CarbonSpace

A SATELLITE-POWERED TECHNOLOGY
TO GUIDE SUSTAINABILITY STRATEGIES IN THE FOOD AND FORESTRY SECTORS

CarbonSpace

KEY HIGHLIGHTS

~€1M seed round is attracted from the Yield Lab, Rockstart and a number of business angels

Feasibility validated by the European Space Agency through its AI Kickstart program and a number of peer-reviewed publications

Commercial customers in the food and forestry sectors in the EU (France, Ireland, Denmark, Germany), the USA, Colombia and Brazil

Top scaling niches are pork production, forestry and perennial crops with €1M+ in the near-term sales pipeline and €15M+ of potential LTV

THE YIELD LAB INSTITUTE

rockstart.

esa space solutions

PLUGANDPLAY

IOT TRIBE SPACE ENDEAVOUR

CarbonSpace

WHAT WE **ARE TRYING TO FIX**

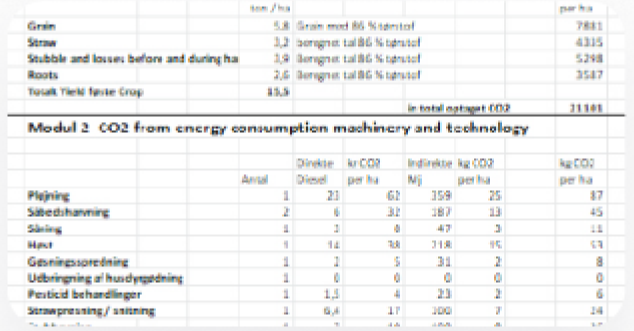
01 The current process of land-based carbon footprint estimation is manual, slow, and prohibitively expensive

02 Mostly self-reported data requires additional costly verification and certification process

03 Heterogenous carbon data for various emission sources hamper cross-industry climate actions

Tree allometry

Soil sampling



	ton / ha		per ha
Grain	5,8	Grain med 86 % tørstof	7881
Straw	3,2	Beregnet tal 86 % tørstof	4335
Stubble and losses before and during ha	3,9	Beregnet tal 86 % tørstof	5298
Roots	2,6	Beregnet tal 86 % tørstof	3537
Totalt Yield Spise Crop	15,5		
		In total optaget CO2	21181

Modul 2 CO2 from energy consumption machinery and technology

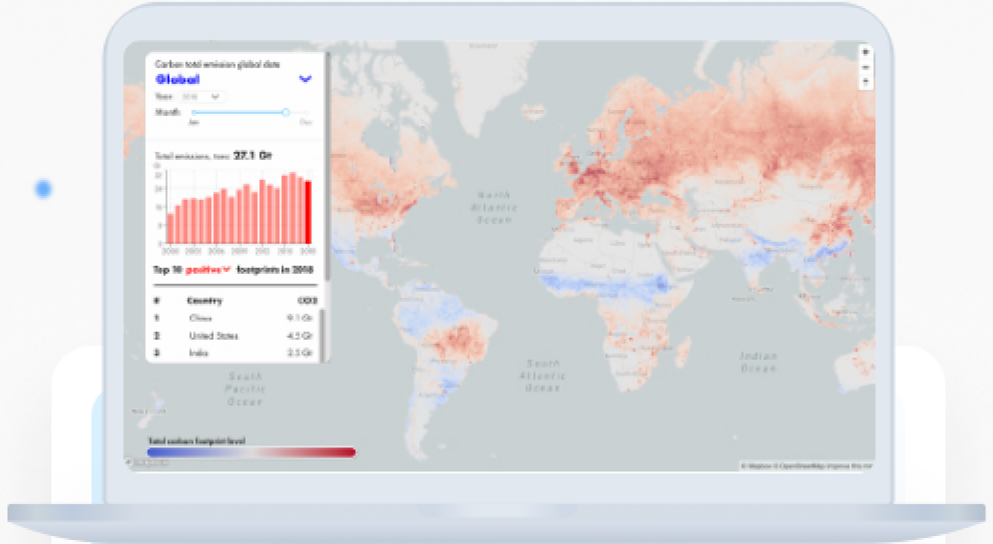
	Antal	Direkte Diesel	kr CO2 per ha	Indirekte Mj	kg CO2 per ha	kg CO2 per ha
Pløjning	1	21	62	359	25	87
Såbedsharvning	2	6	32	187	13	45
Såning	1	3	8	47	3	11
Høst	1	14	38	218	15	53
Gødningsspredning	1	2	5	31	2	8
Udbringning af husdyrgødning	1	0	0	0	0	0
Pesticid behandlinger	1	1,3	4	23	2	6
Strawpressning / snitning	1	6,4	17	100	7	24

Industry averages

We are providing scalable and cost-effective tools for GHG-emissions tracking to guide effective climate action

