Measurement of GHG emissions in peatlands across different land uses – the basis for improved GHG inventory

LIFE Restore: Sustainable Management of Degraded Peatlands and Climate Change Mitigation

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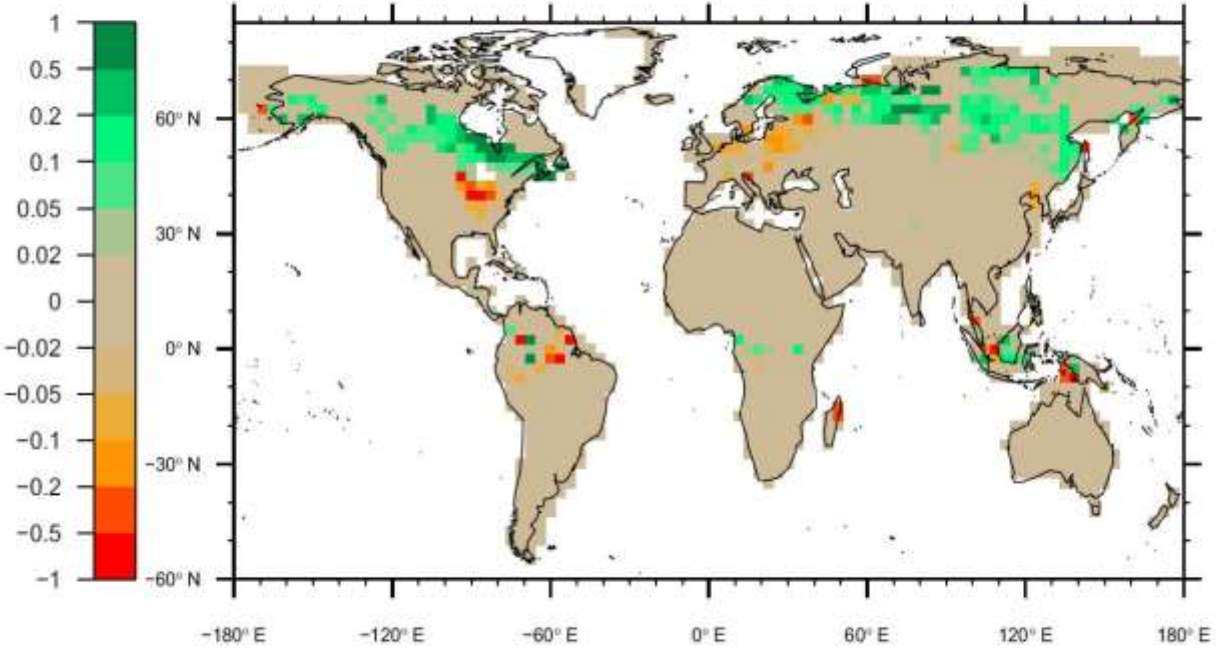
Peatlands – carbon reservoir

Soil – the biggest carbon store in terrestrial ecosystems.

