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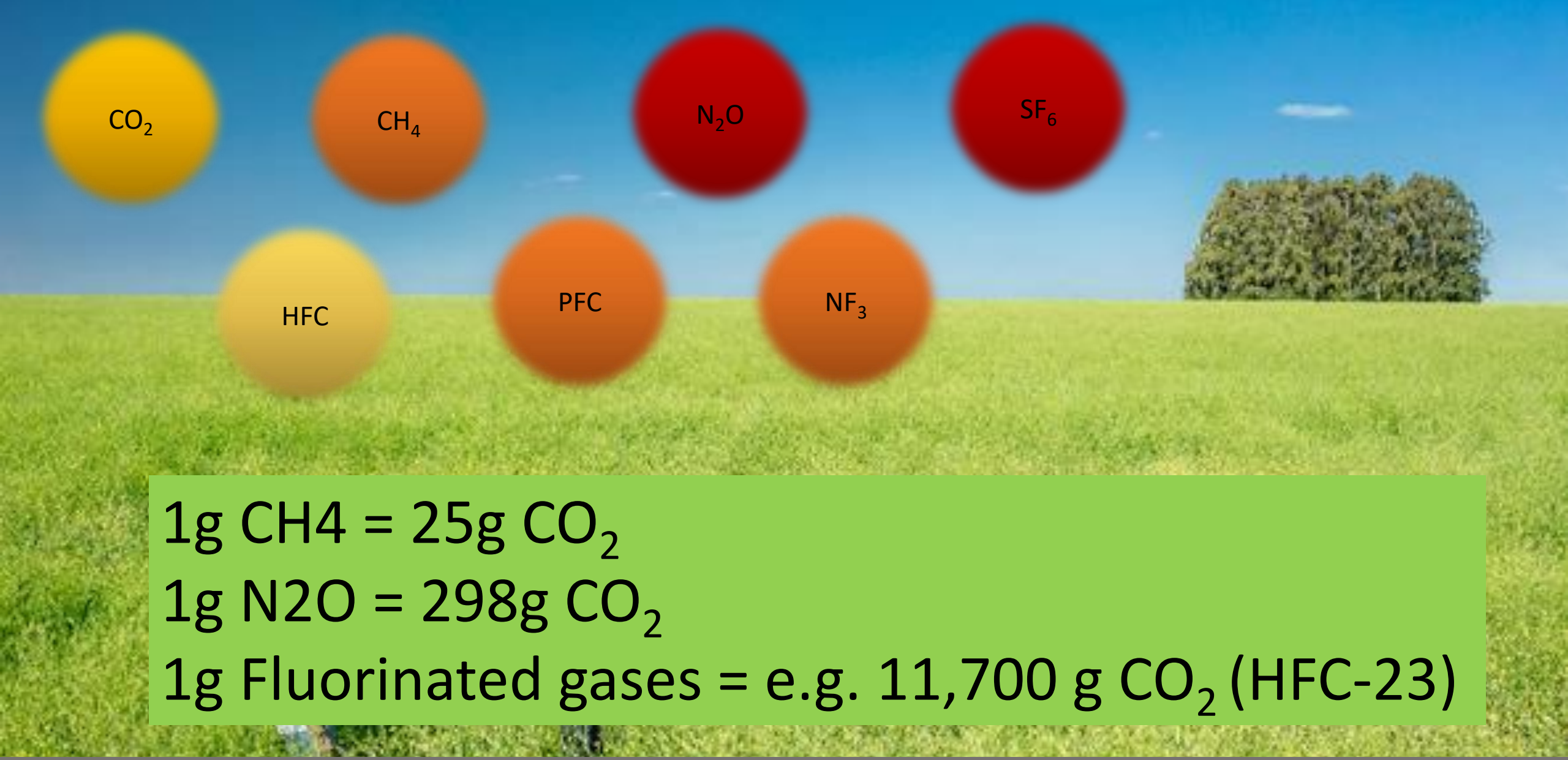
Carbon Economy and Modelling

The Carbon Economy

- Replaces business-as-usual activities with lower emission solutions.
- Stems from a regulatory framework.
- Monetizes additional carbon value.

