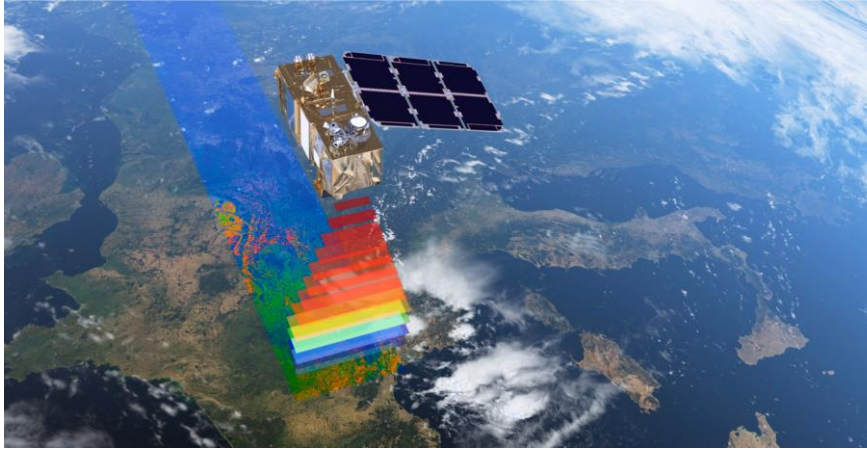



BIOCLEANTECH, Ottawa, 2nd November 2016

BioCleanTech to Meet Global Environmental and Social Goals

BIOCLEANTECH FORUM

Dr Norbert Schmitz, Managing Director, ISCC

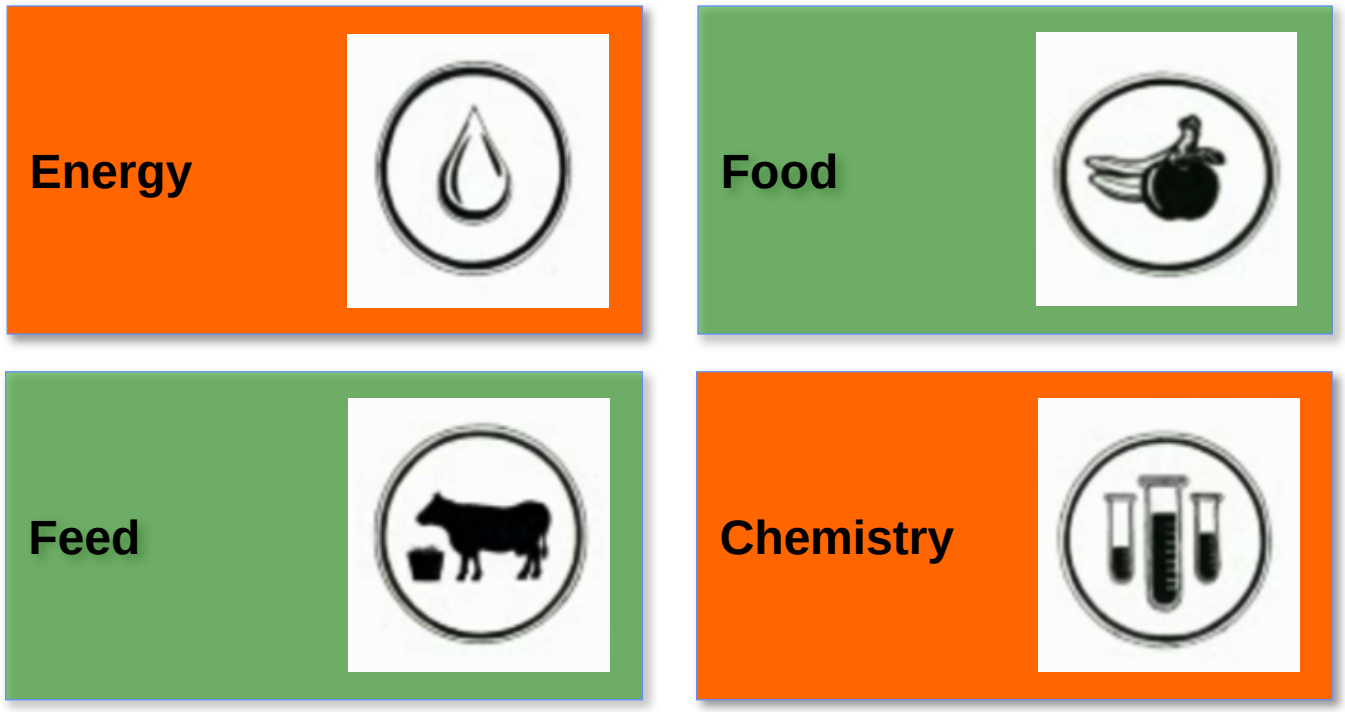
UN GLOBAL COMPACT WE SUPPORT

ISCC International Sustainability & Carbon Certification

Content

- **Global environmental and social market requirements**
- **Impact for growers and processors**
- **Sustainability certification of international supply chains**
- **GHG emission calculation and emission reduction in agriculture**
- **Certification 2.0: Land use change verification based on remote sensing data**

Sustainability has become a core building block for the use of biomass in energy, chemical and conventional markets



Energy markets I: Mandatory sustainability requirements for biofuels have been already implemented in the European Union

- Since 2011, mandatory sustainability requirements for biofuels are in place
- Renewable Energy Directive (RED) and Fuel Quality Directive (FQD) build legal framework for the implementation of renewable energy targets for the transport sector in the European Union
- Certification requirements based on legal requirements cover:
    - Sustainability requirements for biomass production and cultivation
    - Requirements for traceability and chain of custody
    - Requirements for greenhouse gas emission savings calculation methodology
- Sustainability criteria for solid biomass, such as wood pellets, are under discussion