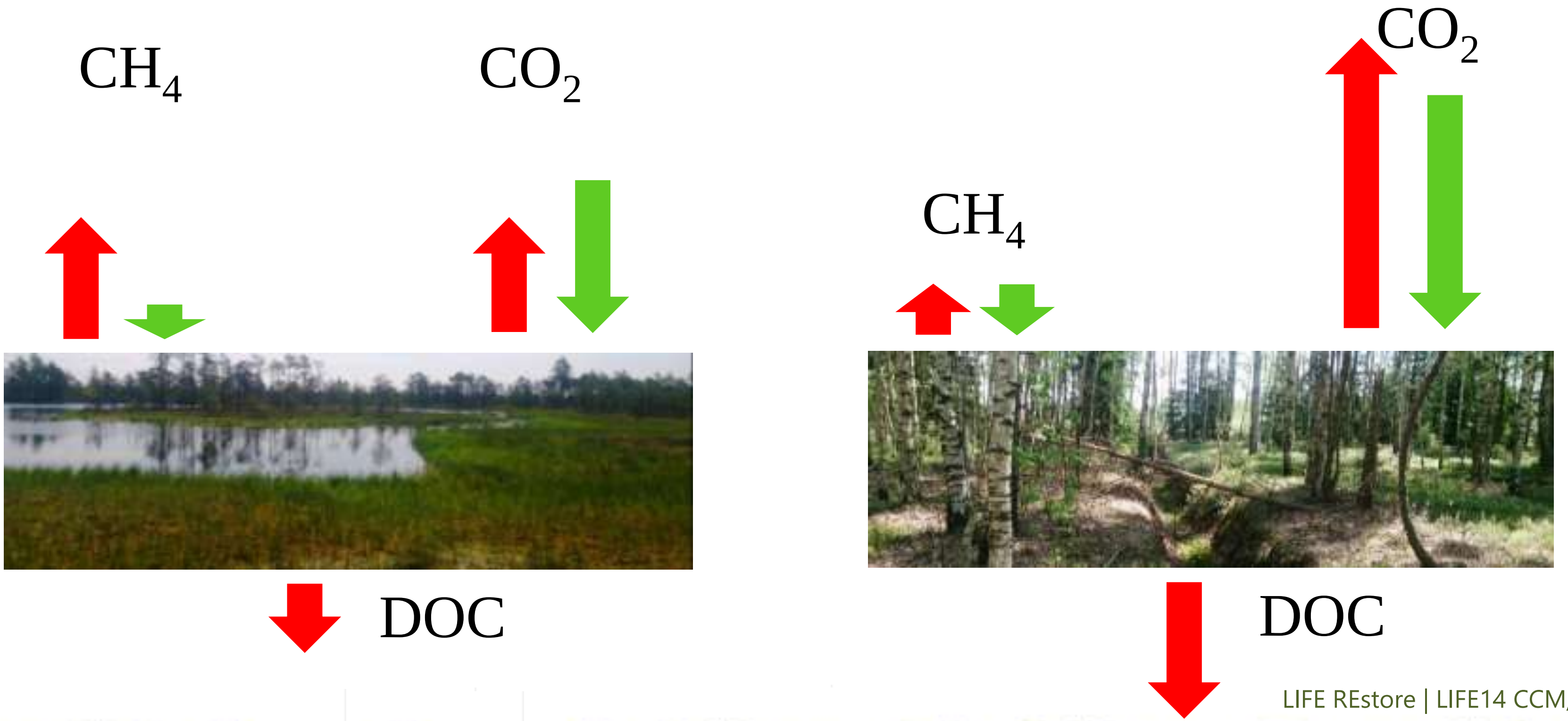
~30% of soil C is stored in peatlands



Source: Stocker et al. 2017

Peatland management - drainage

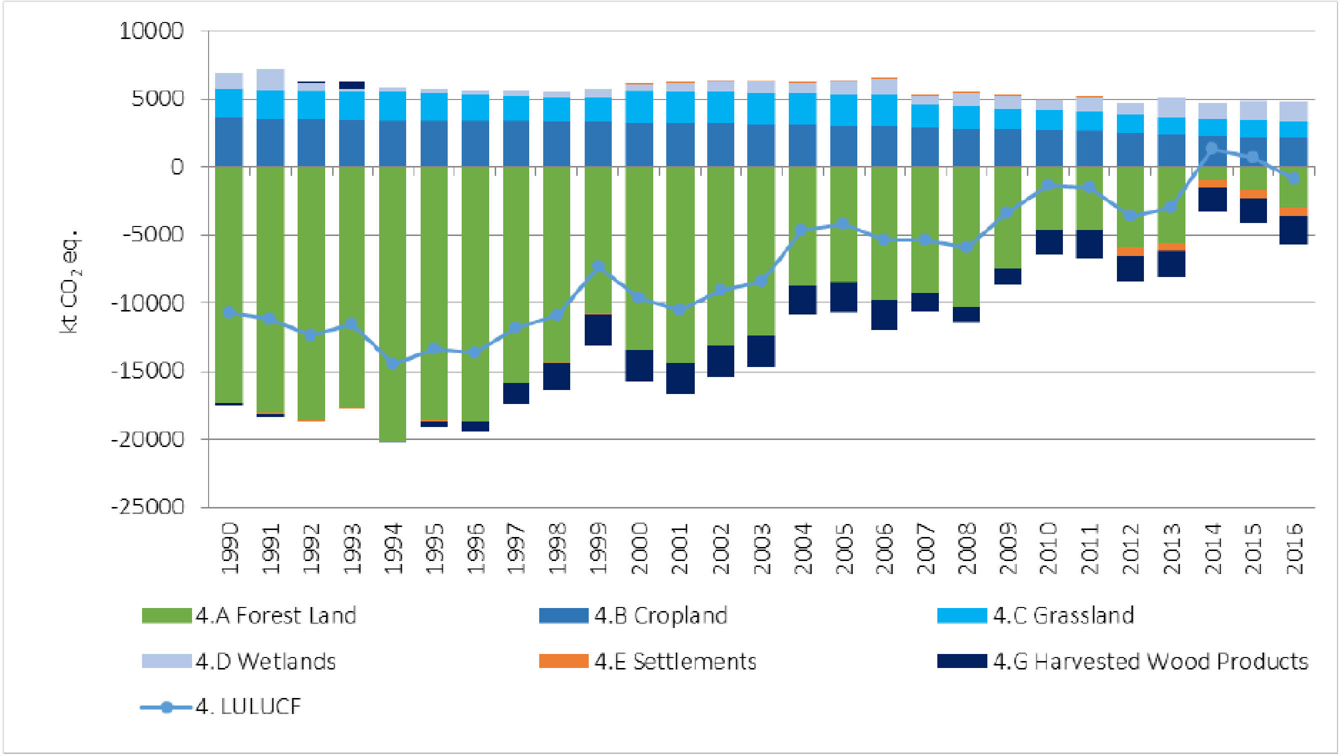
Peatland management and GHG



Recalculations in GHG inventory

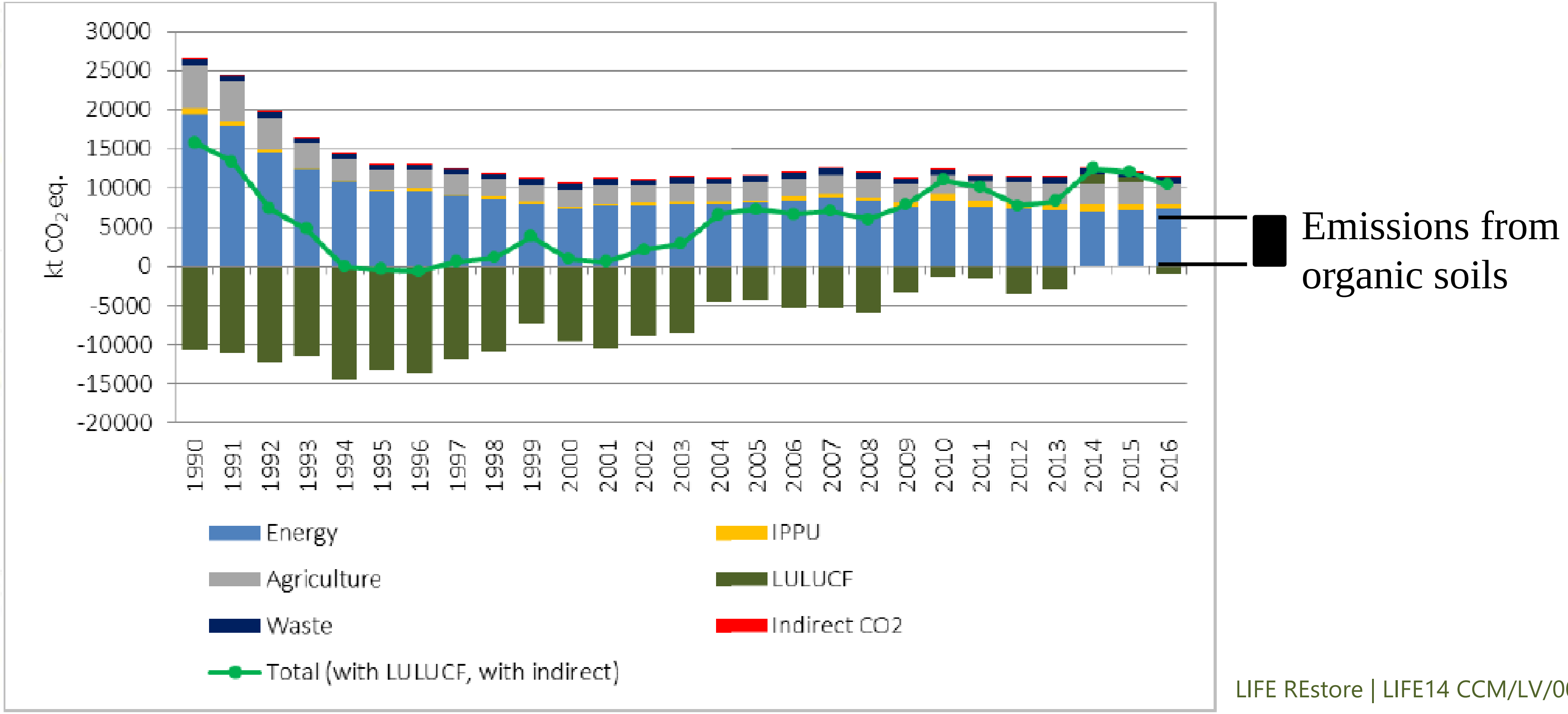
	GPG 2003	IPCC 2006	IPCC 2013
GHG emissions, 1000 tons CO2 eq	1460	3880	10320

GHG emissions in LULUCF sector



Emissions from organic soils – $6.5*10^6$ tons CO_2 eq. ha^{-1} yr^{-1}

GHG emissions – all sectors



Land use types – LIFE Restore

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1. Peat extraction site
2. Abandoned peat extraction site – bare peat
3. Abandoned peat extraction site with ground vegetation
4. Perennial grassland
5. Cropland – cereals, corn
6. Cropland – legumes
7. Pine forest
8. Birch forest
9. Raised bog
10. Transitional mire
11. Blueberries
12. Cranberries
13. Demo sites