Image source https://www.eesc.europa.eu/en/news-media/news/time-accelerate-transition-low-carbon-economy-says-european-civil-society



1g CH4 = 25g CO_2

1g N2O = 298g CO_2

1g Fluorinated gases = e.g. 11,700 g CO_2 (HFC-23)

Greenhouse Gases with carbon value

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Regulatory Frameworks

- Redirects capital to innovative solutions.
- Unleashes the power of markets:
  - Renewable or Clean Fuel Markets
  - Cap and trade markets
  - Independent Markets

CORSIA

European Commission

CALIFORNIA AIR RESOURCES BOARD

Low Carbon Fuel Standard

CLIMATE ACTION RESERVE

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Additional biomass

Non-edible oil for biofuels production

High protein animal feed

Soil cover around year
Crop residues left on soil

Erosion control

More biomass to soil and enhanced soil carbon balance

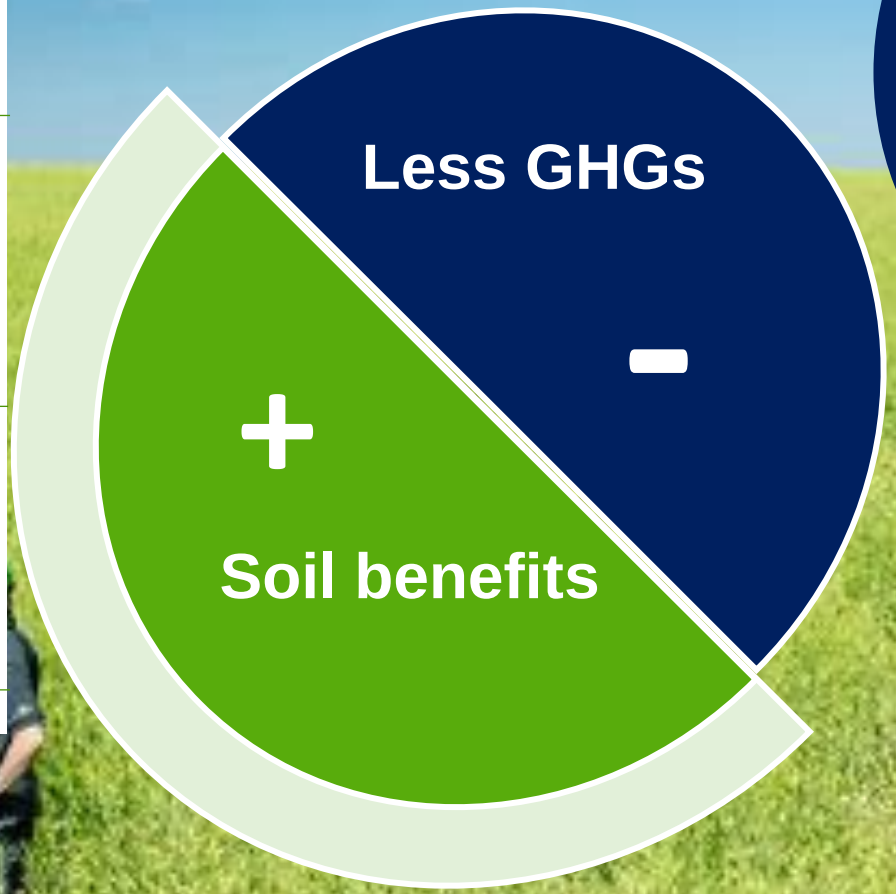
Deep rooting system
Diversification of crop rotation