Energy markets II: Ambitious legislation to cut GHG emissions in California

- With the signature of Senate Bill 32 in September 2016, California has now a very ambitious legislation to reduce GHG emissions
- SB 32 is mandating an additional 40% cut in emissions by 2030
- Successful GHG reduction program requires a system to monitor, report, and verify (MRV) GHG emissions to aid implementation and tracking of the effectiveness of emission reduction strategies
- Historically, the Low Carbon Fuel Standard (LCFS) has relied upon the fuel pathway application process
- CARB has been directed by its Board to consider a full range of sustainability parameters, considering a unified set of requirements covering the entire supply chain
- Mandatory third-party verification white paper presented in October 2016
- The objective of the verification program is to ensure integrity in the LCFS credit market through assurance of GHG reduction claims in the LCFS

Energy markets III: Set of sustainability criteria for eligibility of bio-jet fuels under Global Carbon Offset mechanism for aviation

- Early October 2016, an agreement has been reached by the 191 member states of the International Civil Aviation Organization (ICAO) to implement a market-based measure that will support airlines' efforts to stabilize emissions with carbon neutral growth
- ICAO's member states agreed to implement a Carbon Offset and Reduction Scheme for International Aviation (CORSIA). CORSIA is the first global scheme covering an entire industrial sector
- ICAO has a dedicated Alternative Fuels Task Force (AFTF) which is addressing the development of a set of Sustainability Criteria for eligibility of bio-jet fuels under a Global Carbon Offset mechanism for International Aviation
- Only bio-jet fuels compliant with the conditions of that ICAO sustainability global framework will be recognized for reducing the airline's obligations under the global aviation carbon offset system

Chemical markets: Companies replacing fossil-based raw materials with renewable alternatives to reduce carbon footprint

Example

- Elopak launched beverage cartons featuring certified renewable polyethylene (PE) in 2014. Elopak has been the first company to offer beverage cartons with renewable coating to the European market
- Elopak uses second generation renewable PE, made of European-sourced biomass not in competition with food supply
- An increased use of renewable PE helps to reduce one of the largest sources of CO2 emissions in the beverage carton value chain
- Elopak aims to replace all fossil-based raw materials with renewable alternatives as part of its strategy. In June 2016, Elopak became a CarbonNeutral® company and can offer CarbonNeutral® packaging to its customers
- The renewable PE is certified through the entire value chain, by the International Sustainability and Carbon Certification system. ISCC sets strict requirements for sustainability and traceability through the entire value chain

ELOPAK
Together we make packaging work

Soure: Elopak

Food market requirements: An increasing number of companies commit to social sustainability and zero-deforestation targets

Examples

… to ensure that products have not led to deforestation and that Nestlé and its suppliers are responsible stewards of the forests and forested areas from which they are sourcing materials

Working with governments and other partners to embed no-deforestation objectives into national and international policies. Unilever considers the advancement of women's rights and women's economic inclusion as priority

McDonald's is committed to eliminating deforestation from its global supply chains and to ensure fair and ethical workplace standards in every corner of the supply chain. It promotes responsible production that benefits people, communities and the planet.

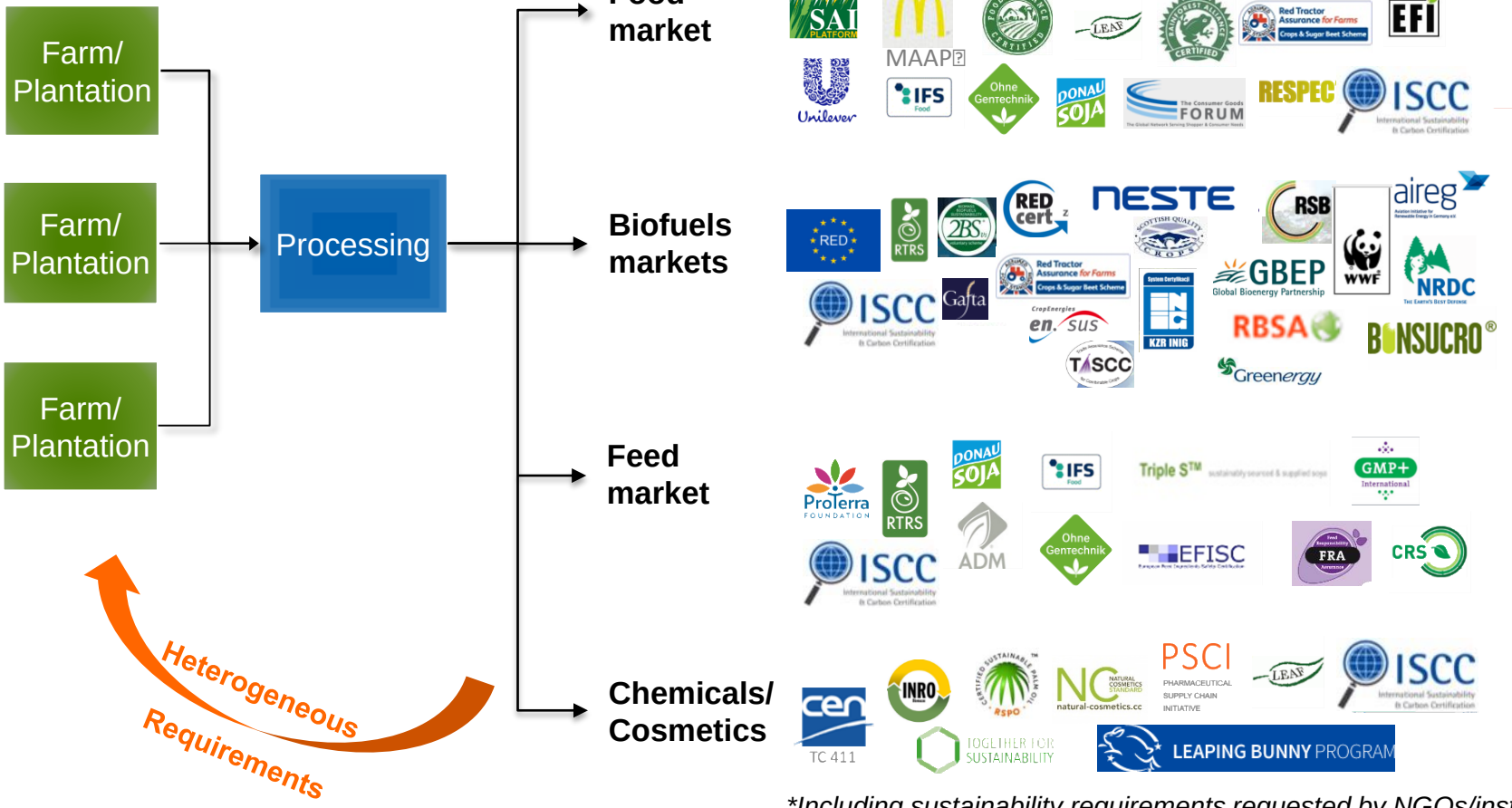
Deforestation policy targets four raw materials with the greatest impacts on forests: beef, palm oil, pulp and paper and soy. By 2020, these supply chains will be deforestation free