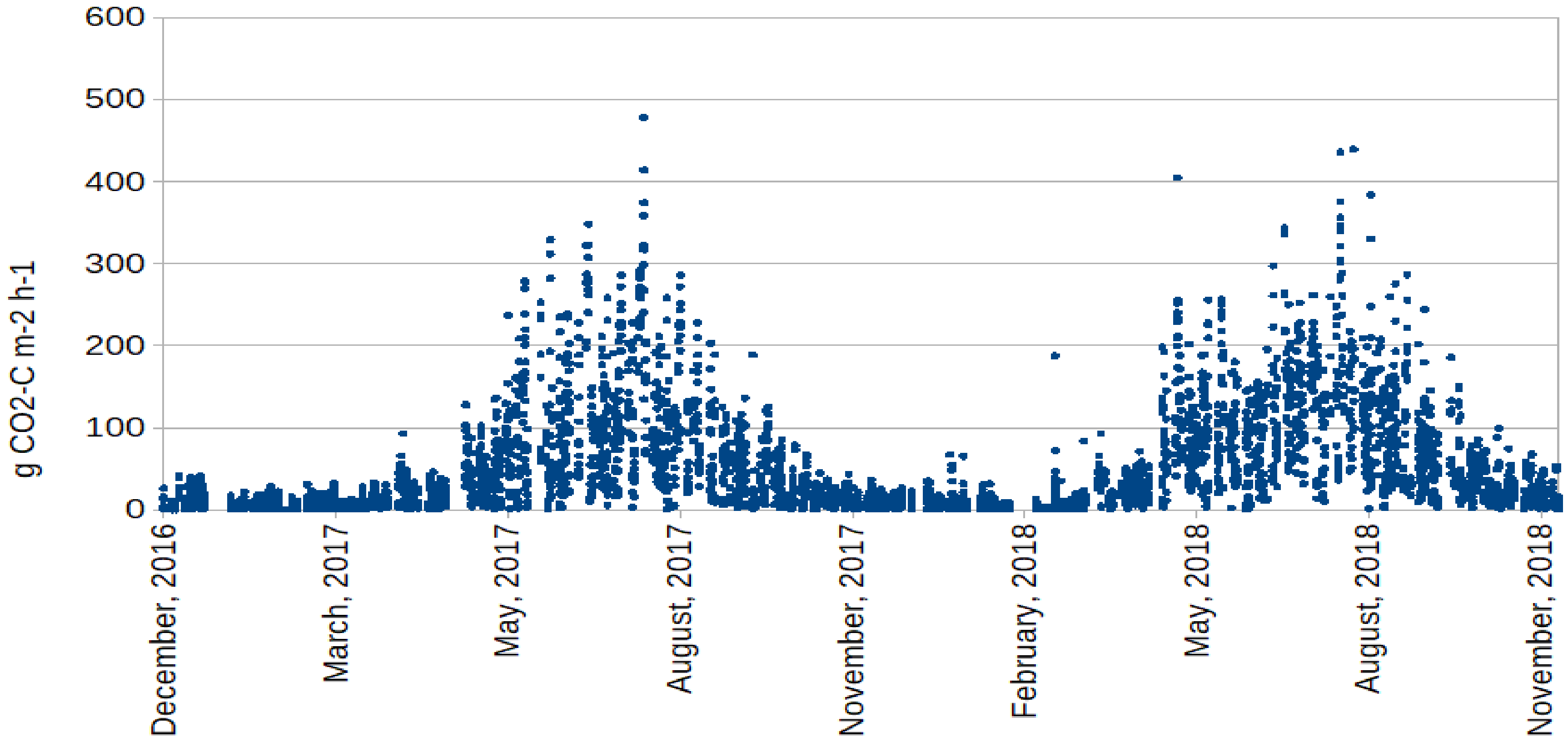
Sampling design

- Manual closed chamber method
- 5 replicates in sample plot
- 2 years - once in a month

