Teagasc
Agriculture and Food Development Authority

Tillage Life Cycle Analysis

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www.teagasc.ie/tillagecon24

Carbon accounting methods

Globally, carbon accounting follows two methods which have different ‘system boundaries’

- Intergovernmental Panel on Climate Change (IPCC)
  - Used for national inventory
- Life Cycle Assessment (LCA)
  - Used to calculate embedded carbon emissions in products i.e. kg $CO_{2\ eq}$ per kg of grain, meat or milk

Carbon accounting calculations

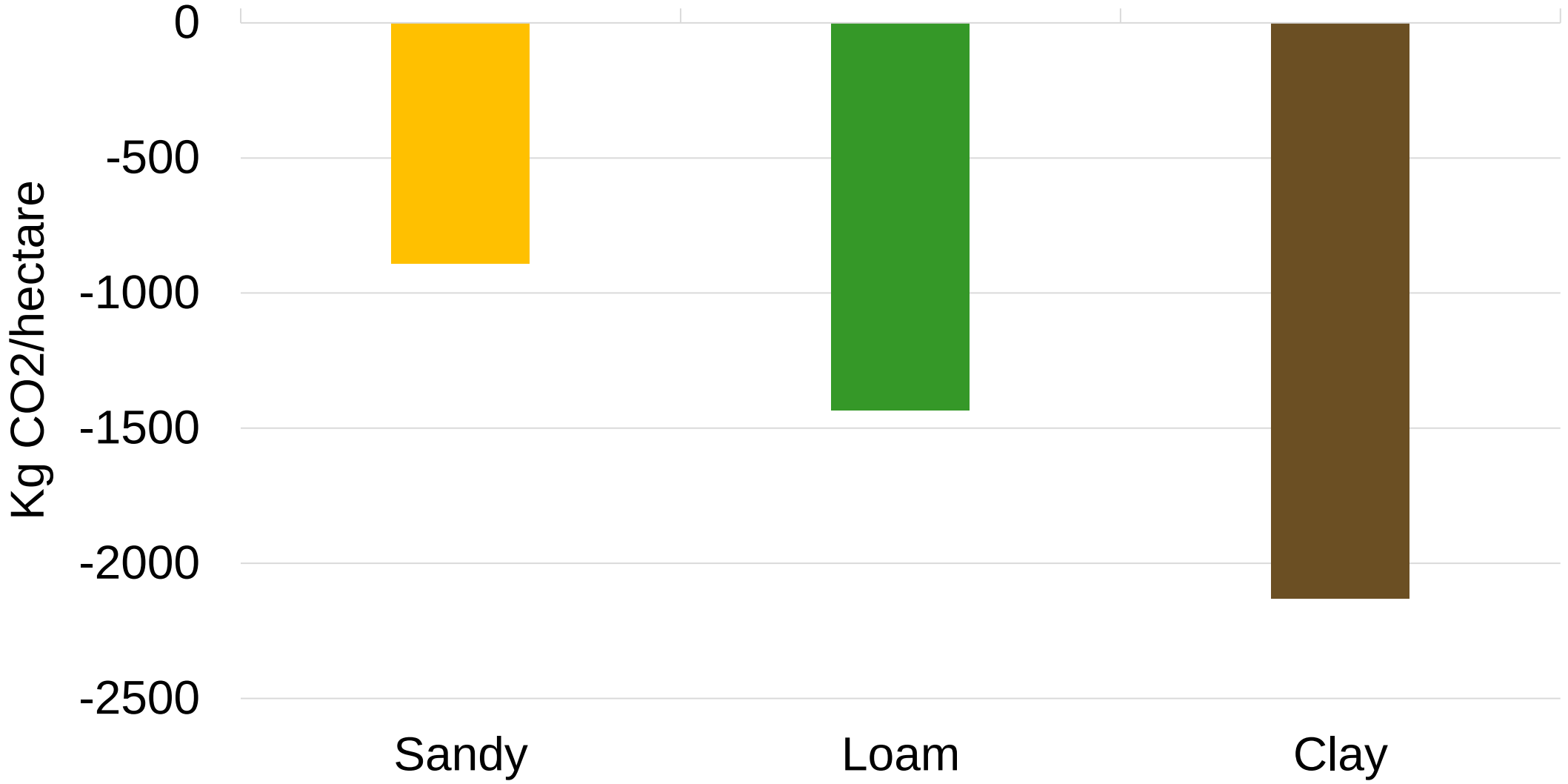
Both Carbon accounting methods require:

- Activity data
  - e.g fertiliser type and amount, cultivation methods
- Emissions factors
  - Tier 1 – international default figure
  - Tier 2 – national figures
  - Tier 3 – Values dependant on circumstances (e.g different figures for different soil types)

On-farm nitrous oxide emissions factors

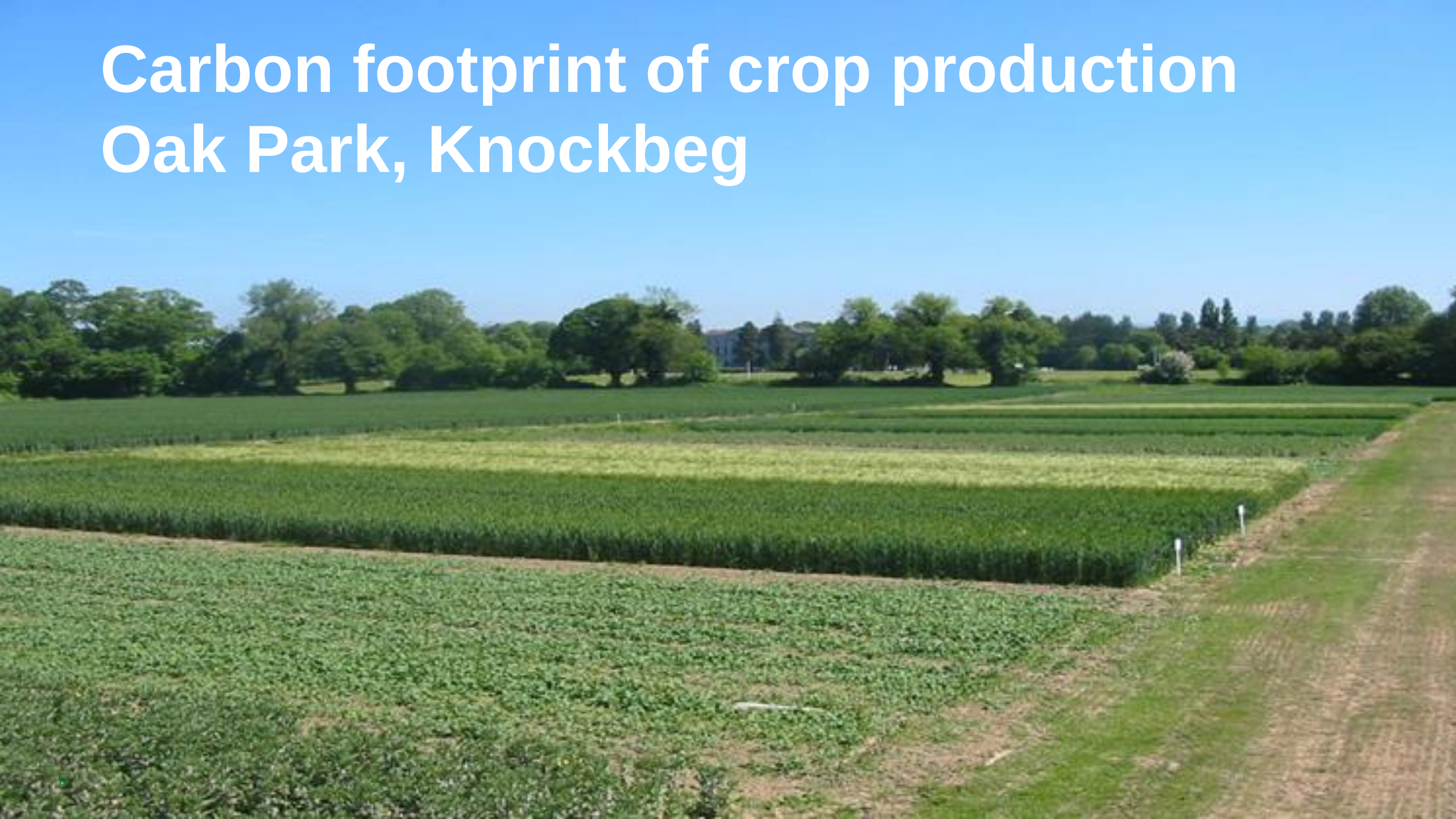
Selected Source	Emission factor used	Tier 1 factor
Chemical N application		
• CAN, NPK, Other	0.35% N	1.0% N
• Urea	0.27% N	1.0% N
• Protected Urea	0.20% N	1.0% N
Crop Residues	0.60% N	0.60% N
Organic materials application	0.60% x (organic N)	0.60% x (organic N)