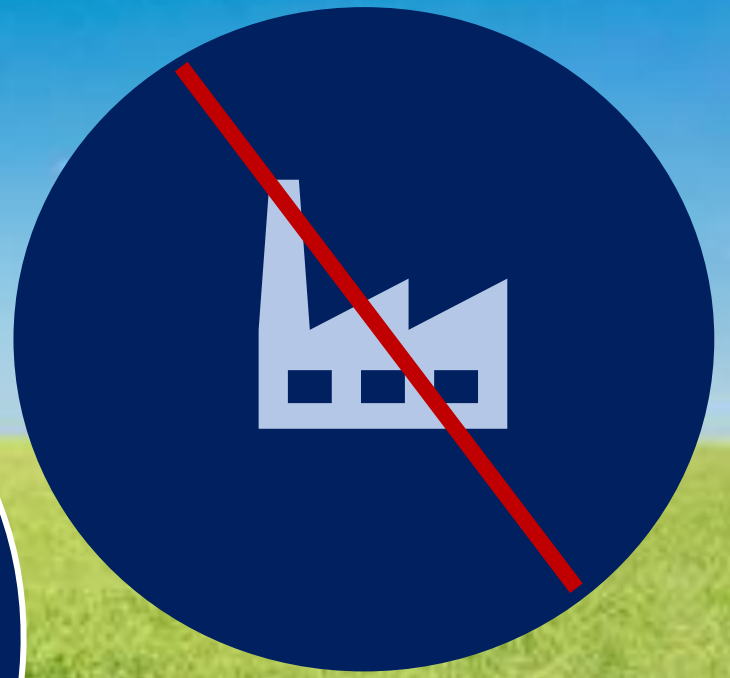
Better growth conditions

Soil quality improves

Efficient nutrient uptake

Better pest and weed control for main crop





Low-carbon fuels and Carinata

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Modelling GHGs

A reduction must be

- Quantified
- Audited
- Approved:
  - Registries
  - Certification Schemes

Capturing Carbon Value

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca}$$

GHG Savings

%

Value

- RSB GHG Tool
- Biograce

EU RED Methodology

$$E = e_{ec} + e_l + e_p + e_{td}$$

CI Score
gCO_2e/MJ

Value

- CA GREET

California LCFS

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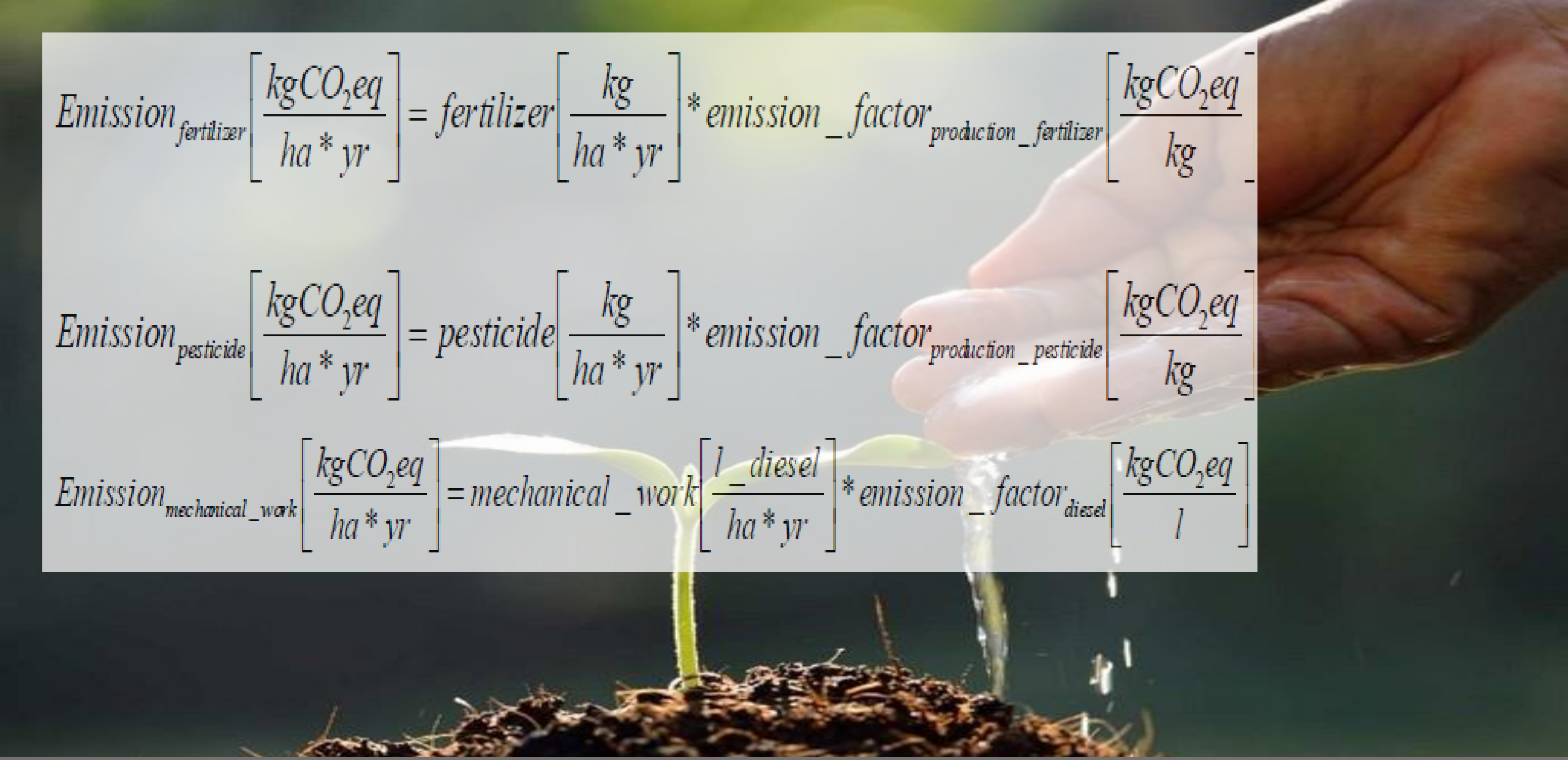
$$Emission_{fertilizer}\left[\frac{kgCO_2eq}{ha*yr}\right] = fertilizer\left[\frac{kg}{ha*yr}\right] * emission\_factor_{production\_fertilizer}\left[\frac{kgCO_2eq}{kg}\right]$$