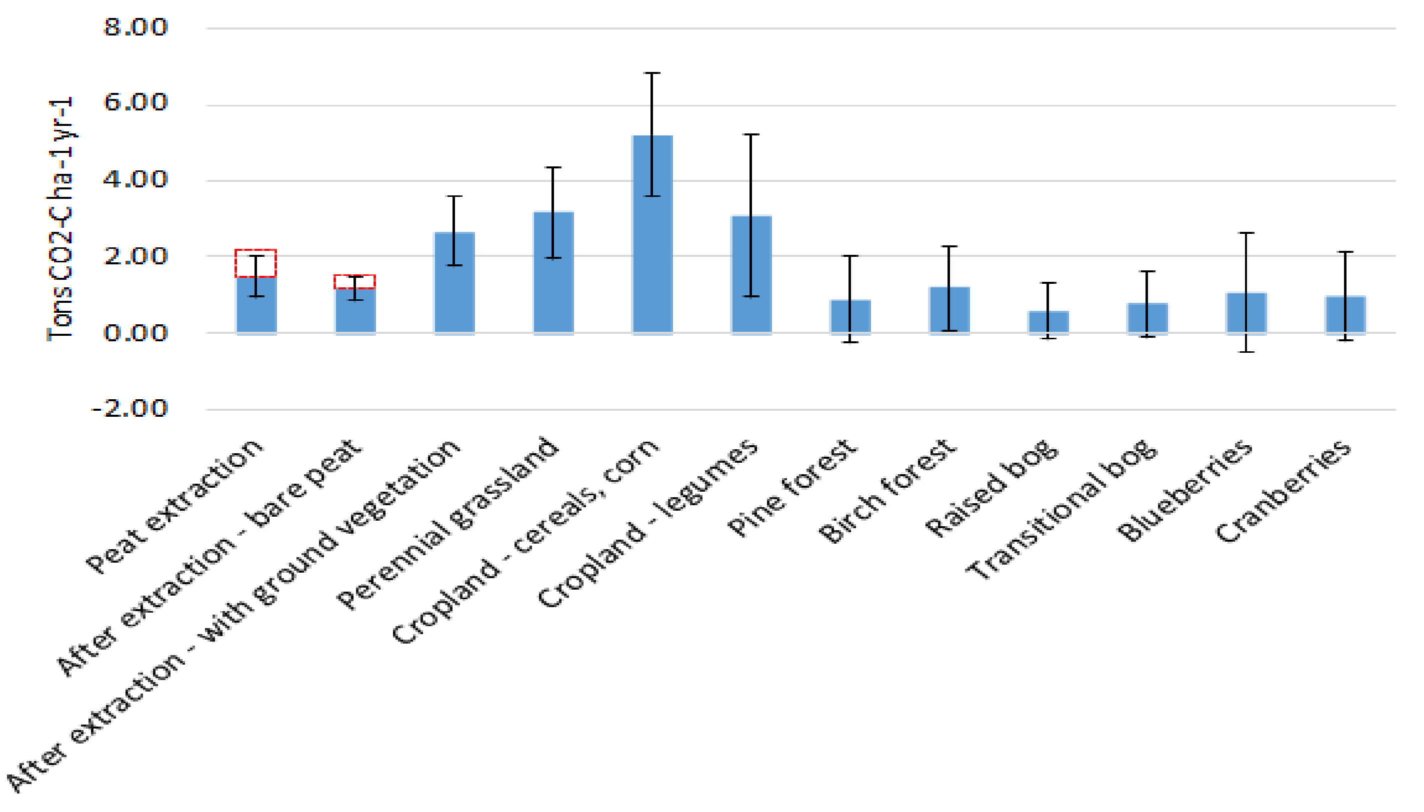
Measurement methods

- Transparent – CO_2 fluxes
- Opaque – CH_4, N_2O, wintertime CO_2

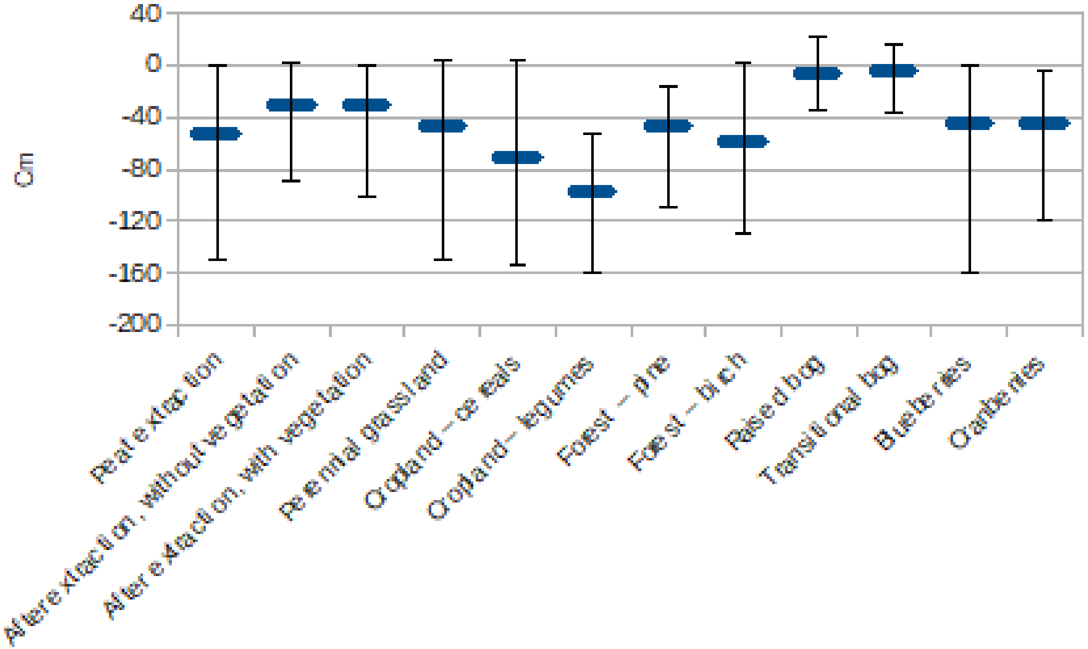
Seasonal CO2-C emissions



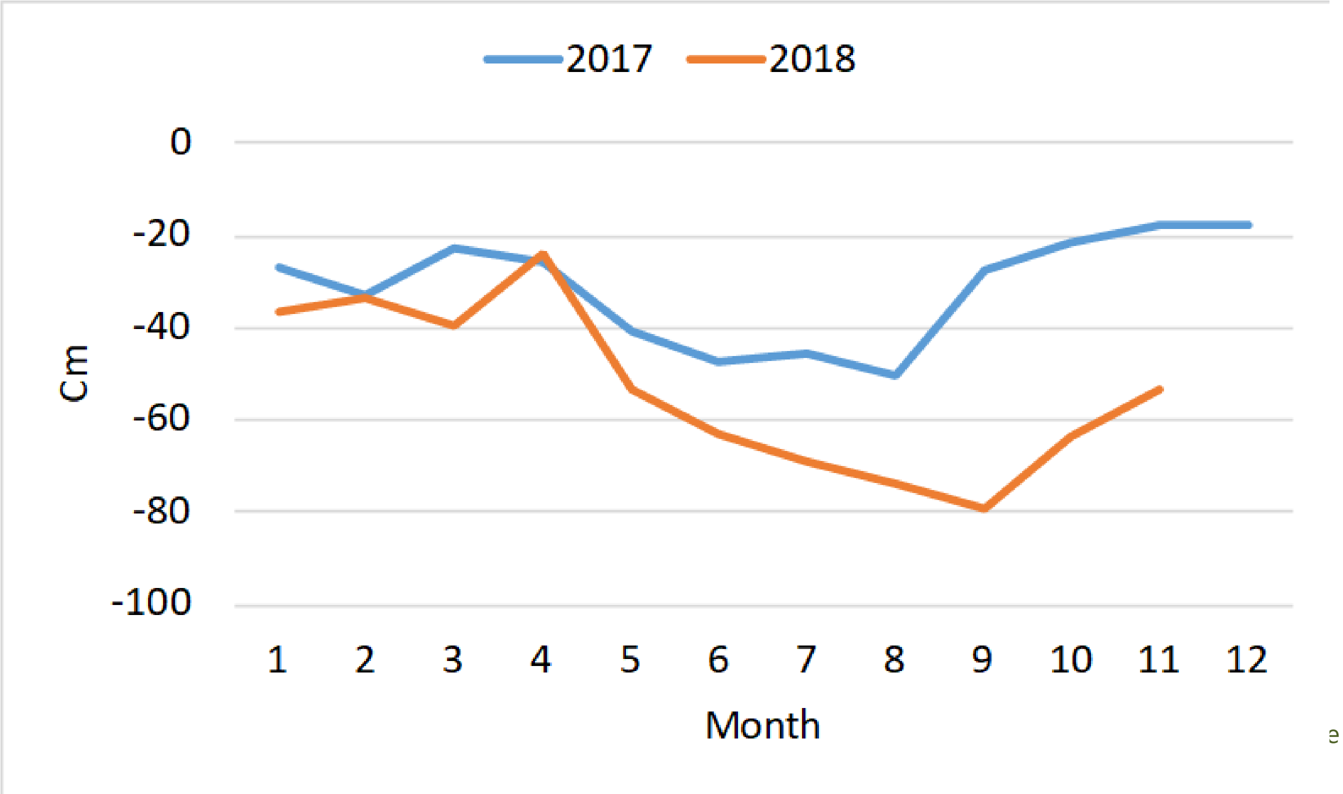
CO2 "soil" fluxes(tree biomass is not included)