Coca Cola introduced principles to establish human and workplace rights, environmental stewardship and farm management criteria – including asking suppliers to protect the rights of communities to maintain access to land and natural resources

Starbucks supports a zero-tolerance approach to deforestation. Committed to improve ethical sourcing in coffee and throughout the supply chain, to serve their communities and engage young people

Feed market requirements: European Feed Association (FEFAC) committed to responsibly produced soy

Companies looking for sustainability standards encounter a fragmented landscape



*Including sustainability requirements requested by NGOs/institutions

This fragmented landscape is causing quite some headache for operators

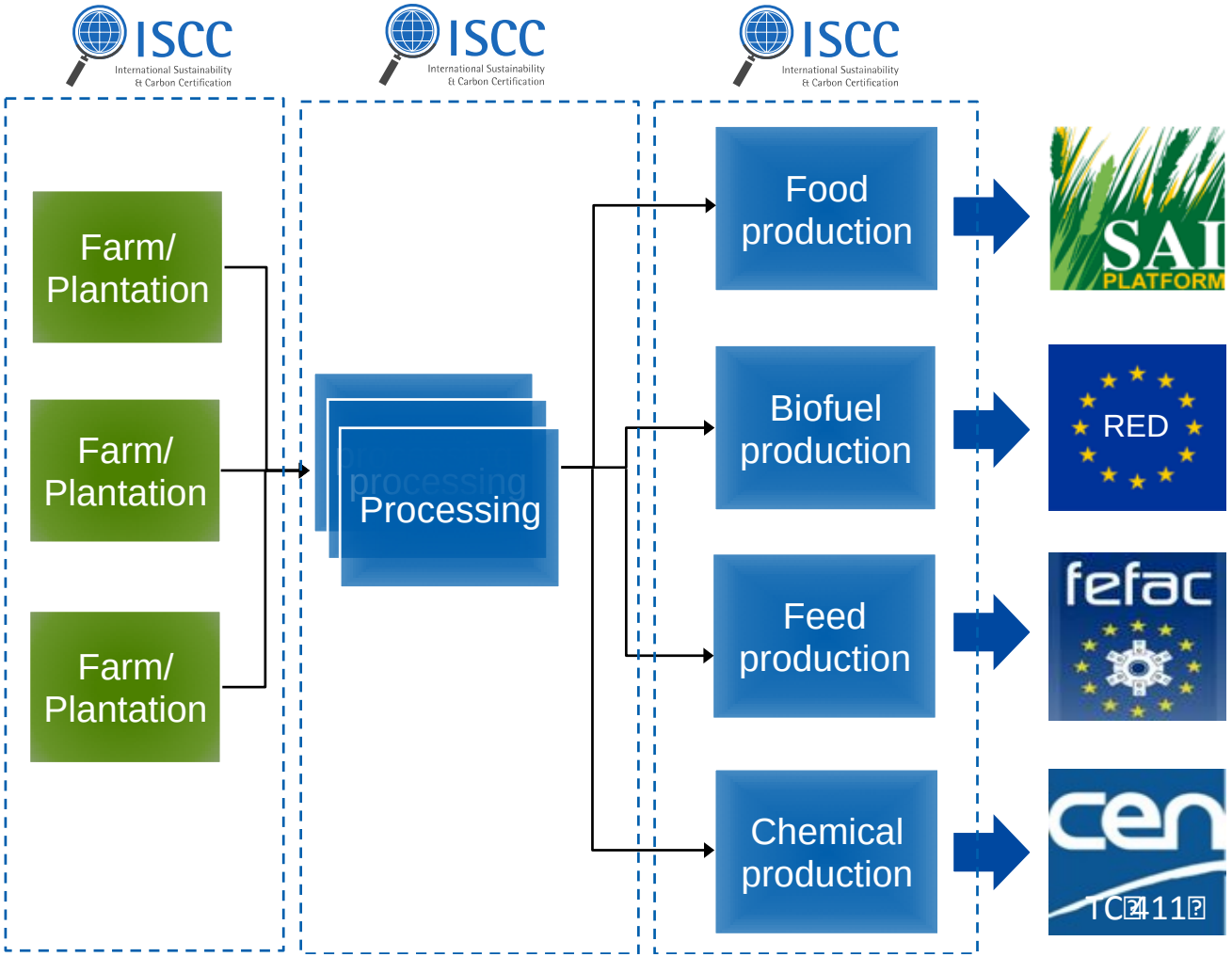
Challenges for companies

- Sustainability requirements differ between and within market segments
- Even if similar sustainability requirements are phrased and structured differently
  - In depth know-how required
  - Open to misinformation and misunderstanding

➡ Multiple certificates needed

- Multiple costs
- Increasing time and effort for training, bookkeeping and operation
- Increasing risks

ISCC is a one stop solution for all crops and markets



ISCC is being used by companies in more than 100 countries. More than 12,500 certificates have been issued so far