Straw incorporation & carbon sequestration

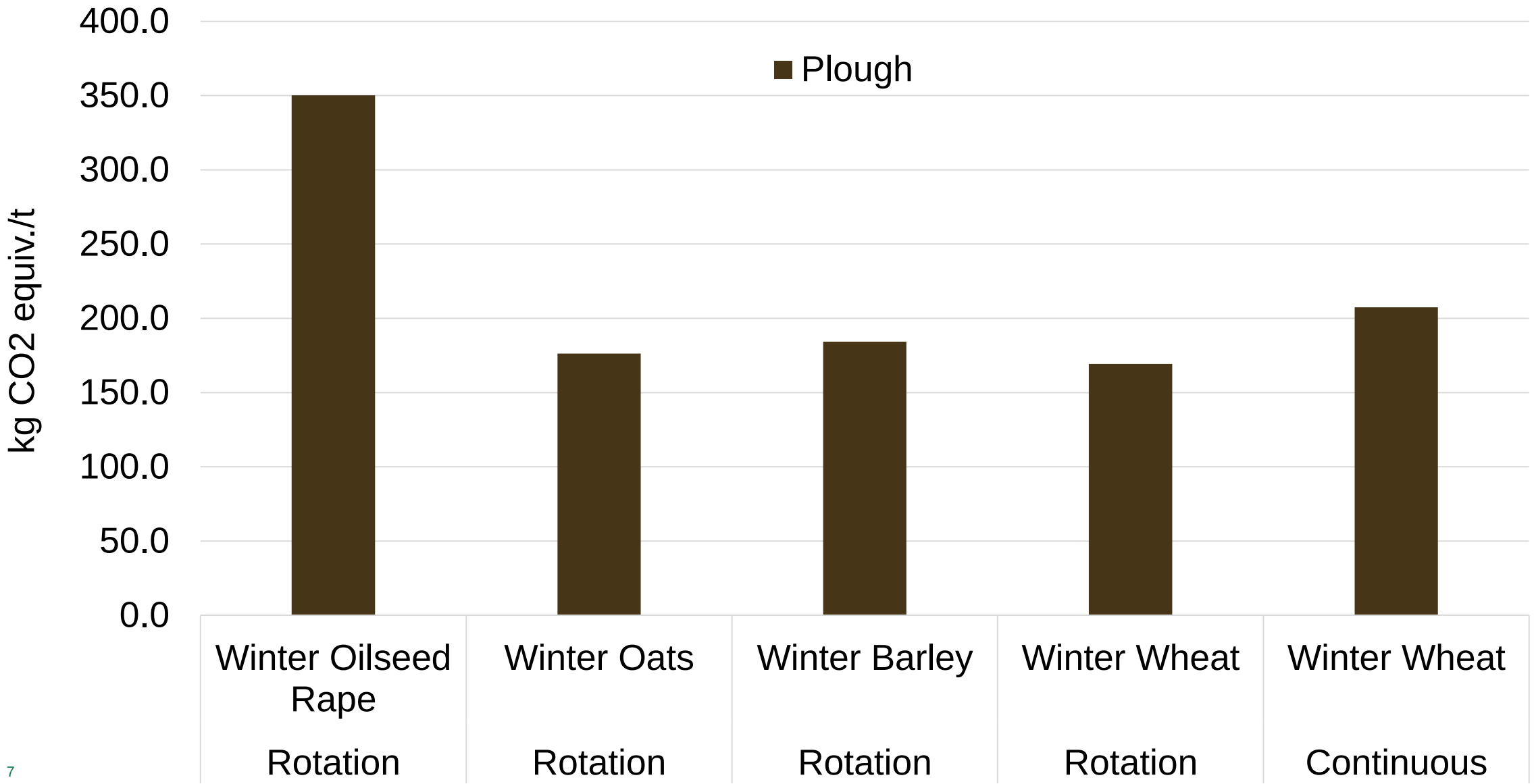


*Van Groenigen et al. 2011 – Straw yield, 4 t/ha

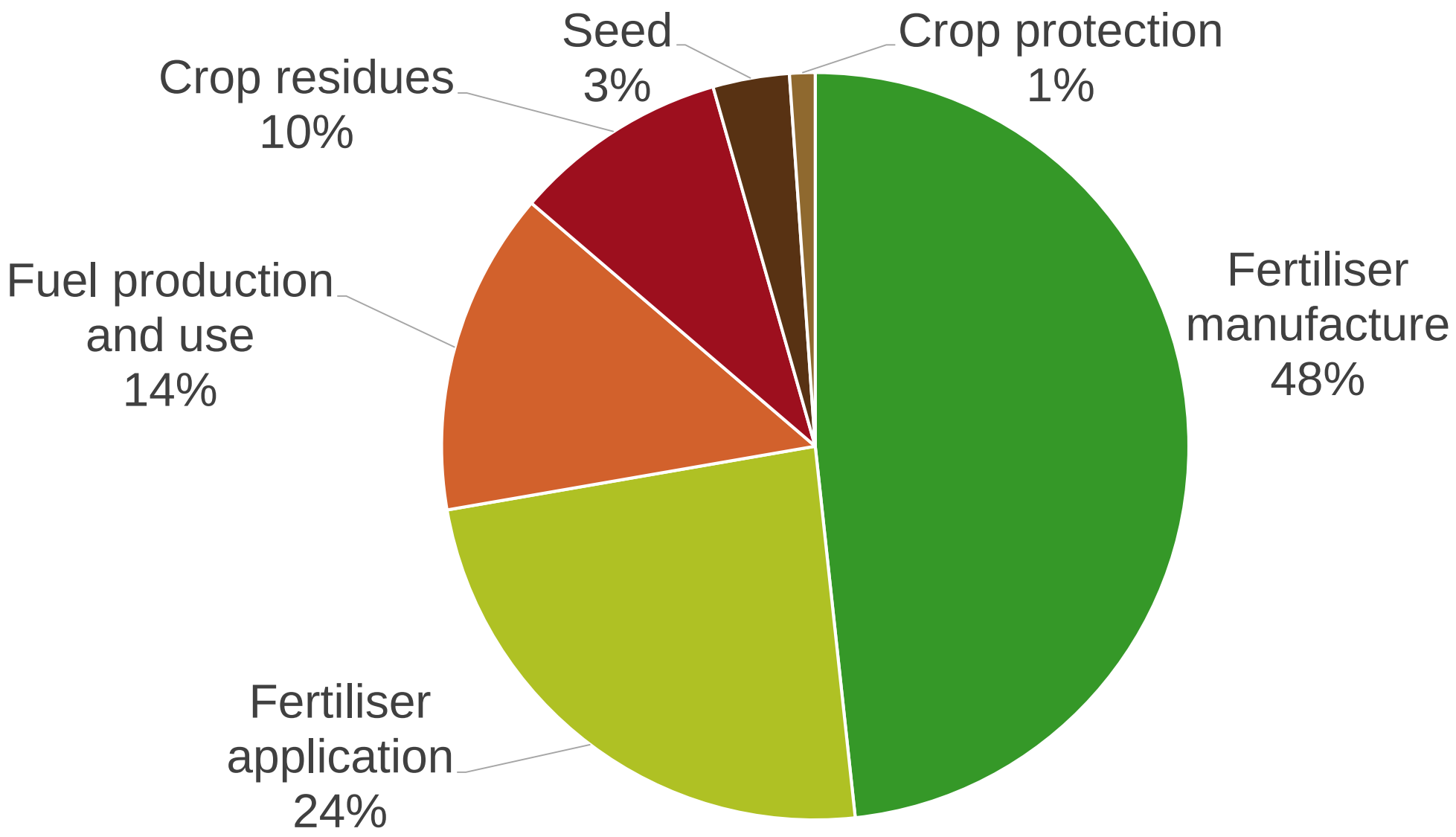
Carbon footprint of crop production
Oak Park, Knockbeg