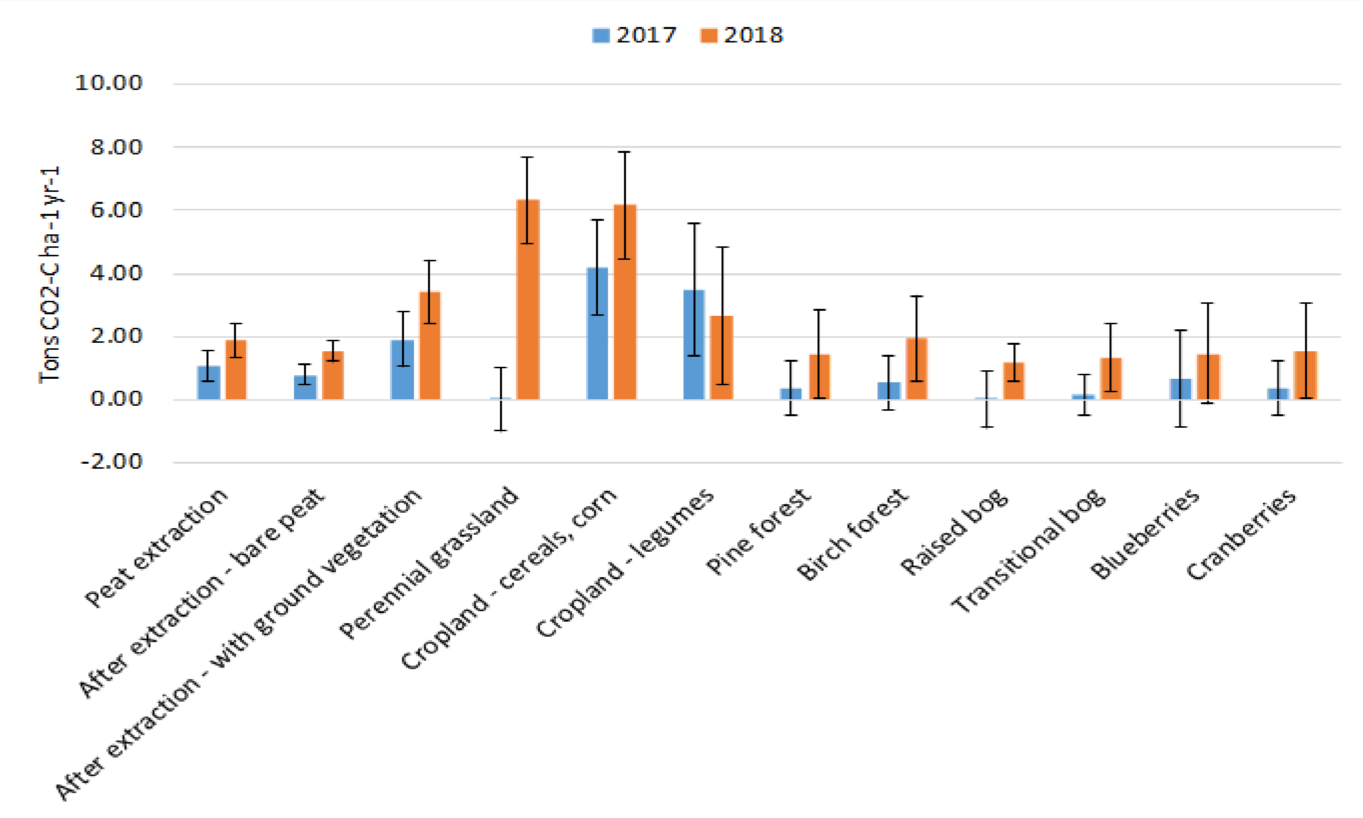
Mean ground water level



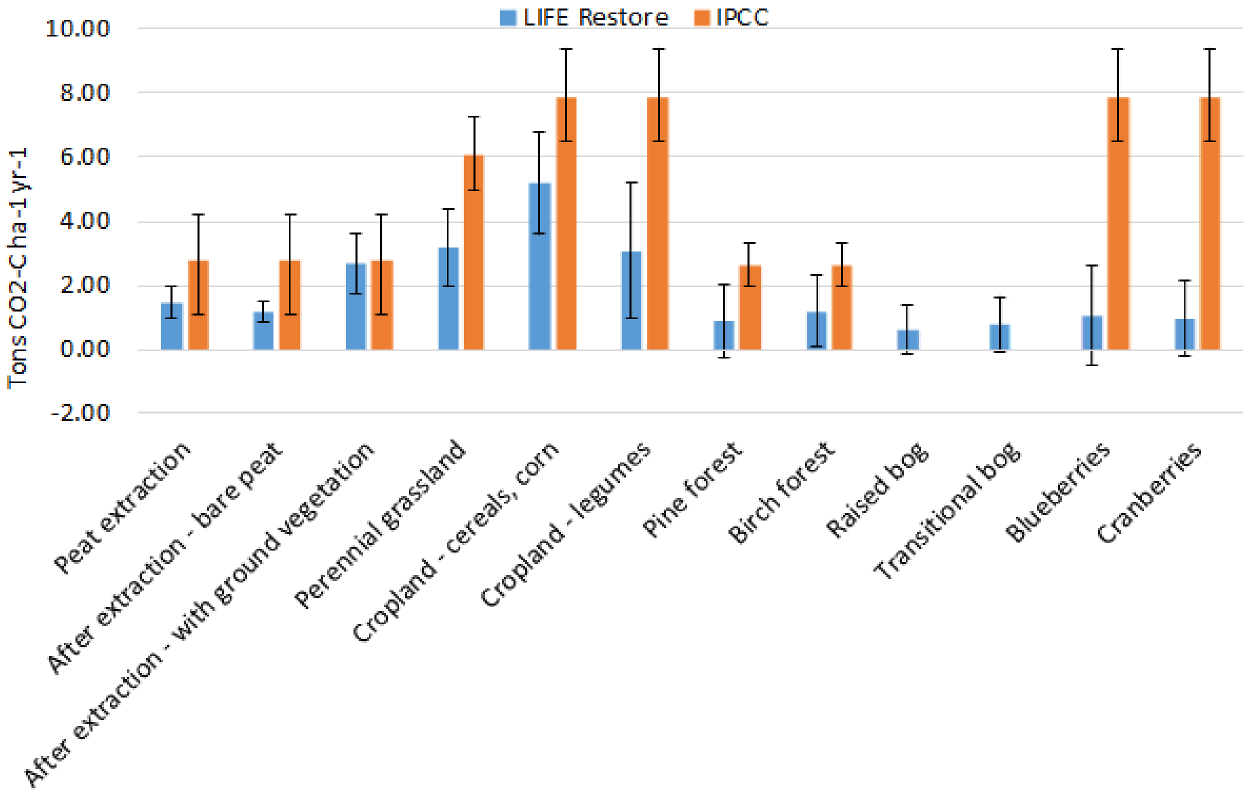
Ground water level in all plots



CO_2 emissions in 2017 and 2018

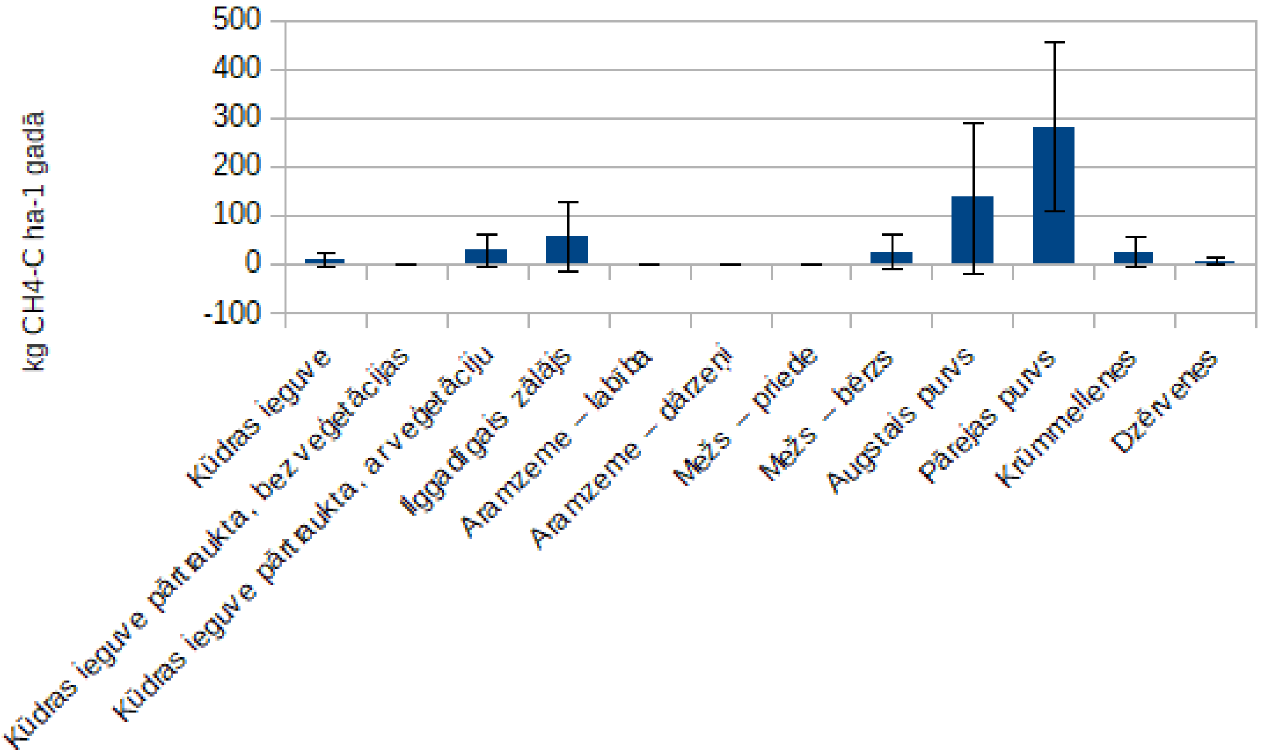


LIFE Restore and IPCC CO_2 emission factors