System users in 100+ countries

12,500+ certificates

3,000+ system users

33 certification bodies

630+ ISCC trained auditors

52 Trainings (Basic, PLUS, GHG, LUC, Waste)

Stakeholder dialogue: 86 ISCC Association members

Strong regional stakeholder dialogue: 5 TCs

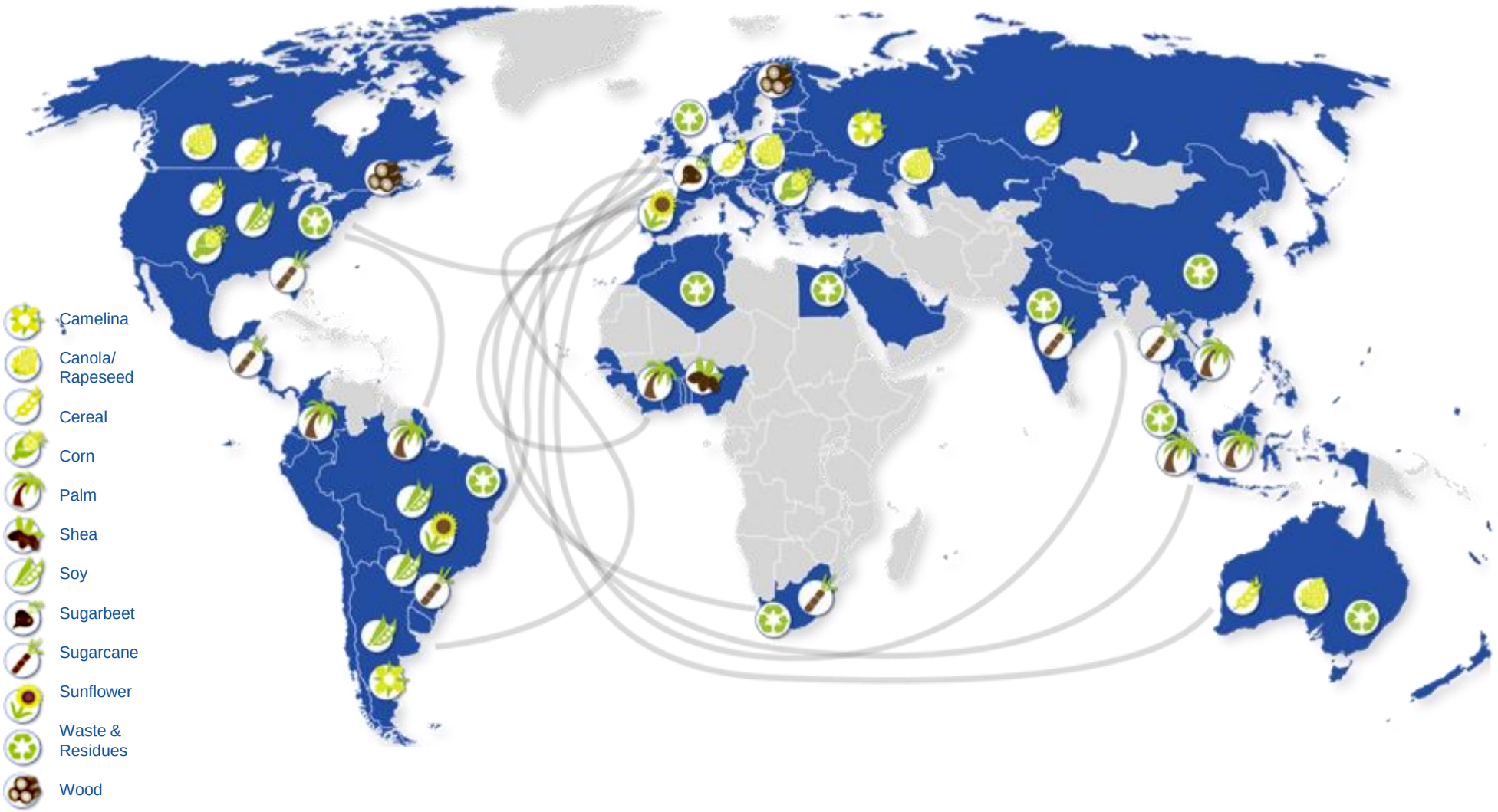
Integrity Program 3 auditors

Innovative feedstocks (low iLUC, non-bio renewable, etc.)

New procedures (e.g. on co-processing)

280+ ISCC PLUS certificates

ISCC is a leading multi feedstock certification system for sustainable and deforestation free supply chains

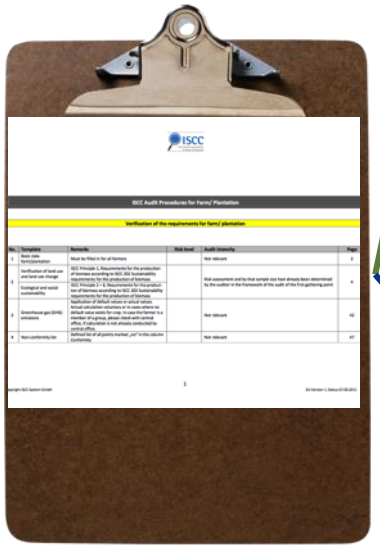


ISCC International Sustainability & Carbon Certification

Example ISCC system user in Canada: Viterra with more than 1,000 growers certified in Manitoba, Saskatchewan, and eastern Alberta

Source: Viterra

ISCC certified producers comply with a set of ecological and social criteria. Traceability is secured along the whole supply chain

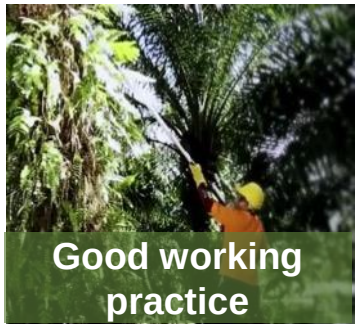


Mandatory controls

At plantation, farm or forest management unit:

Protection of biodiversity

Preservation of carbon sinks



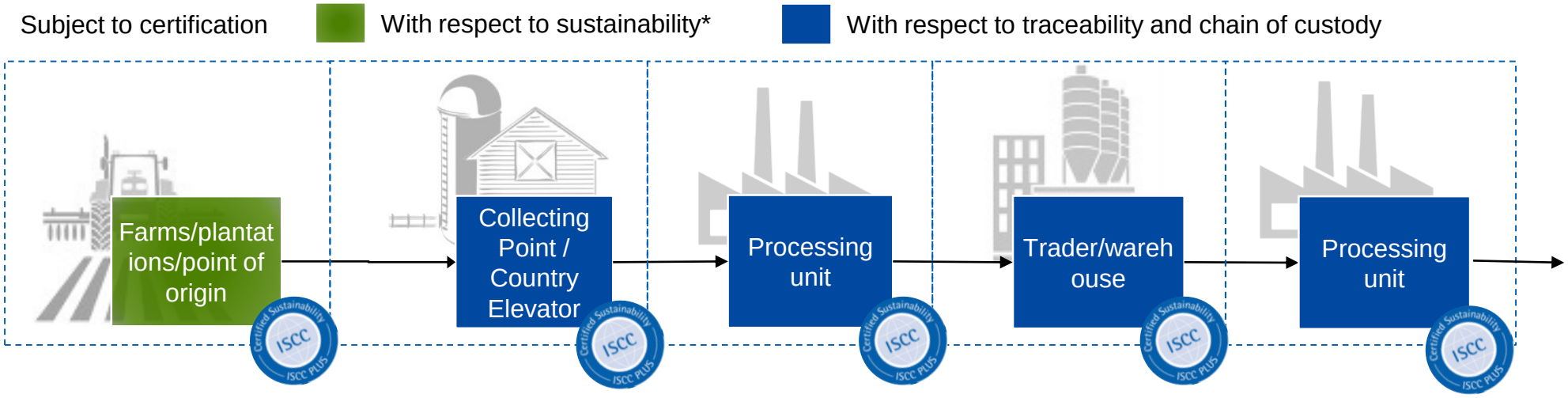
Good working practice

Human and social rights

Along the supply chain:

Traceability, and greenhouse gas emissions

An independent third-party certification is always conducted to show compliance with the ISCC requirements

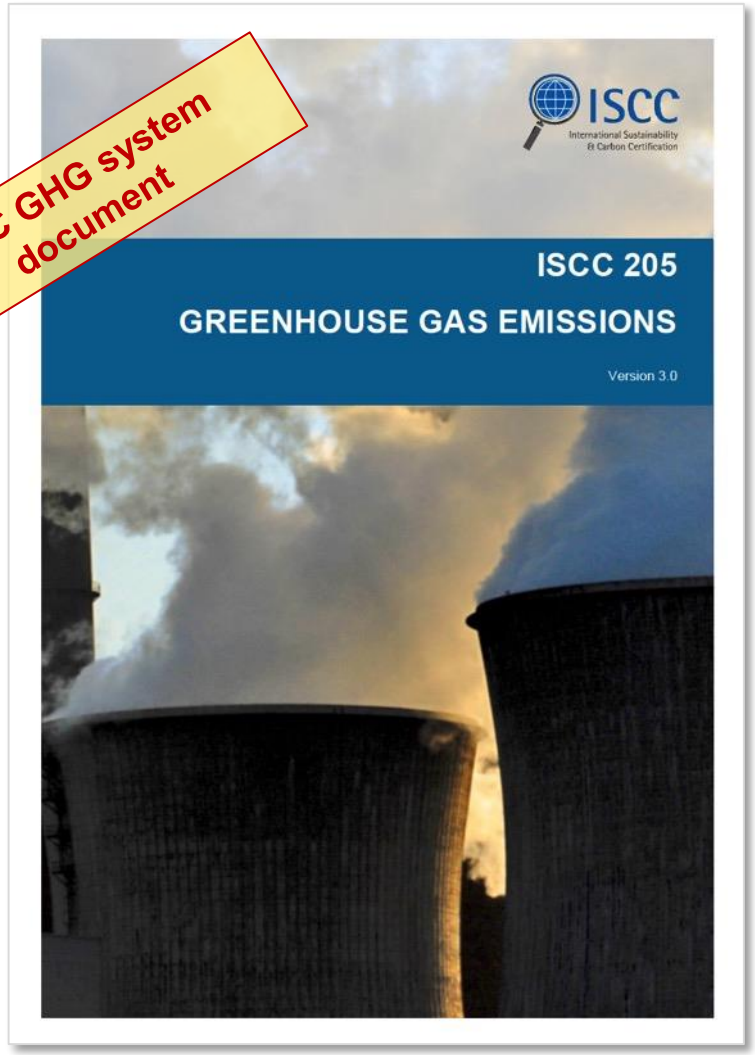


Advantage:

Instead of auditing an entire value chain each player can source sustainable material from any certificate holder

* Certification as part of the First Gathering Point/ Group certification or individual certification

