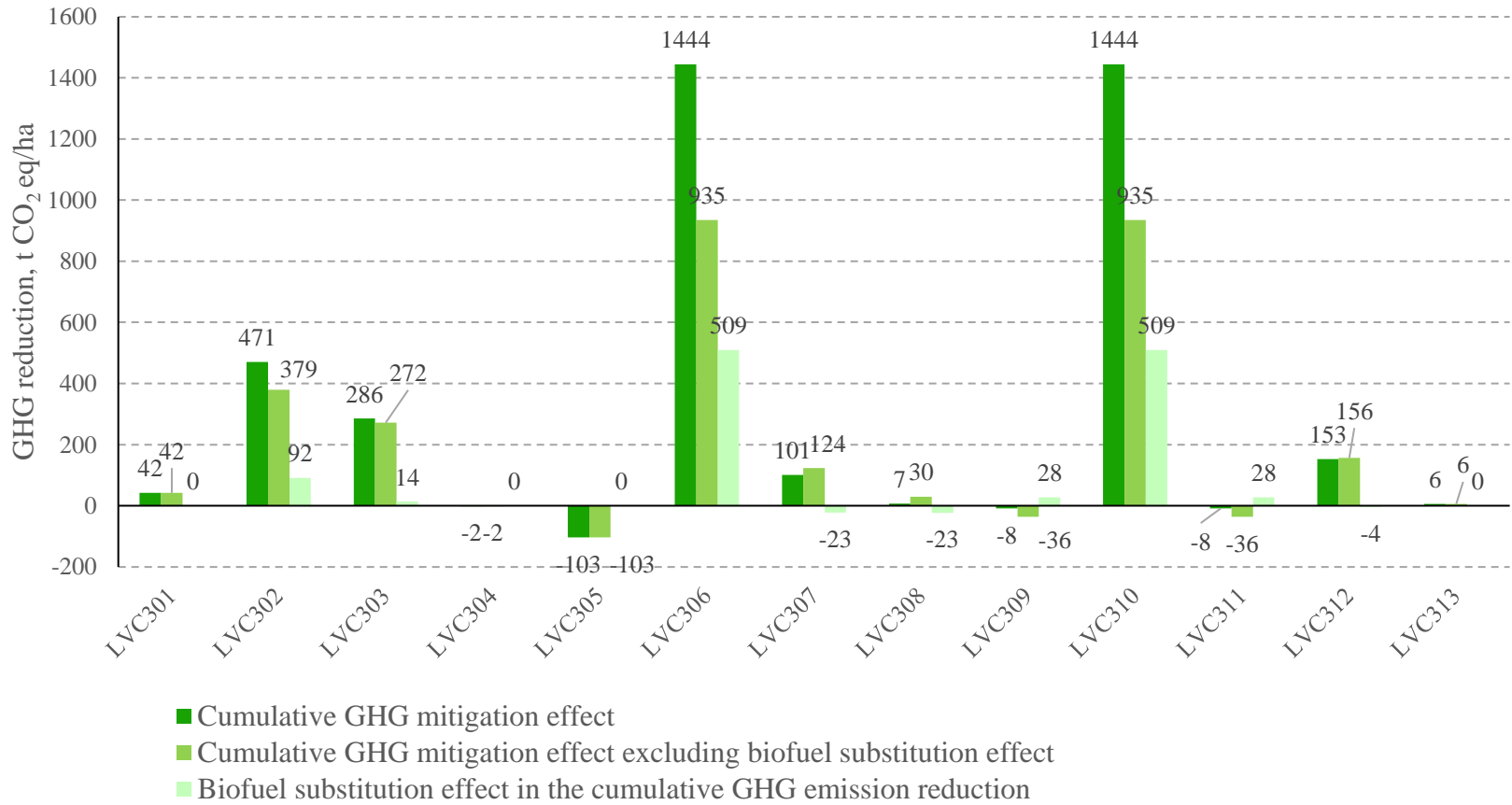


Figure 2. Comparison of the effect of different climate change mitigation measures in Lithuania, tonnes CO₂ eq ha⁻¹ in 50 years

Projection results – Lithuania (2)