Reported CO_2 emissions from organic soils may decrease by ca. 30%-35%.

CH_4 emissions



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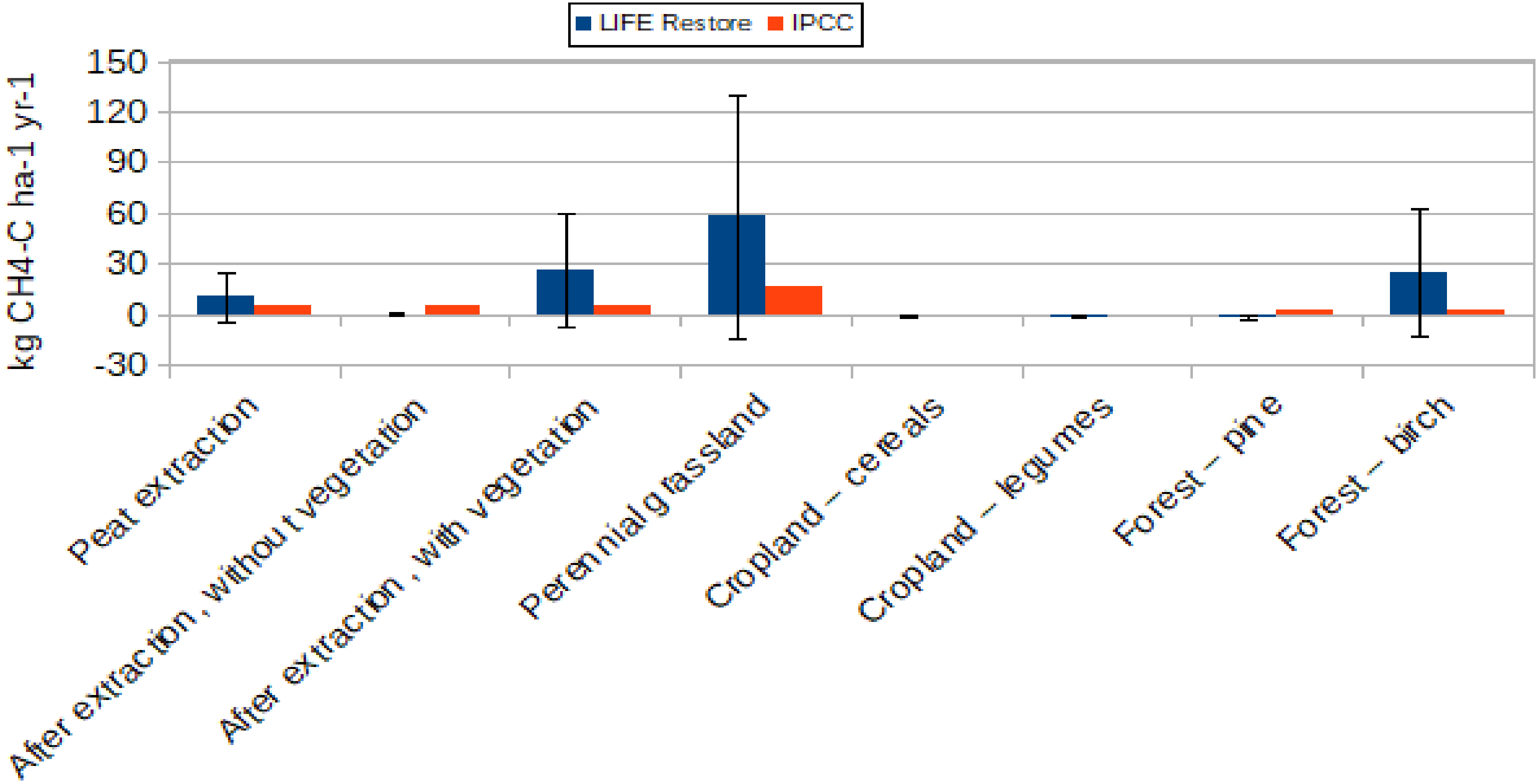
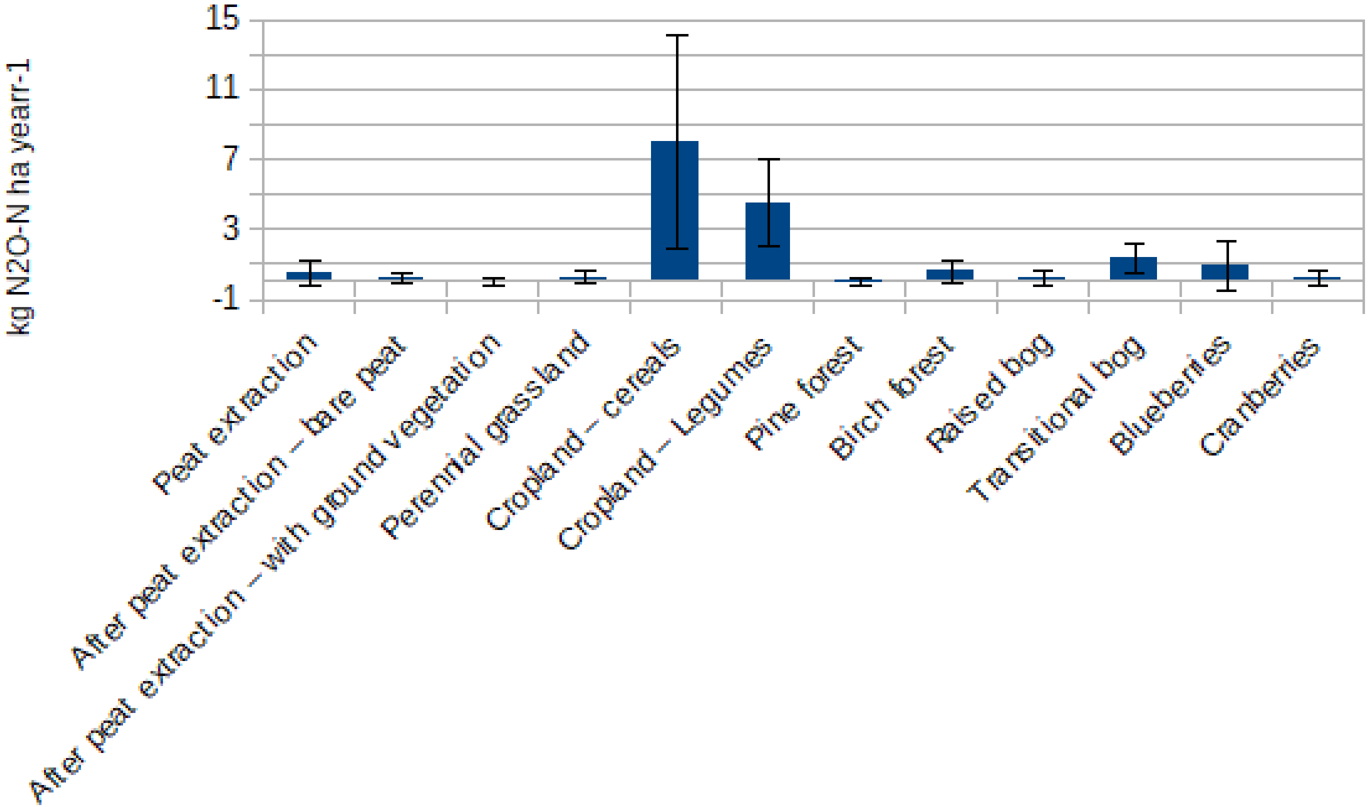