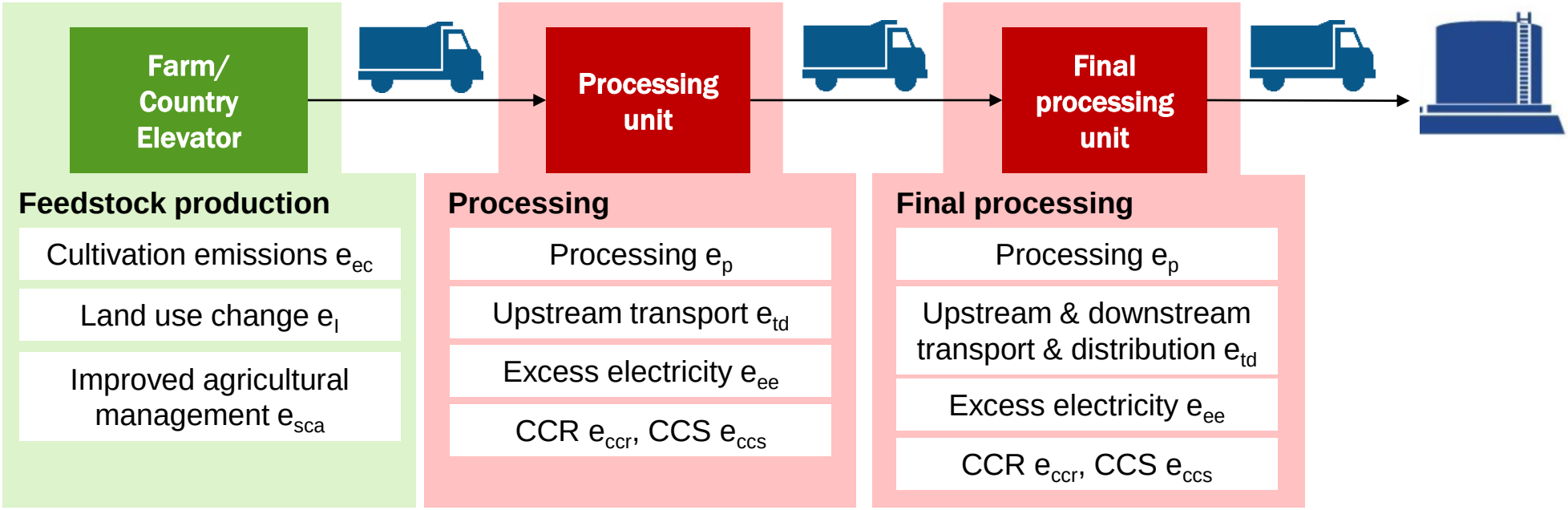
ISCC uses a comprehensive methodology to do actual GHG calculations



$$E = e_{ec} + e_{l} + e_{p} + e_{td} + e_{u} - e_{sca} - e_{CCS} - e_{CCr} - e_{ee}$$

E	Total GHG emissions from supply and use of the fuel (in g CO_{2eq}/MJ)
e_{ec}	GHG emissions from the extraction or cultivation of raw materials
e_{l}	Annualized (over 20 years) GHG emissions from carbon stock change due to land use change
e_{p}	GHG emissions from processing
e_{td}	GHG emissions from transport and distribution
e_{u}	GHG emissions from the fuel in use (shall be taken to be zero
e_{sca}	GHG emissions savings from soil carbon accumulation via improved agricultural management
e_{ccs}	GHG emissions savings from carbon capture and geological storage
e_{ccr}	GHG emissions savings from carbon capture and replacement
e_{ee}	GHG emissions savings from excess electricity from cogeneration

Individual calculation of actual GHG values along the supply chain elements where emissions appear

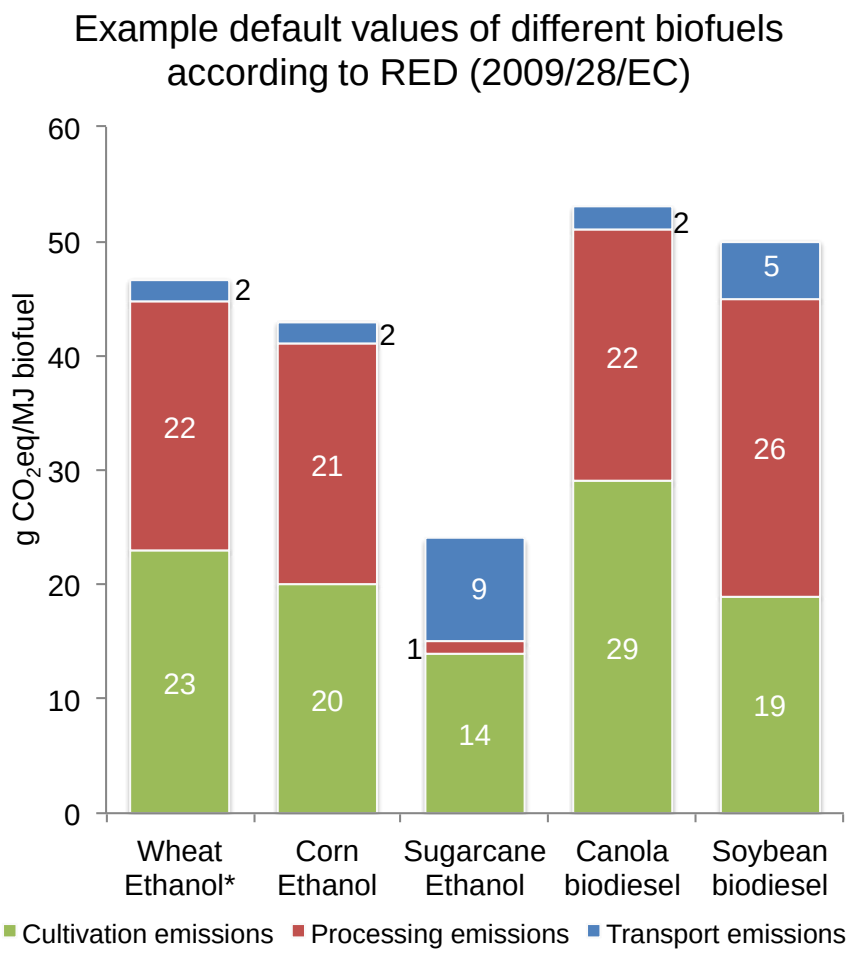


Use of actual GHG values

- Farms/plantations or CE do actual calculations for cultivation; processing units do actual calculations for processing and upstream transport; final processing unit also for downstream transport and distribution
- **Verification** of correct application of ISCC methodology for each calculation formula element

The greenhouse gas (GHG) emissions from cultivation of feedstocks have a major impact on products' overall GHG emissions