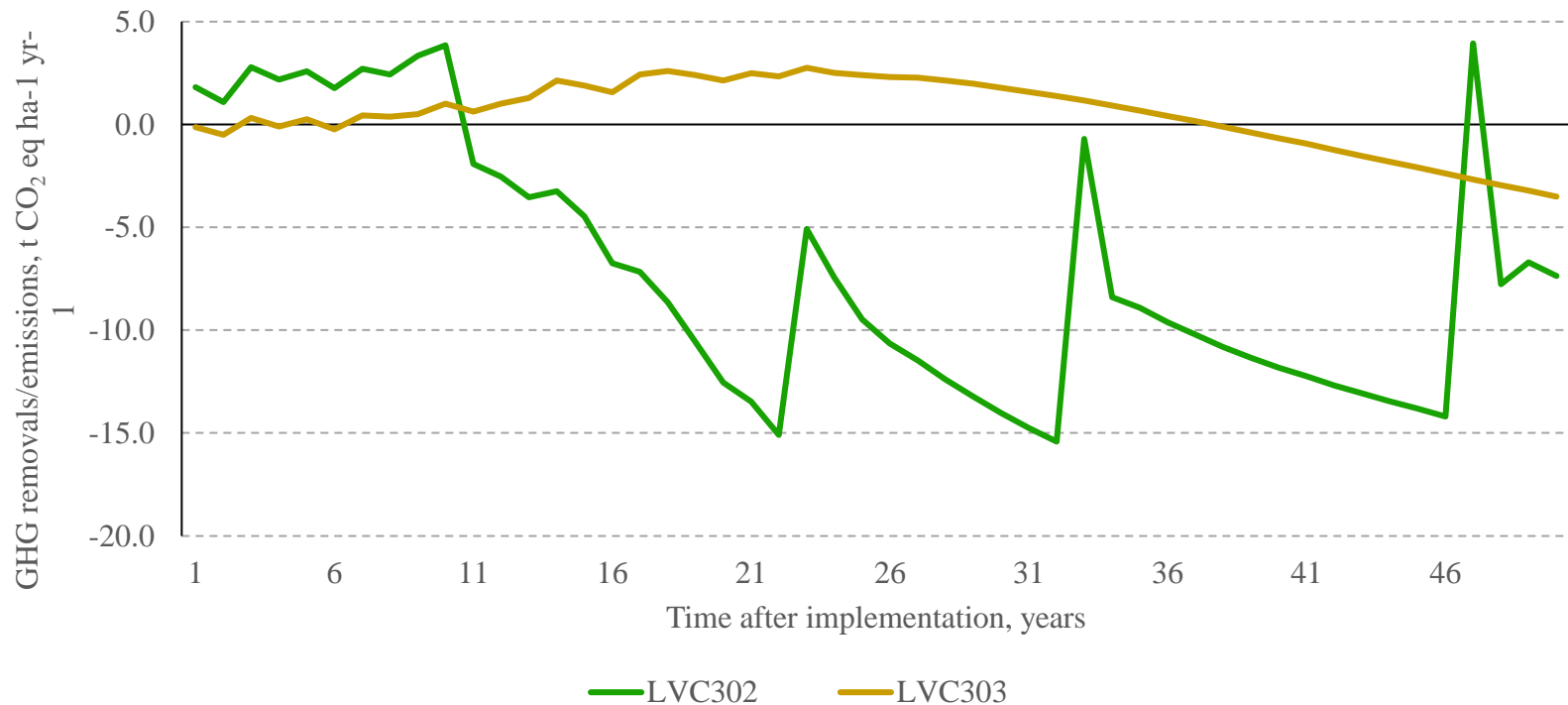


Figure 3. Annual fluctuations of GHG removals and emissions in different climate change mitigation measures: conventional afforestation considering shorter rotation (LVC302), paludiculture – afforestation of grassland with black alder and birch (LVC303), tonnes CO₂ eq ha⁻¹ yr⁻¹

Projection results – Lithuania (3)



Figure 4. Annual fluctuations of GHG removals and emissions in different climate change mitigation measures: agroforestry – fast growing trees and grass (LVC306), fast growing species in riparian buffer zones (LVC310), tonnes CO₂ eq ha⁻¹ yr⁻¹