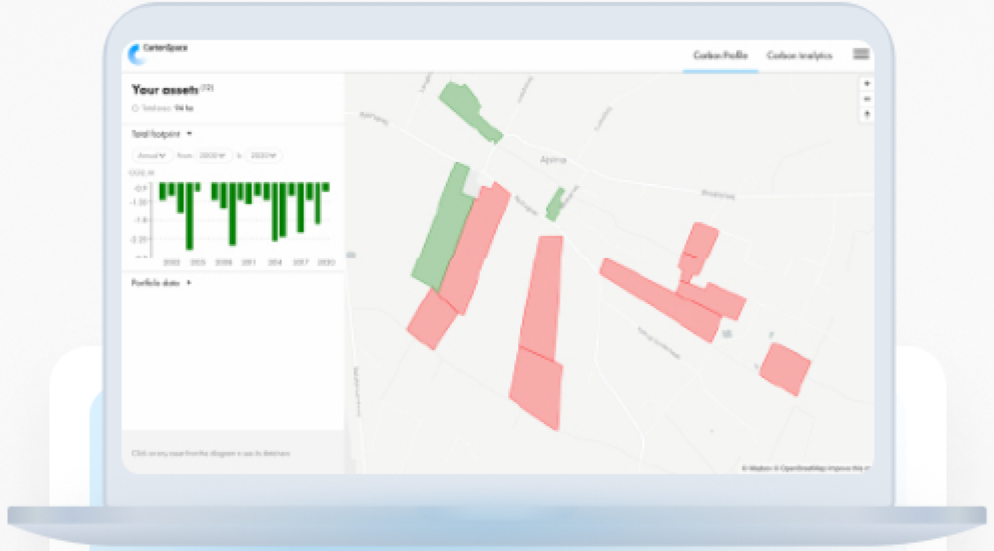
CarbonSpace

CURRENT **SOLUTION**



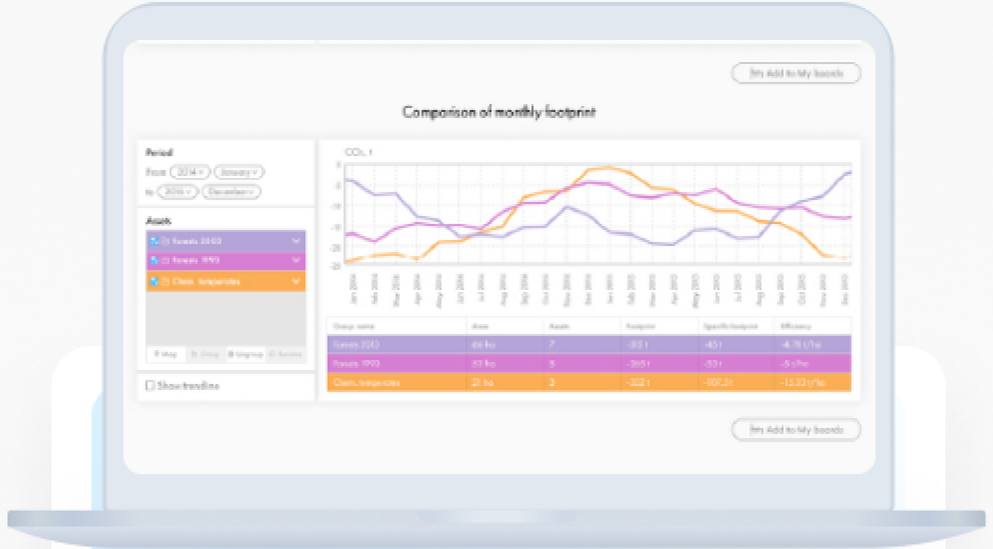
Carbon map

5-10 km resolution CO_2 data for countries and regions
20 years of historical monthly data from 2000