N_2O emissions



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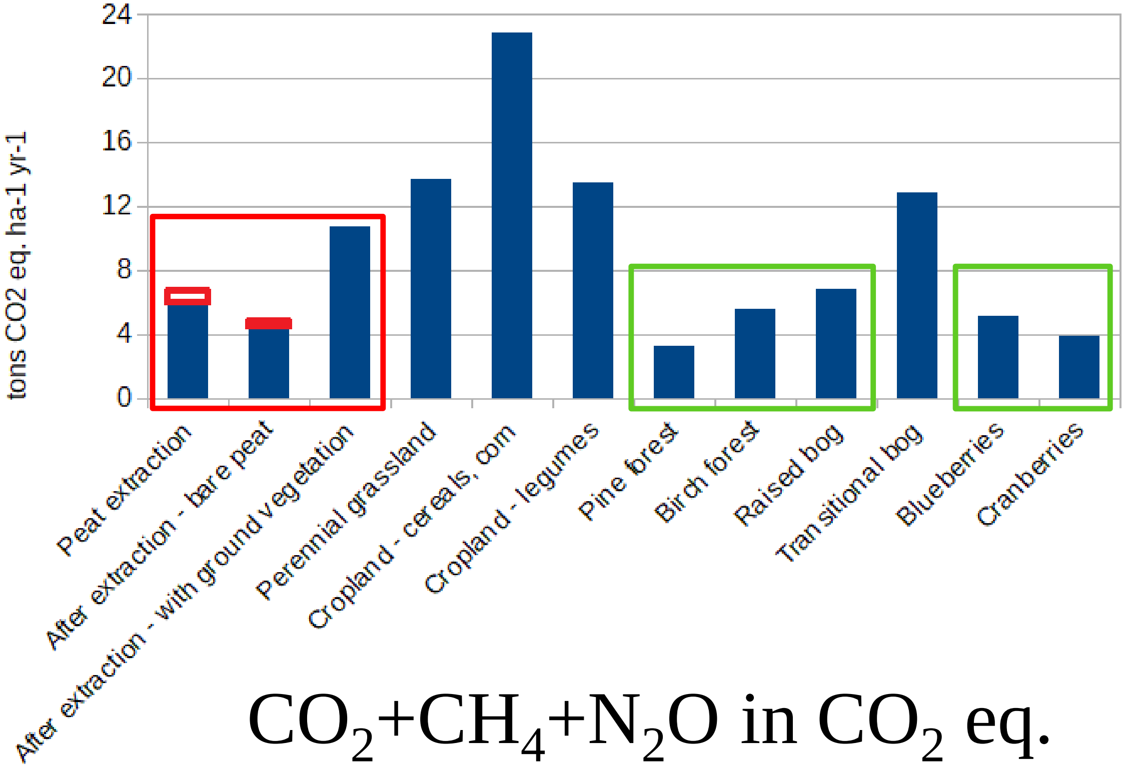
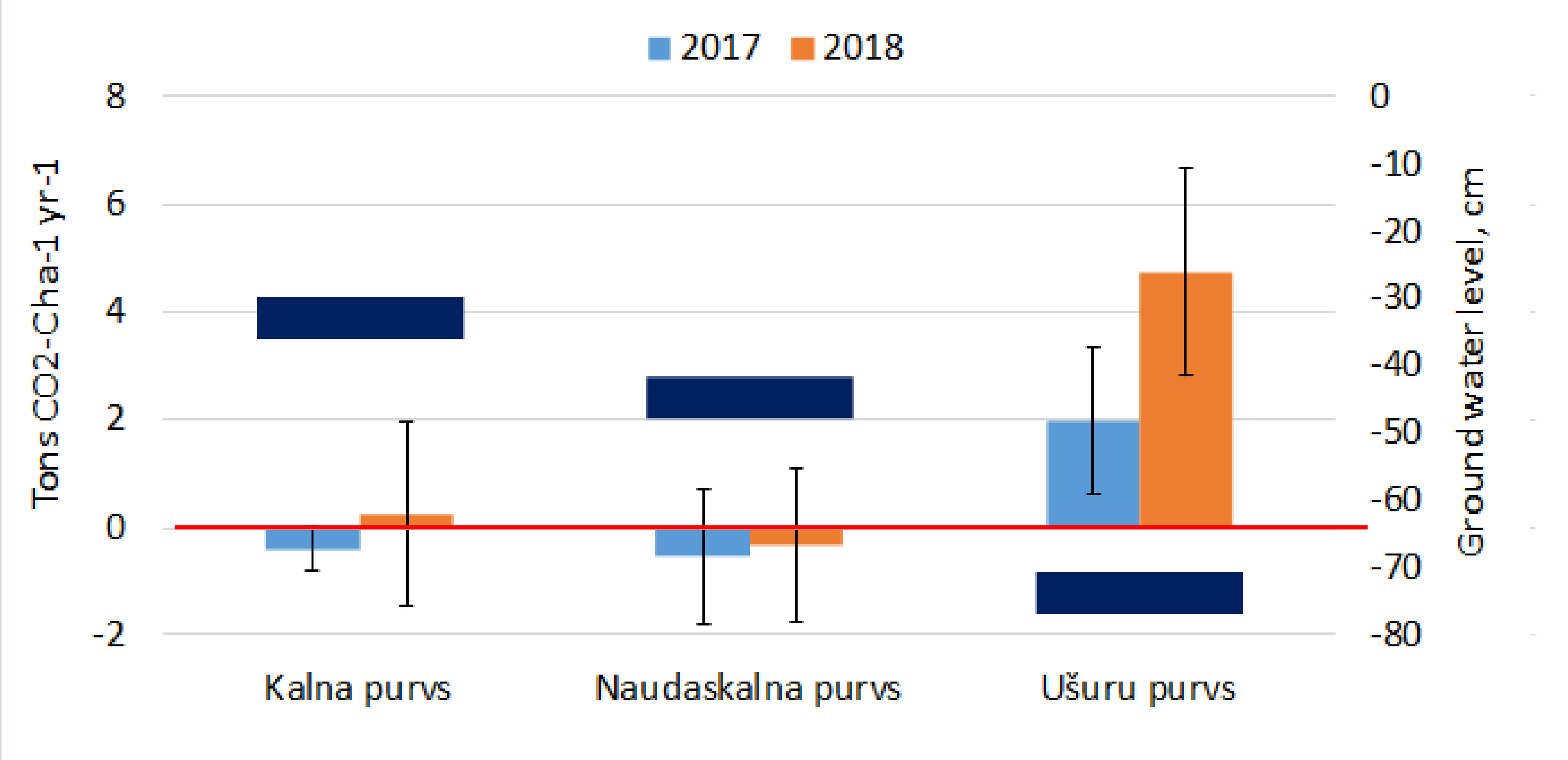
Emission reduction potential (tree biomass is not included)