Estimation of total GHG from drained organic soils - Lithuania

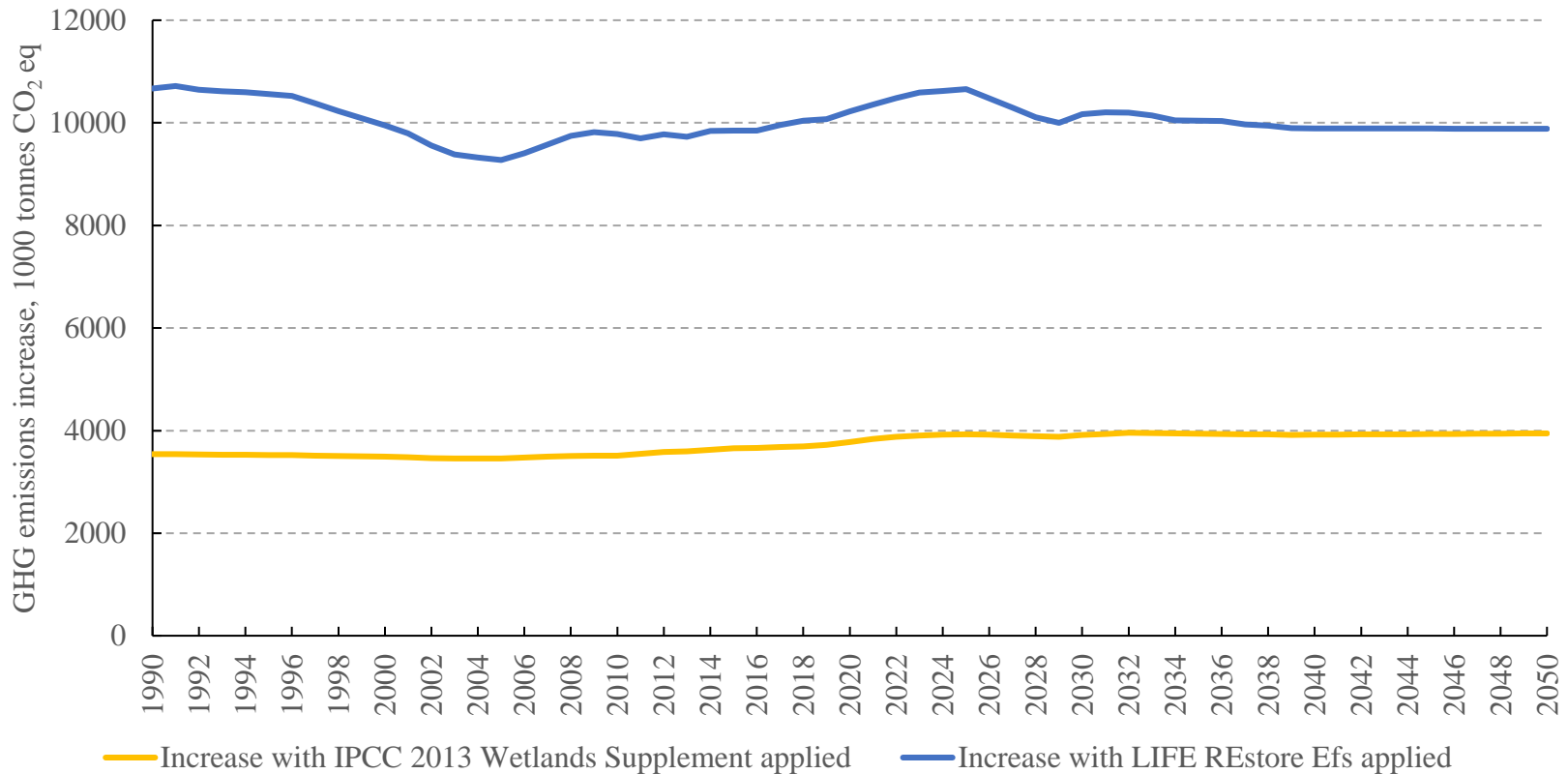


Figure 5. Potential increase of GHG emissions from organic soils in reported land use categories in Lithuania after LIFE REstore and 2013 Wetlands Supplement EFs applied instead of EFs from 2006 IPCC Guidelines