Carbon profile

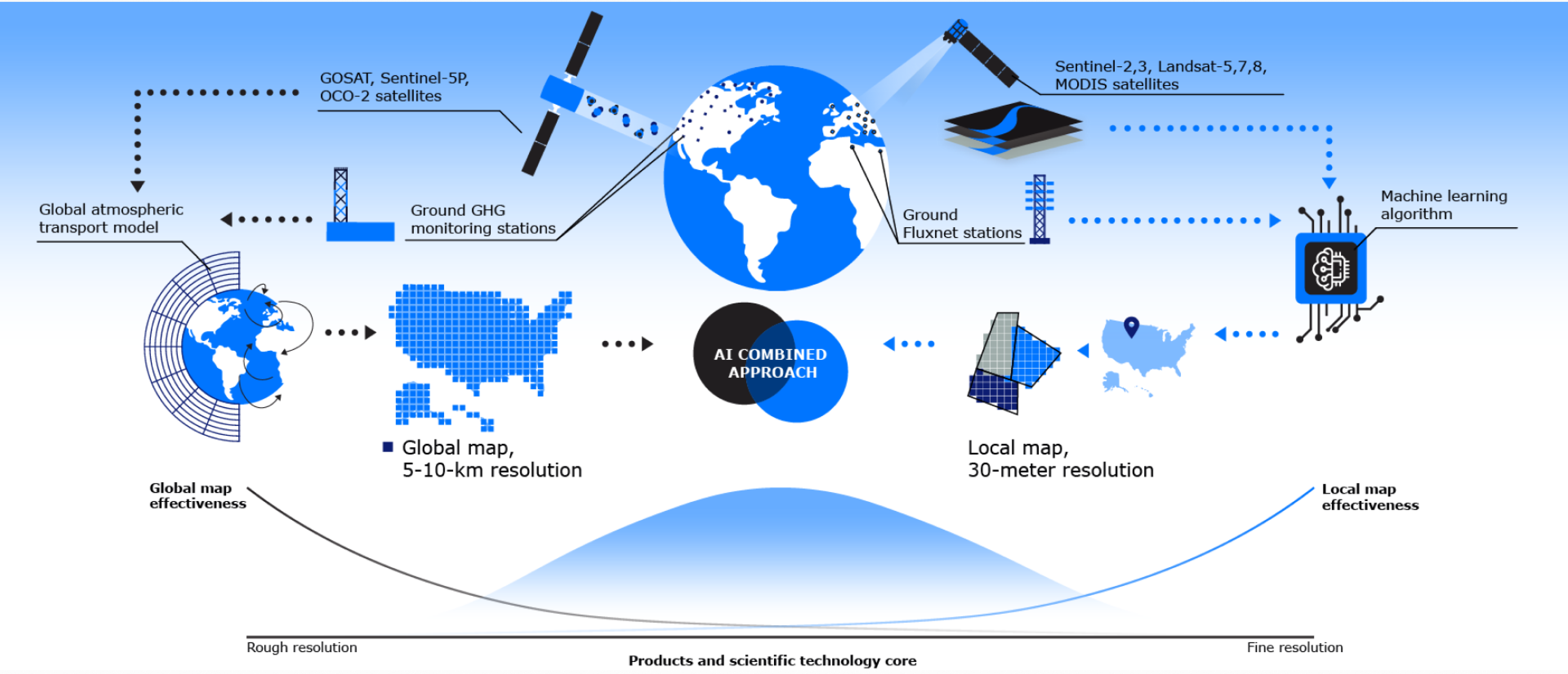
30 m resolution CO_2 flux data for land assets (fields, forests)
20 years of historical monthly data from 2000



Carbon analytics

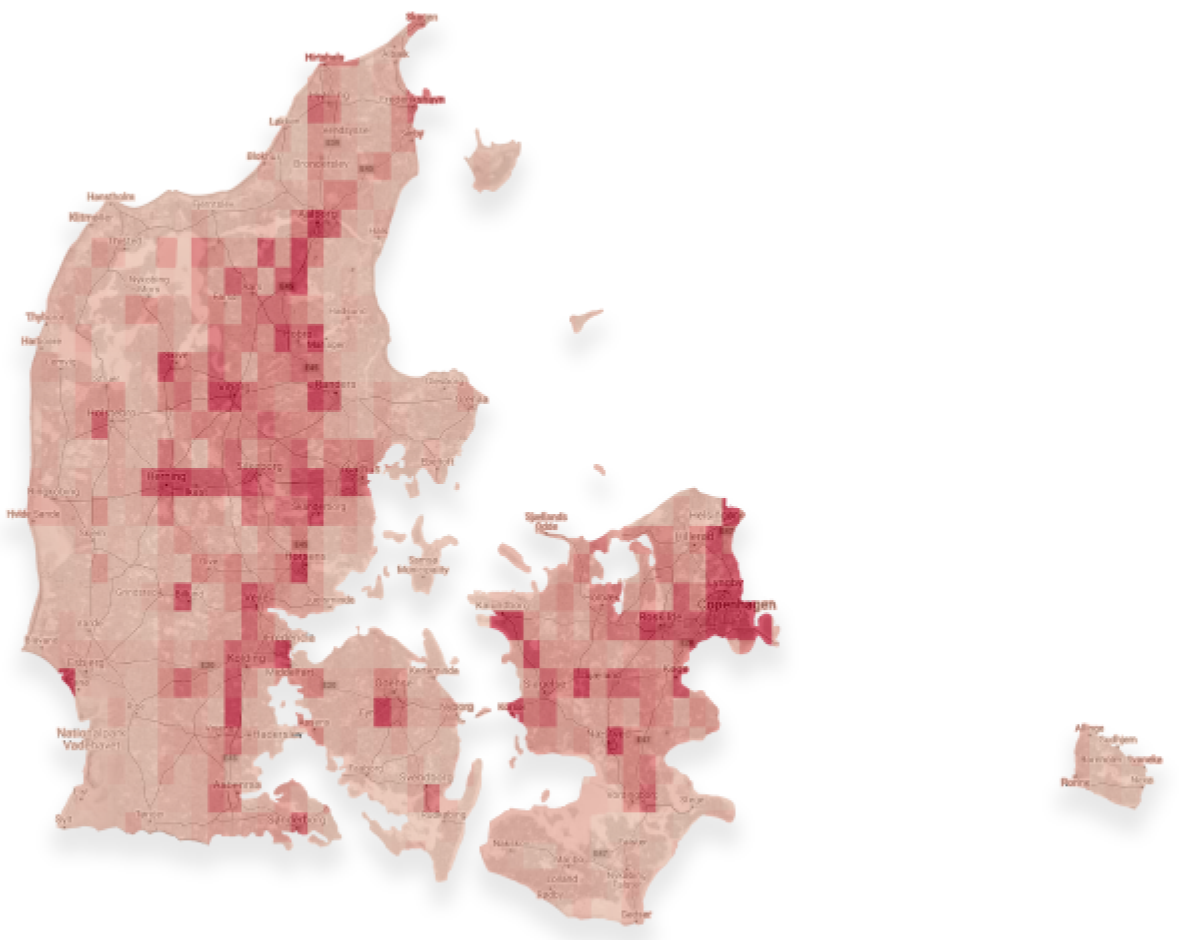
Analytical dashboards, baselines and trends
Impact assessment for carbon reduction activities