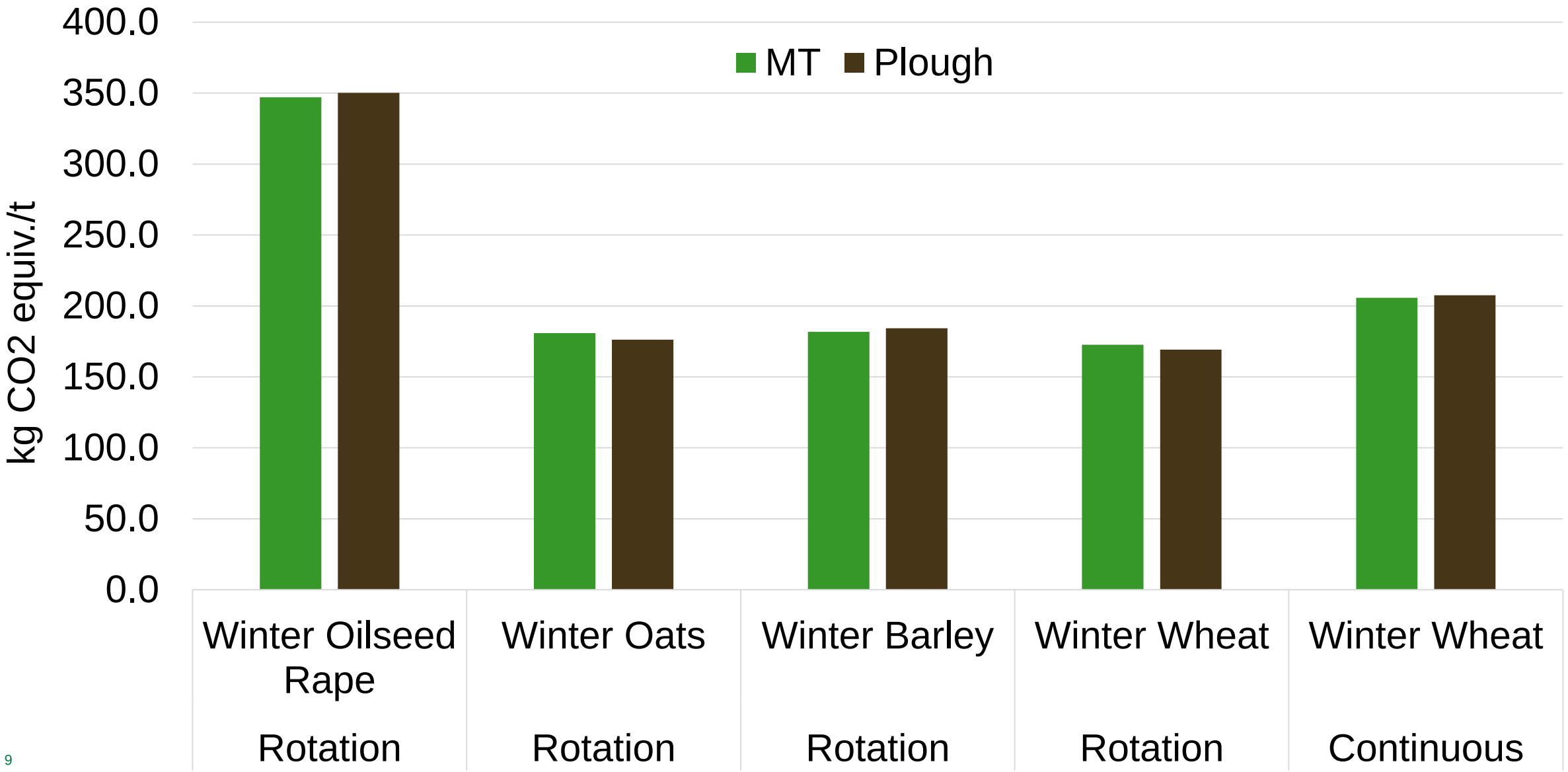
What is the C footprint of each crop in rotation?