Estimation of total GHG from drained organic soils - Estonia

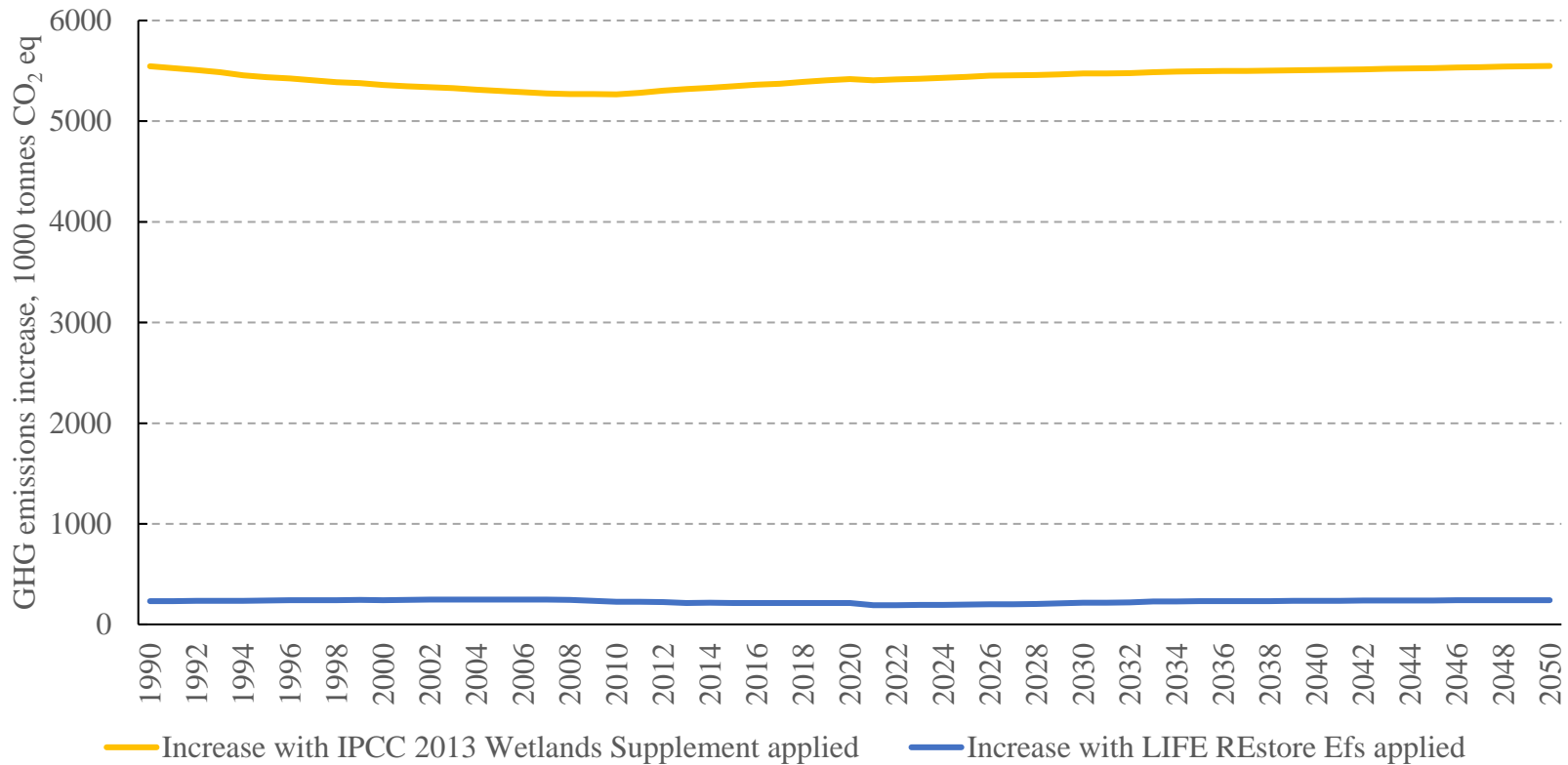


Figure 6. Potential increase of GHG emissions from organic soils in reported land use categories in Estonia after LIFE REstore and 2013 Wetlands Supplement EFs applied instead of EFs from 2006 IPCC Guidelines