OUR INNOVATION

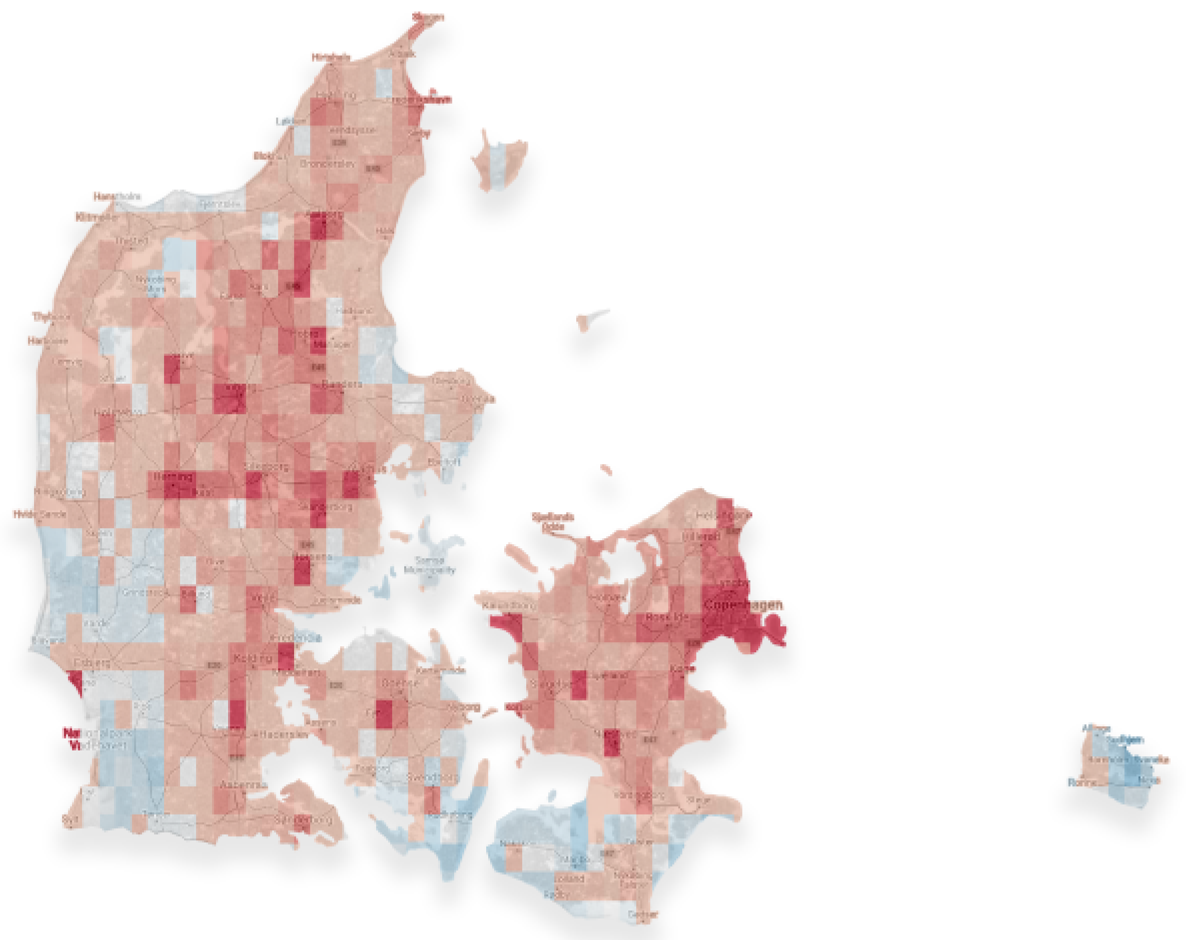


CarbonSpace

TOP-DOWN APPROACH. **LOW RESOLUTION**



Carbon flux in 2016, kt CO_2 per km^2

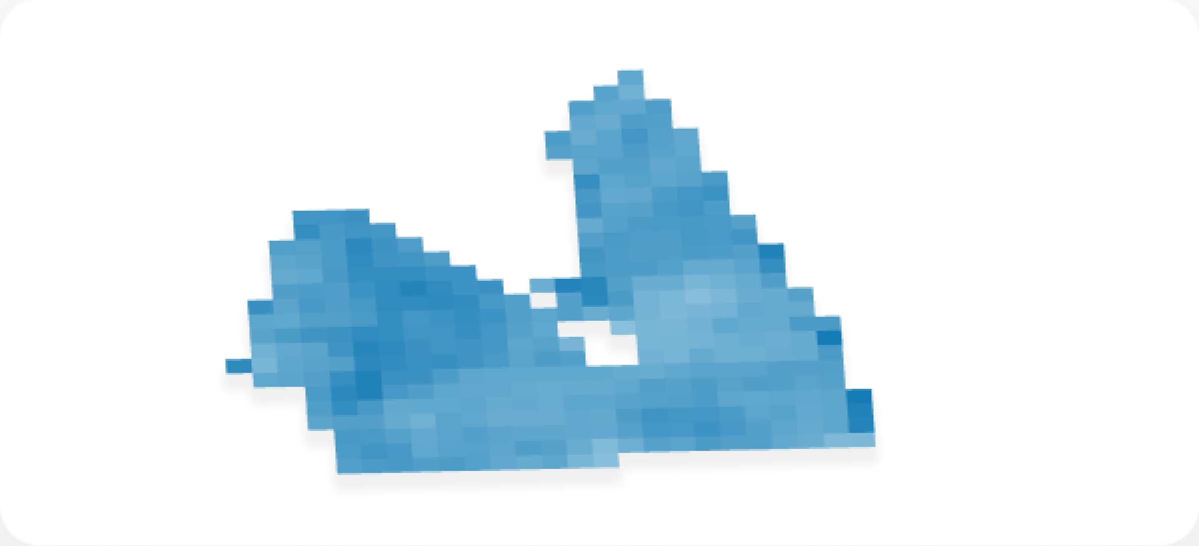


Carbon flux in 2019, kt CO_2 per km^2