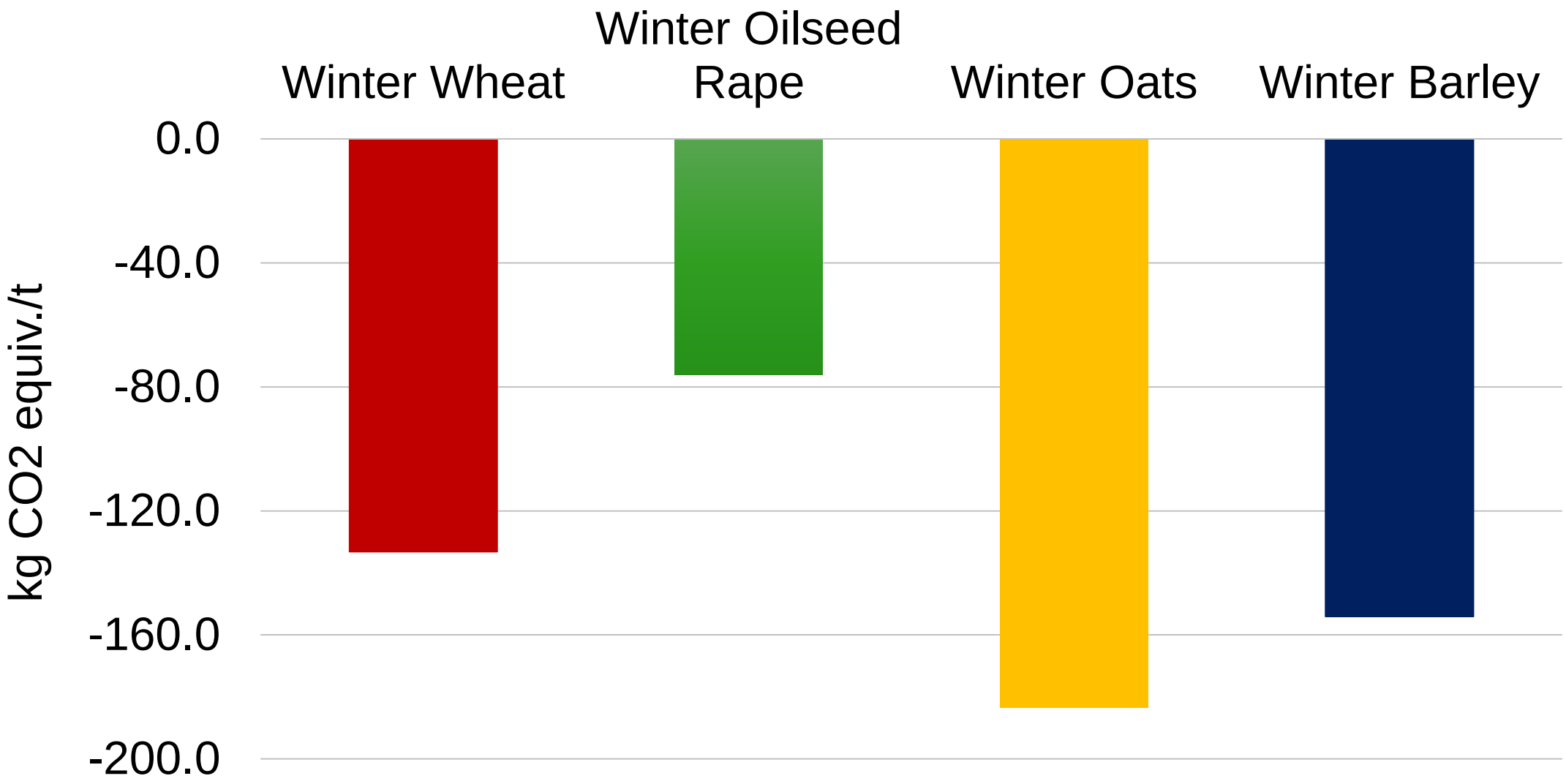
What contributes to the carbon footprint of winter wheat ?