Estimation of GHG from drained organic soils - Lithuania

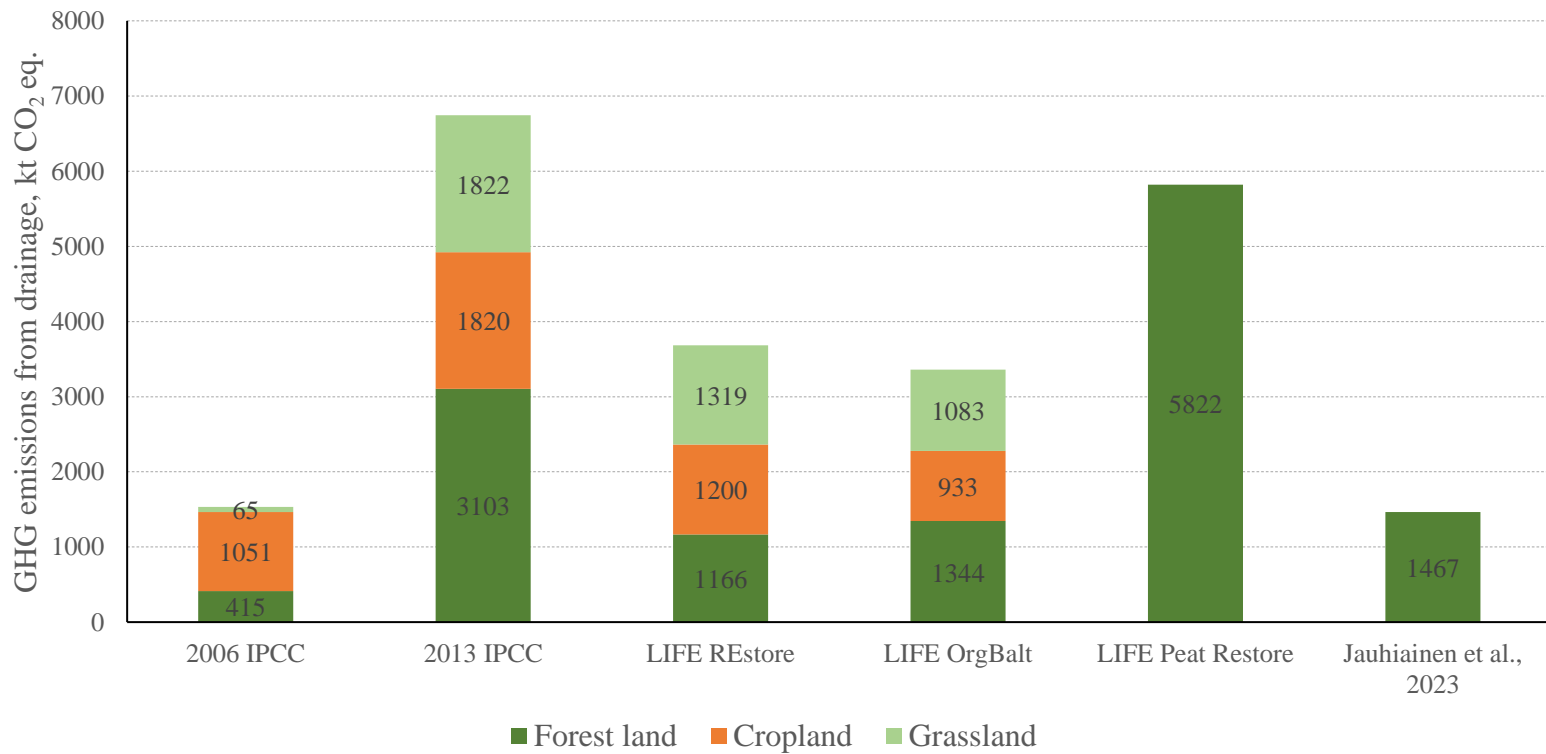


Figure 7. GHG emissions from drained organic soils in forest land, cropland and grassland in 2021 with different EFs applied, kt CO₂ eq.