$CO_2+CH_4+N_2O$ in CO_2 eq.

Emission reduction potential - cranberries



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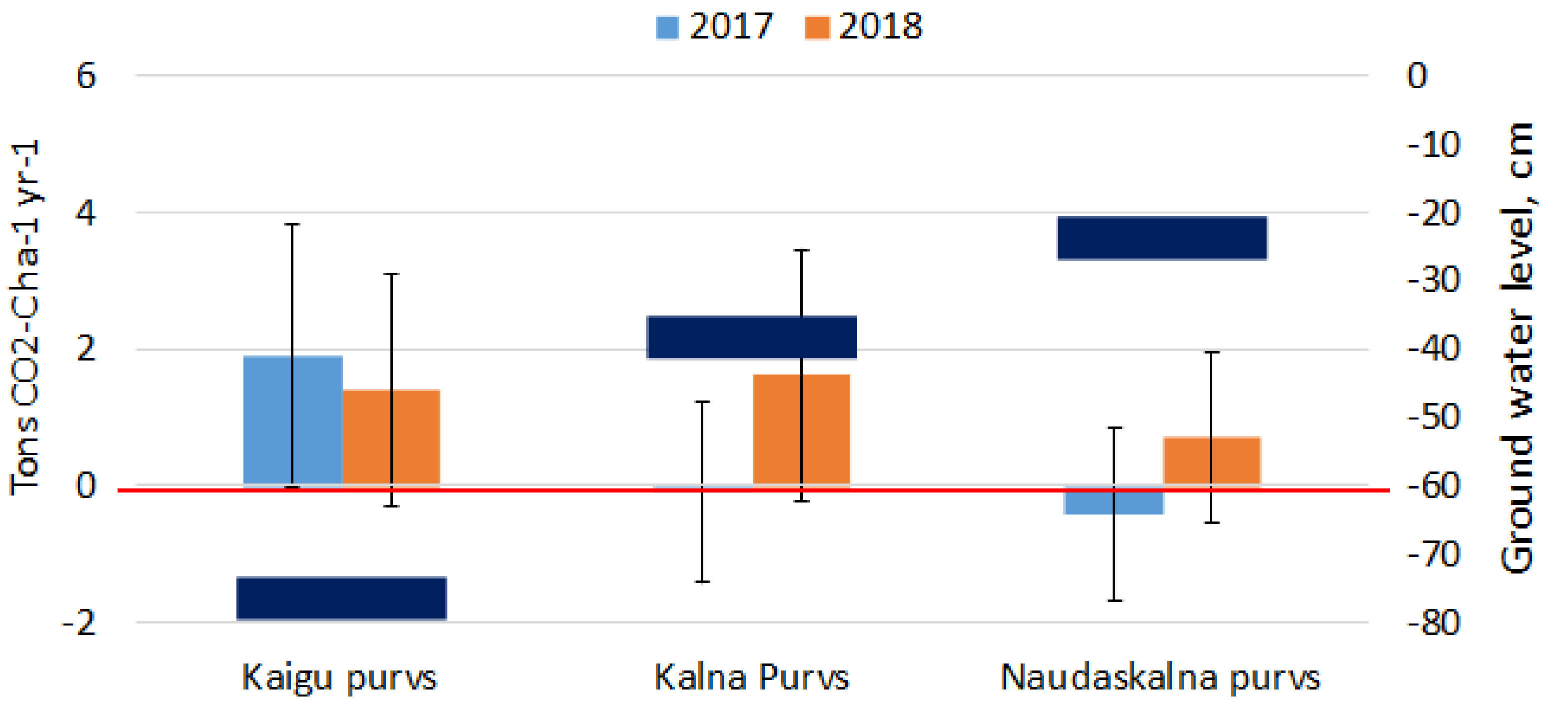
Emission reduction potential -



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Conclusions

- Measured soil CO_2 emissions is up to 2 times smaller than in IPCC 2014 guidelines. CH_4 emissions shows opposite trend.

- "The worst land use scenario" - croplands.

- Afforestation and berry cultivation – potential to reduce GHG emissions and even to become C sink if managed properly.

Projekts “Degradēto purvu atbildīga apsaimniekošana un ilgtspējīga izmantošana Latvijā" (LIFE REstore, LIFE14 CCM/LV/001103) tiek īstenots ar Eiropas Komisijas LIFE programmas finansiālu atbalstu. Projektu Latvijā no 2015. gada 1. septembra līdz 2019. gada 30. augustam īsteno Dabas aizsardzības pārvalde sadarbībā ar biedrību "Baltijas krasti", Latvijas Valsts mežzinātnes institūtu "Silava" un Latvijas Kūdras asociāciju.

Thanks for the attention!

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