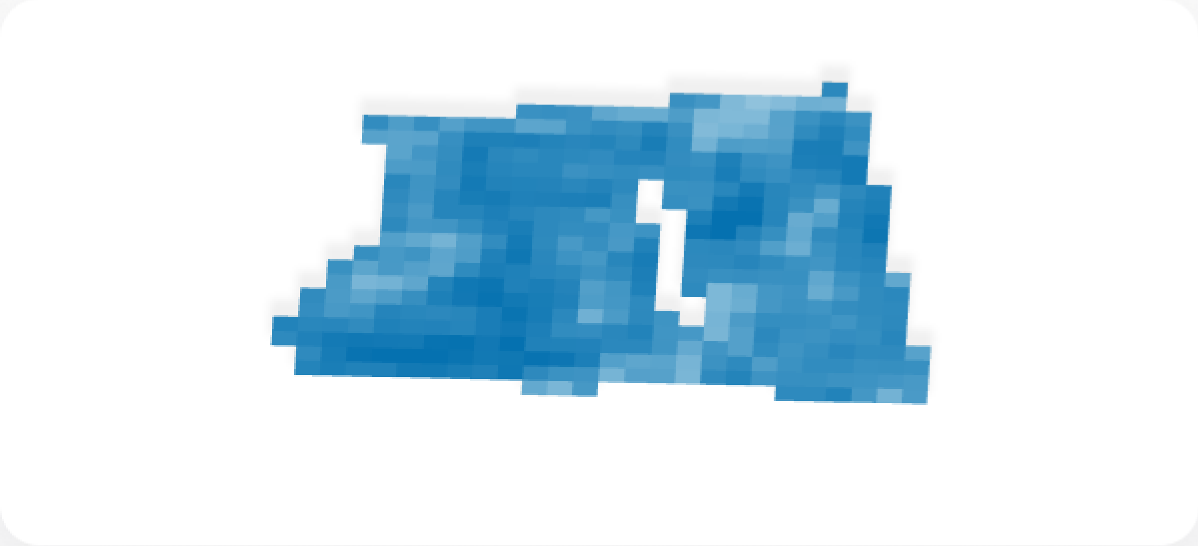
-0,3 40

CarbonSpace

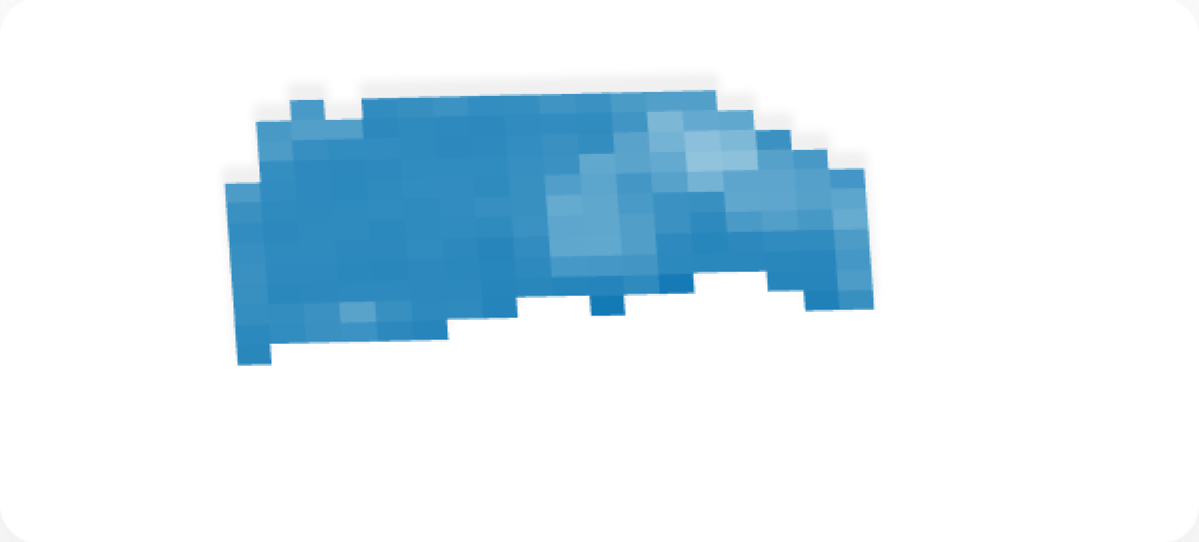
BOTTOM-UP APPROACH. **HIGH RESOLUTION**



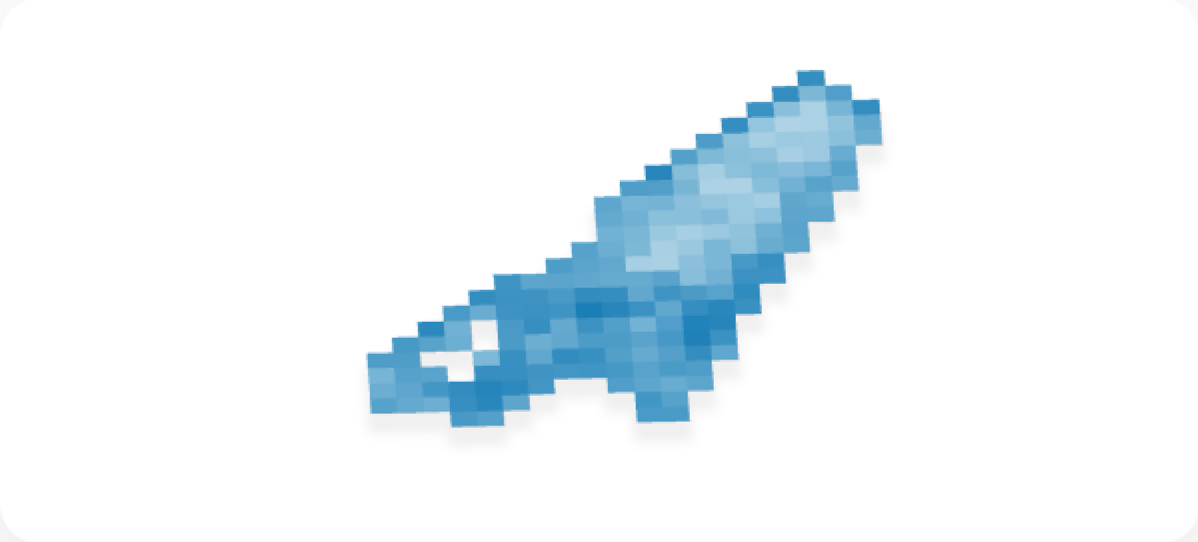
Annual carbon flux - Field 1, t CO_2 per ha