Impact cultivation on overall GHG emissions

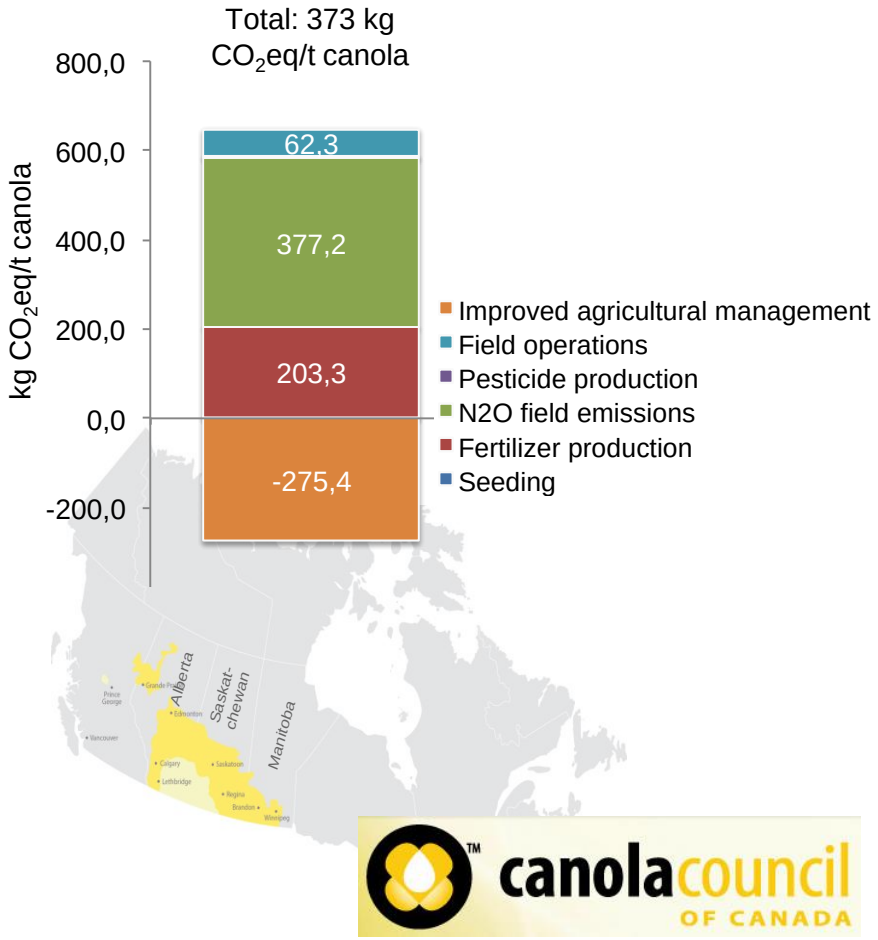


- In average, cultivation emissions account for about 30% to 60% of total biofuel greenhouse gas emissions
- In most supply chains, they have a much higher impact compared to processing and transport
- Main influencing factor of cultivation emissions are Nitrogen fertilizers
  - Mineral Nitrogen fertilizers contribute through production emissions (Mining, extraction, processing)
  - Mineral, as well as organic Nitrogen fertilizers and crop residues contribute to on field N_2O emissions (after application)
  - The climate impact of N_2O is 298 times higher than CO_2
- Further influencing factors are diesel use during cultivation, other fertilizers (Phosphorus, Potassium), pesticides, seeds

*Average for processing technology

On behalf of Canola Council of Canada, typical GHG emissions for canola cultivation in Canada have been calculated to facilitate certification and exports

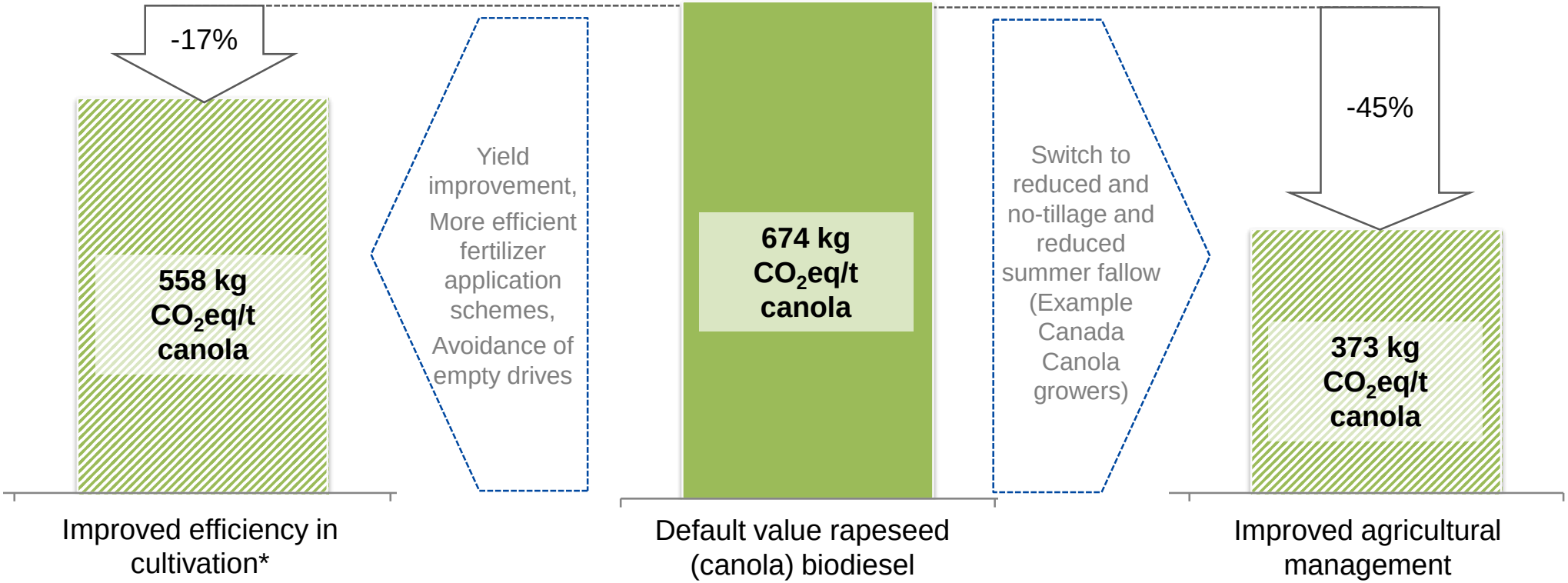
Cultivation emissions of canola in Canada