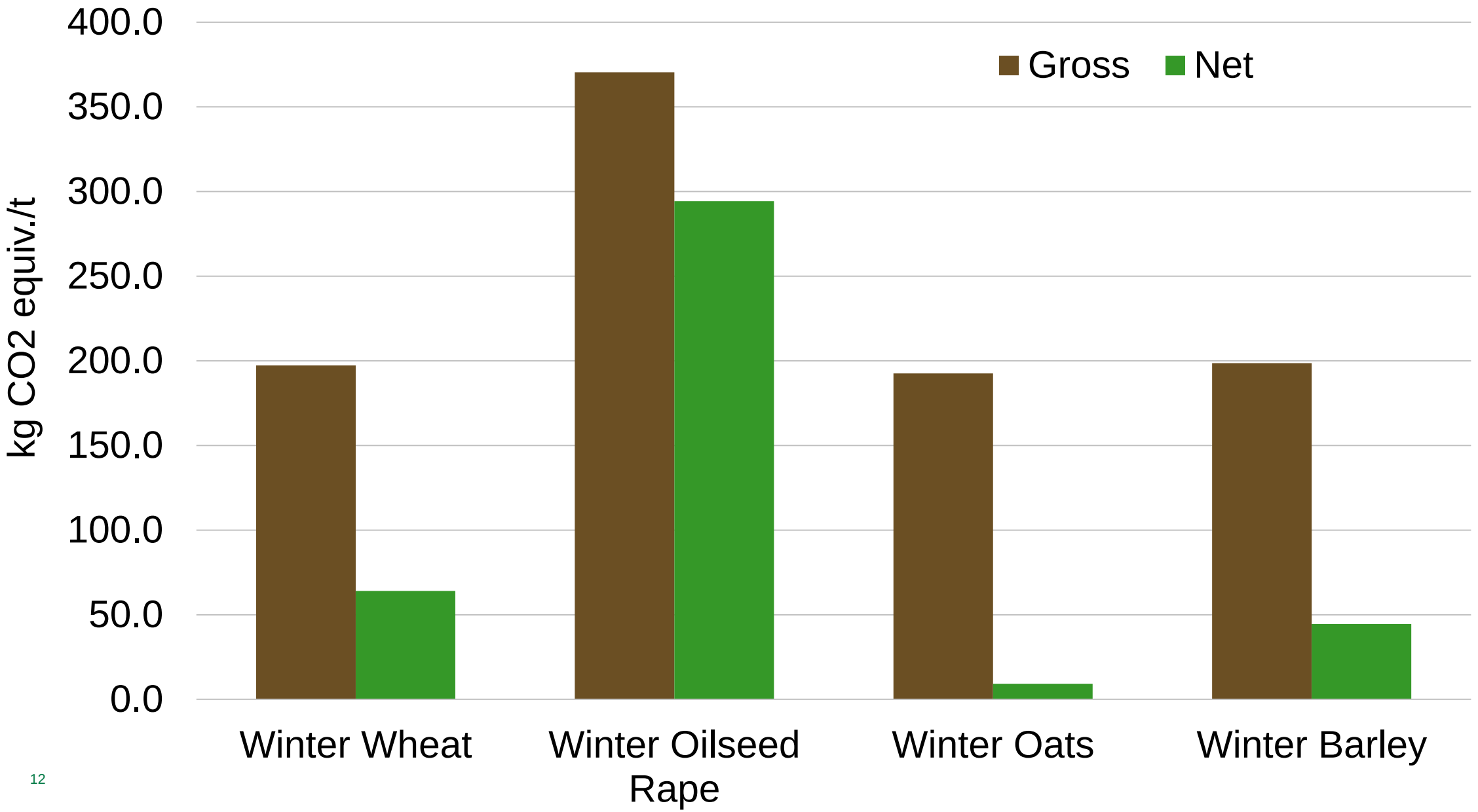
Influence of cultivation method on carbon footprint ?



Straw incorporation: C sequestration rate per crop ?



Straw incorporation: C footprint of crops ?



Conclusions

- N fertiliser use and yield main factors affecting Carbon Footprint
- Further research needed to refine some emissions factors
- Carbon footprint of Irish grain is low by international standards
- Endorsement of the sector’s credentials to stakeholders in the value chain

Thanks to

Tirlán

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