Annual carbon flux - Field 2, t CO_2 per ha



Annual carbon flux - Field 3, t CO_2 per ha



Annual carbon flux - Field 4, t CO_2 per ha

CarbonSpace

CASE STUDY: CROPLAND IN NORTH DAKOTA

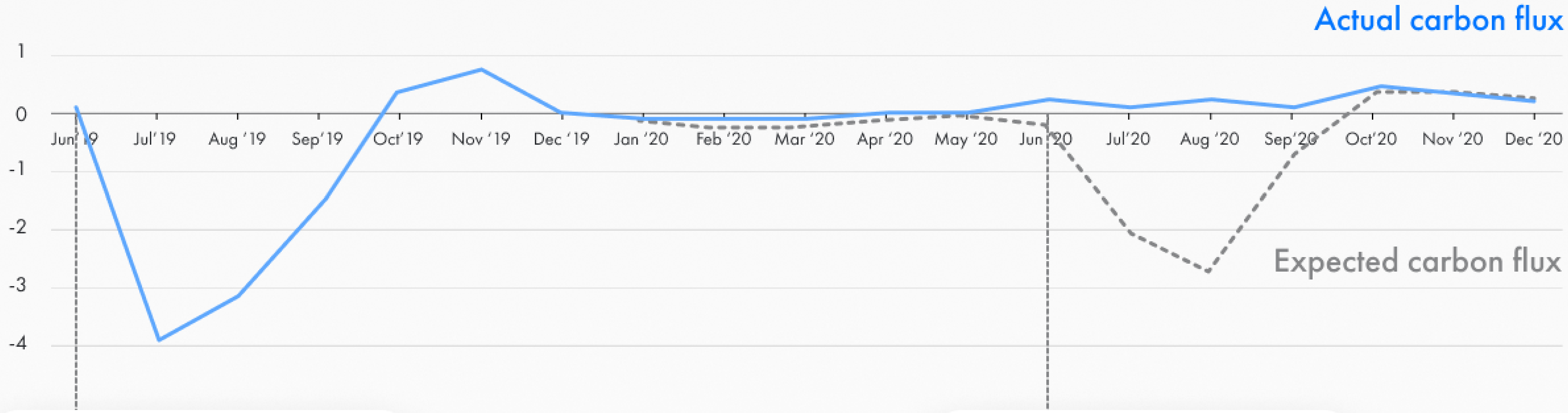
Average annual carbon flux, tCO_2/ac

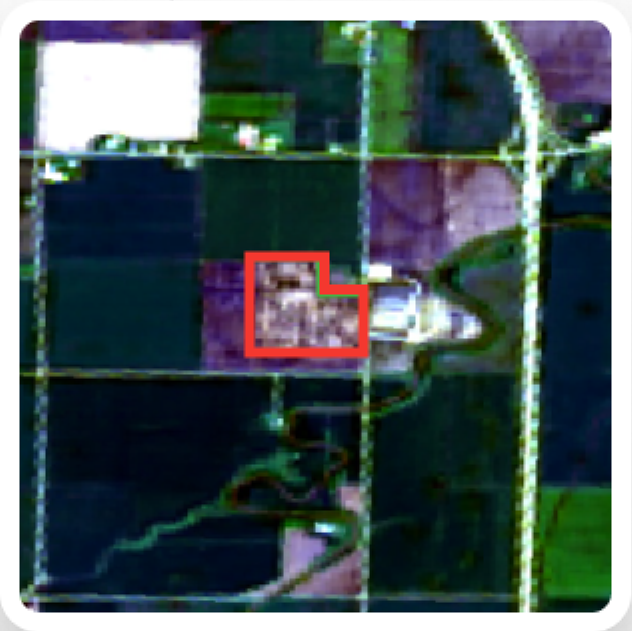
- The cropland served mostly as a carbon sink.
- The average carbon flux in 2000-2019 was -4.8 tCO_2/ac.
- In 2020 the carbon flux became positive (+1.1 tCO_2/ac.).