$$Emission_{pesticide}\left[\frac{kgCO_2eq}{ha*yr}\right] = pesticide\left[\frac{kg}{ha*yr}\right] * emission\_factor_{production\_pesticide}\left[\frac{kgCO_2eq}{kg}\right]$$

$$Emission_{mechanical\_work}\left[\frac{kgCO_2eq}{ha*yr}\right] = mechanical\_work\left[\frac{l\_diesel}{ha*yr}\right] * emission\_factor_{diesel}\left[\frac{kgCO_2eq}{l}\right]$$



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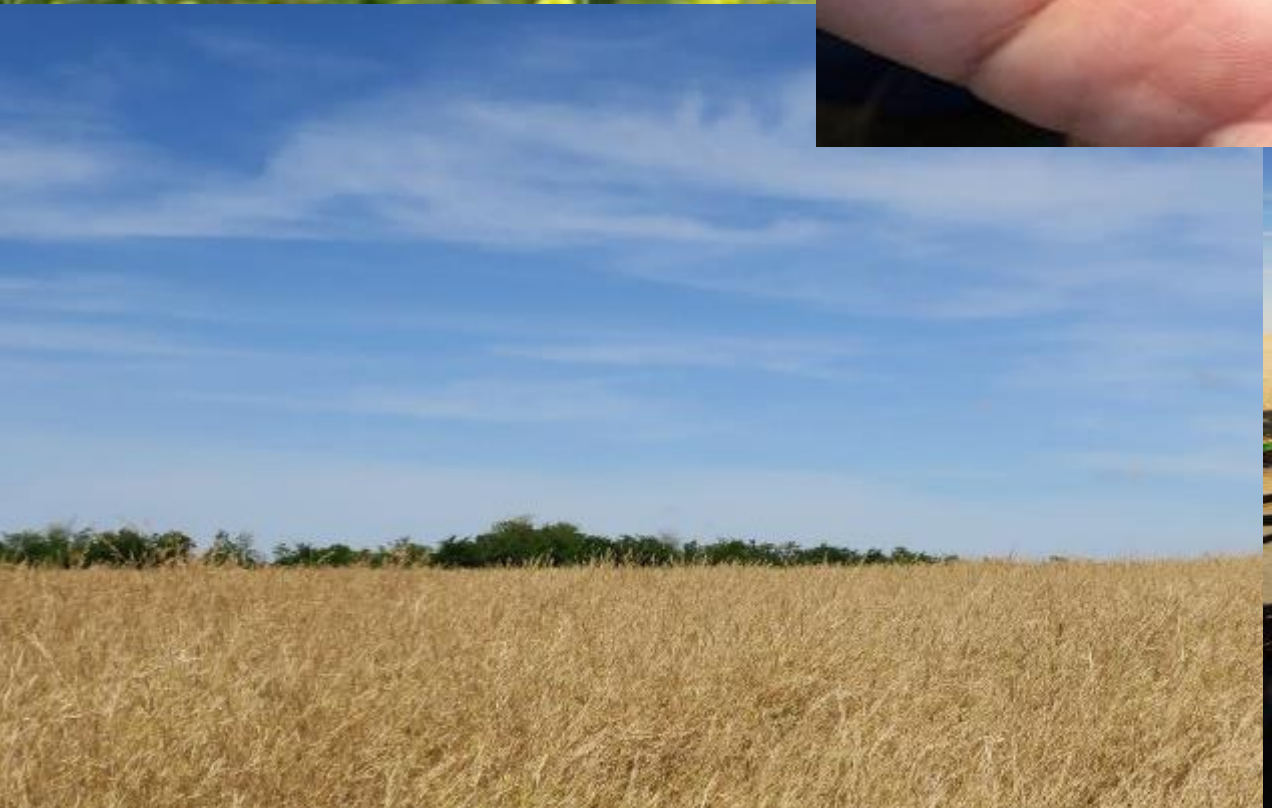

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