Estimation of total LULUCF GHG - Lithuania

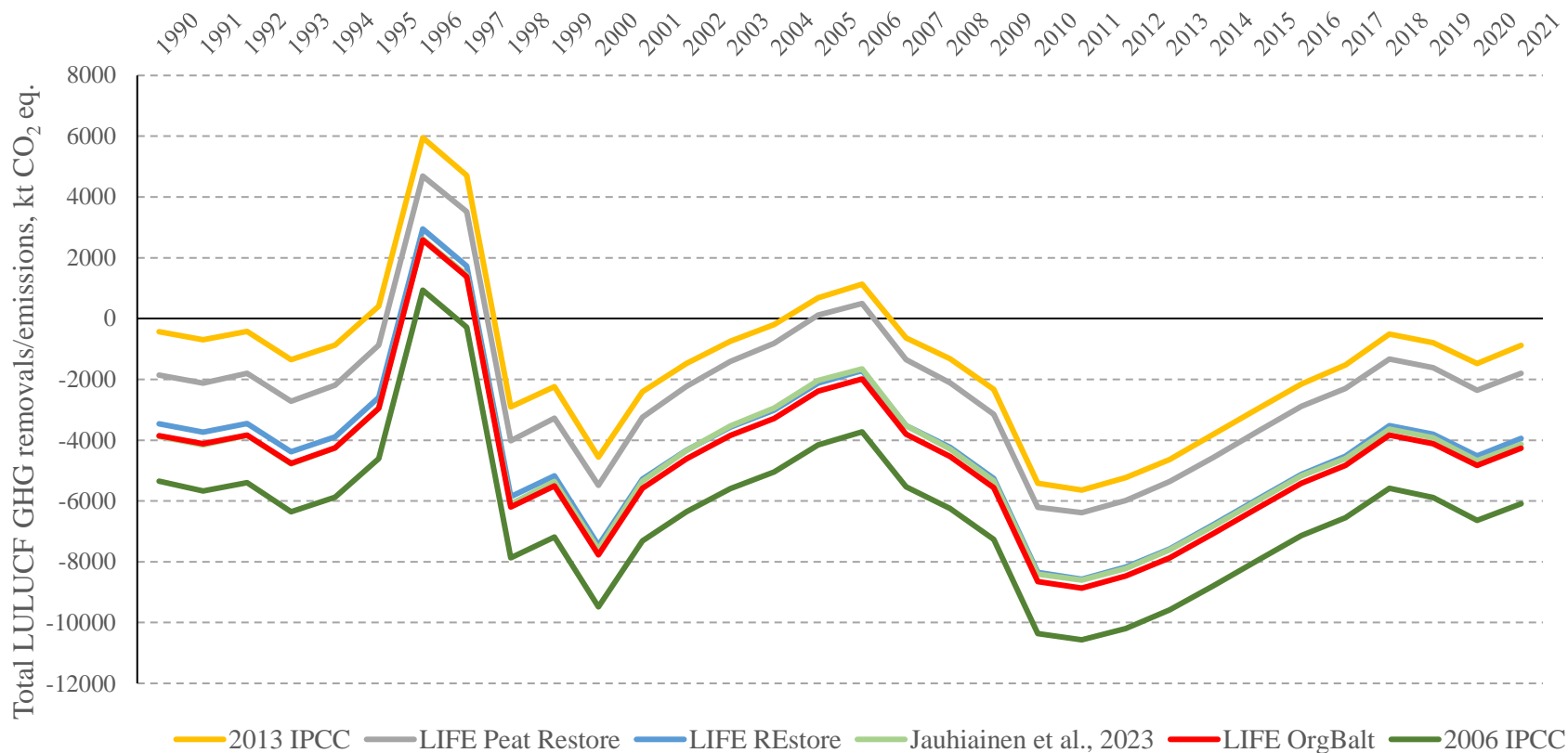


Figure 8. Total LULUCF GHG removals/emissions with different EFs for estimation of GHG emissions from drained forest land, cropland and grassland applied, kt CO₂ eq.



Thank You!