CarbonSpace

CASE STUDY: CROPLAND IN NORTH DAKOTA

Monthly carbon flux in 2020, tCO_2/ ac



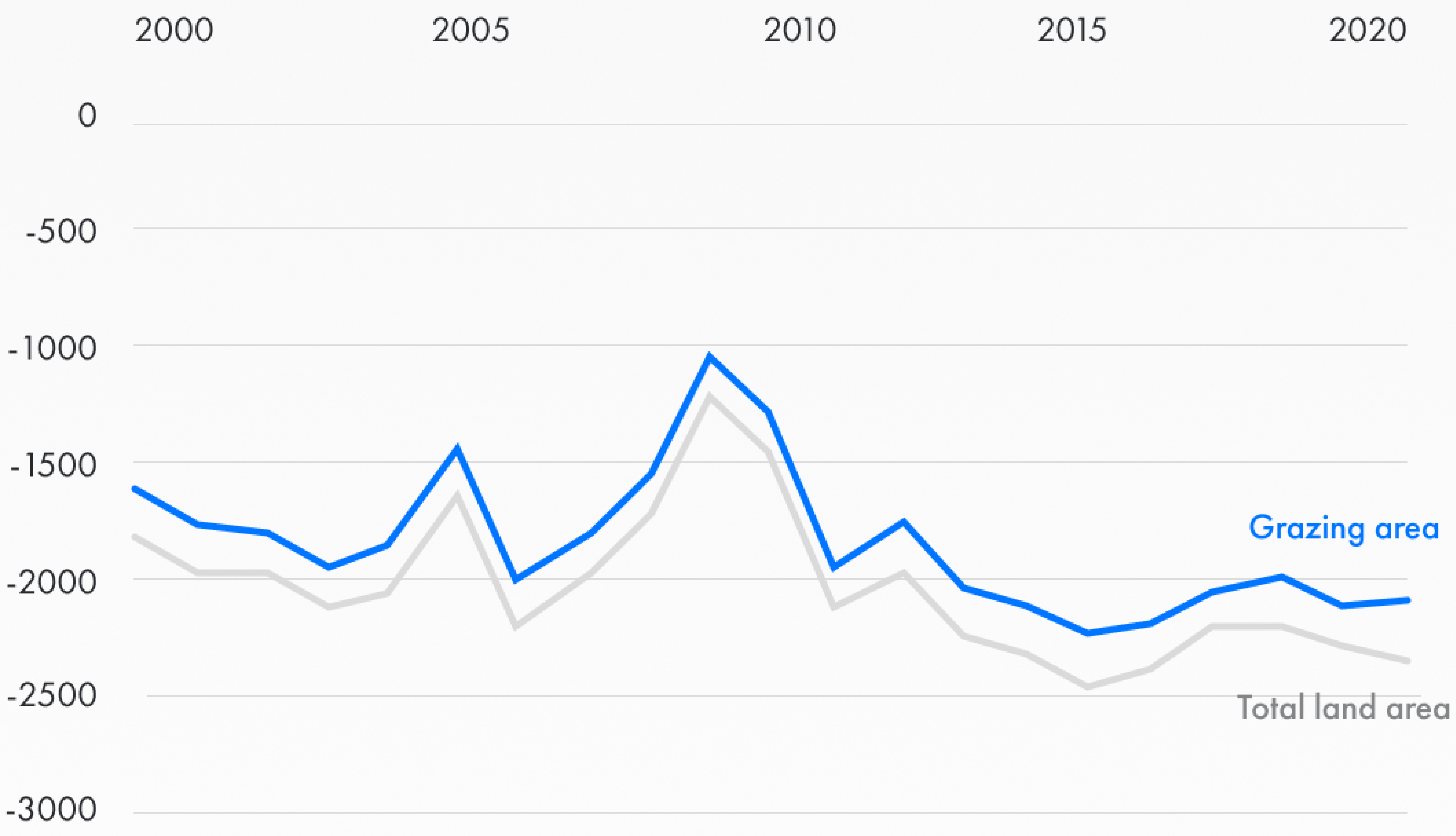


- At the end of 2019, the cropland changed ownership and remained disturbed for more than a year.
- The annual difference between the actual and potential carbon fluxes was 470 tCO_2, which can be regarded as a cost of poor land management.

CarbonSpace

CASE STUDY: **GRAZING LAND IN IRELAND**

Average annual carbon flux, tCO_2



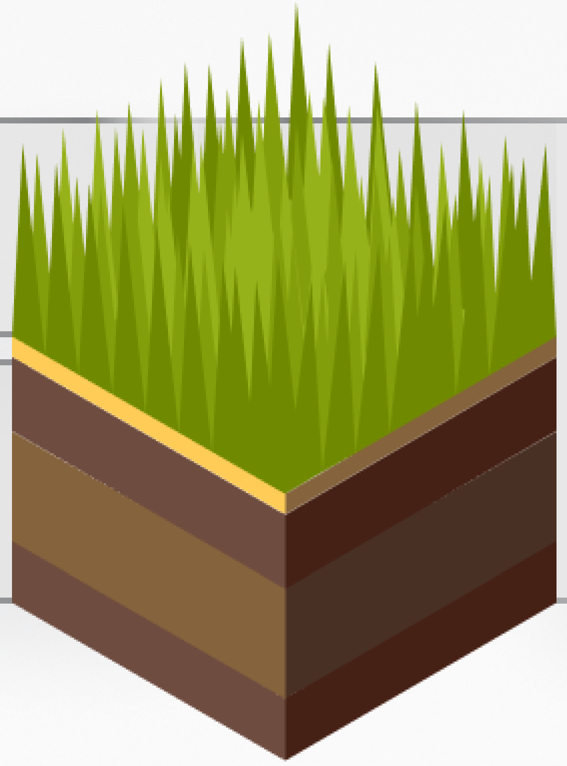
- Grazing area occupies 79 hectares of the farm and generates 21-year average carbon flux of -1840 tCO_2.
- The rest 3.5 hectares are mixed and deciduous forest, which also generate negative carbon flux (-195 tCO_2 on average).

CarbonSpace

CASE STUDY: GRAZING LAND IN IRELAND

505 tC
Grass harvested, data from the farm

35 tC (0.44 tC per ha)
Carbon which stayed in the ecosystem, estimation



540 tC
Annual NEE - 1982 tCO_2 ,
CarbonSpace estimation

	Without carbon sequestration		With carbon sequestration
LCA 2018	0.89 kg CO_2 / kg FPCM*	→	0.80 kg CO_2 / kg FPCM
LCA 2020	0.76 kg CO_2 / kg FPCM	→	0.65 kg CO_2 / kg FPCM

*Fat-and-protein-corrected-milk

CarbonSpace

SCALING AND **MARKET ACCEPTANCE**

	Food and Forestry supply chains	Nature-based carbon removal
Biomass-focused estimations	Case-studies to compare CarbonSpace estimations to carbon footprint calculations within popular corporate frameworks	Assessments of (re-)afforestation and conservation projects and third-party validation
Soil-focused estimations	Case-studies to explore the potential of NEE to predict the SOC change and sequestration in soils, integration with industry tools	Developing models to support the insetting initiatives and carbon removal projects in agriculture

CarbonSpace

R&D ROADMAP AND CHALLENGES

- Complete integration of top-down and bottom-up approaches
- Integration of Soil-vegetation-atmosphere transfer models (SVAT)
- Integration of radar data
- High-resolution data for CH_4 emissions
- On-ground flux estimations in tropical areas
- Separation of biospheric and anthropogenic emissions
- N_2O emissions estimations

CarbonSpace

AREAS FOR COLLABORATION

Participation in Carbon Monitoring System Science Team Meeting and Applications Workshops and other CMS activities

Joint prototyping of carbon MRV systems for the land sector utilizing broad range of satellite data according to the current carbon trading protocols

More holistic utilization of NASA's data and capabilities in the CarbonSpace carbon emission modeling

Participation in inter-comparison campaigns and reports for inverse modelling results

CarbonSpace

carbonspace.tech

CONTACT

Oleg Demidov
Founder and CEO

+ 49 176 863 80612
oleg@carbonspace.tech