- Study performed by Meo Carbon Solutions and (S&T)2 on behalf of Canola Council Canada
- Regional GHG emission values for canola cultivation were calculated in eight reconciliation units in the Canadian canola growing regions
- Emissions from cultivation as well as improved agricultural management have been taken into account
- Total emissions vary between 145 and 671 kg CO_2eq/t canola. In average the GHG emissions account 373 kg CO_2eq/t canola
- Report “Regional greenhouse gas emissions from cultivation of canola for use as biofuel or bioliquid” was submitted to European Commission for recognition under the EU RED

*Canola Council Canada (2016): Regional greenhouse gas emissions from cultivation of canola for use as biofuel or bioliquid

Depending on the type of measure, reductions of emissions in cultivation up to 50% are possible, enabling canola biodiesel to meet EU RED GHG requirements



*Reflected by regional GHG (NUTS2-) values in Europe

Global Risk Assessment Services (GRAS) is a remote sensing tool to implement site- and region-specific sustainability risk analysis & land use verification

GRAS
Global Risk Assessment Services

With GRAS sustainability can be checked from your desktop

Web-Tool

Biodiversity

Land Use Change

Carbon Stock

Social Indices

ISCC
International Sustainability & Carbon Certification

GRAS has been developed to facilitate sustainability analysis and increase credibility

Supported by

Gefördert durch:

Bundesministerium für Ernährung und Landwirtschaft

aufgrund eines Beschlusses des Deutschen Bundestages

FNR Fachagentur Nachwachsende Rohstoffe e.V.

Core Team

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ISCC International Sustainability & Carbon Certification

DLR

The Nature Conservancy Protecting nature. Preserving life.

ifw

wabion led by sense

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ERC ENERGY RESOURCES CENTER

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Agriculture and Agri-Food Canada

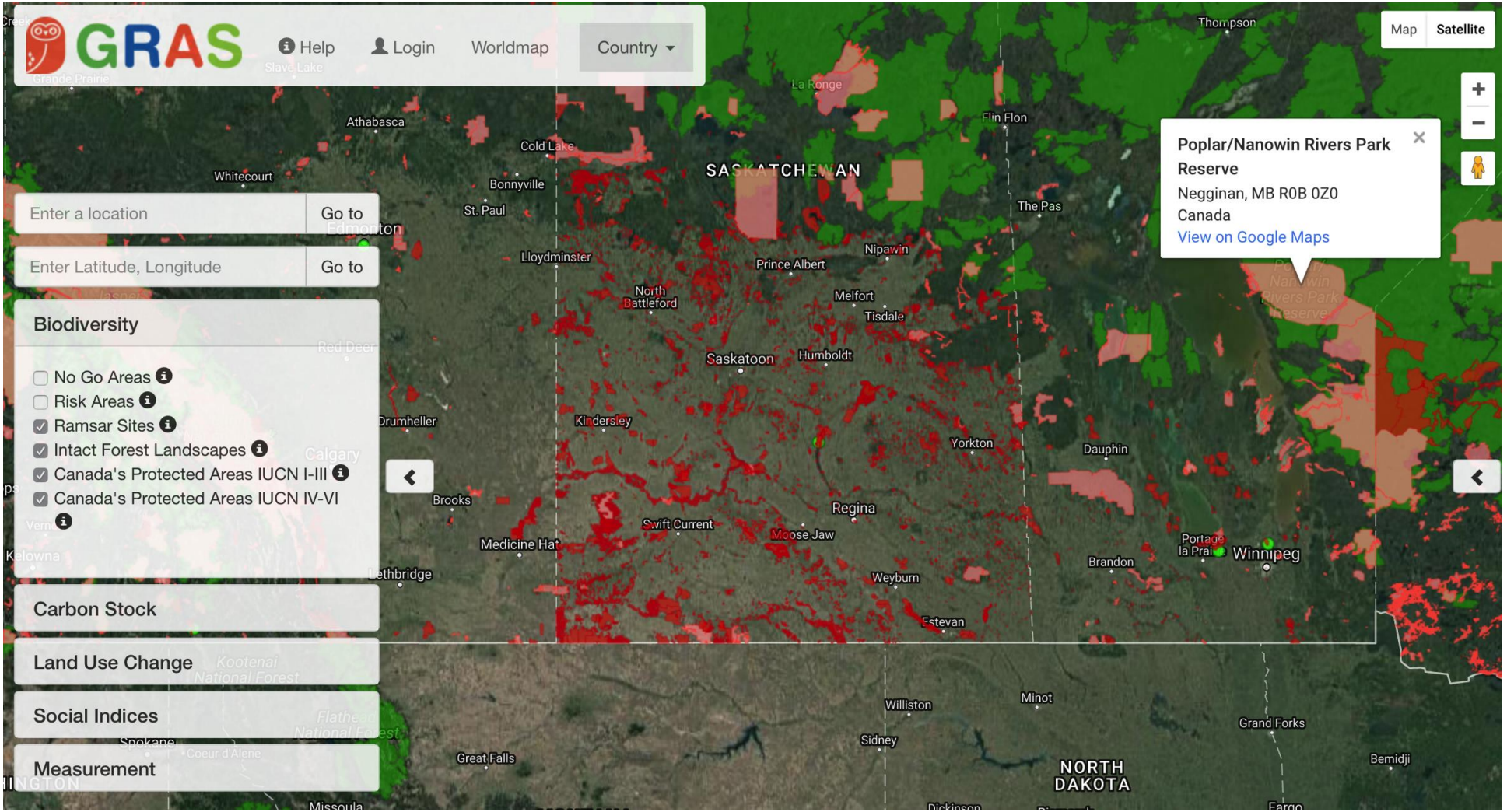
Agriculture et Agroalimentaire Canada

CASA DA FLORESTA

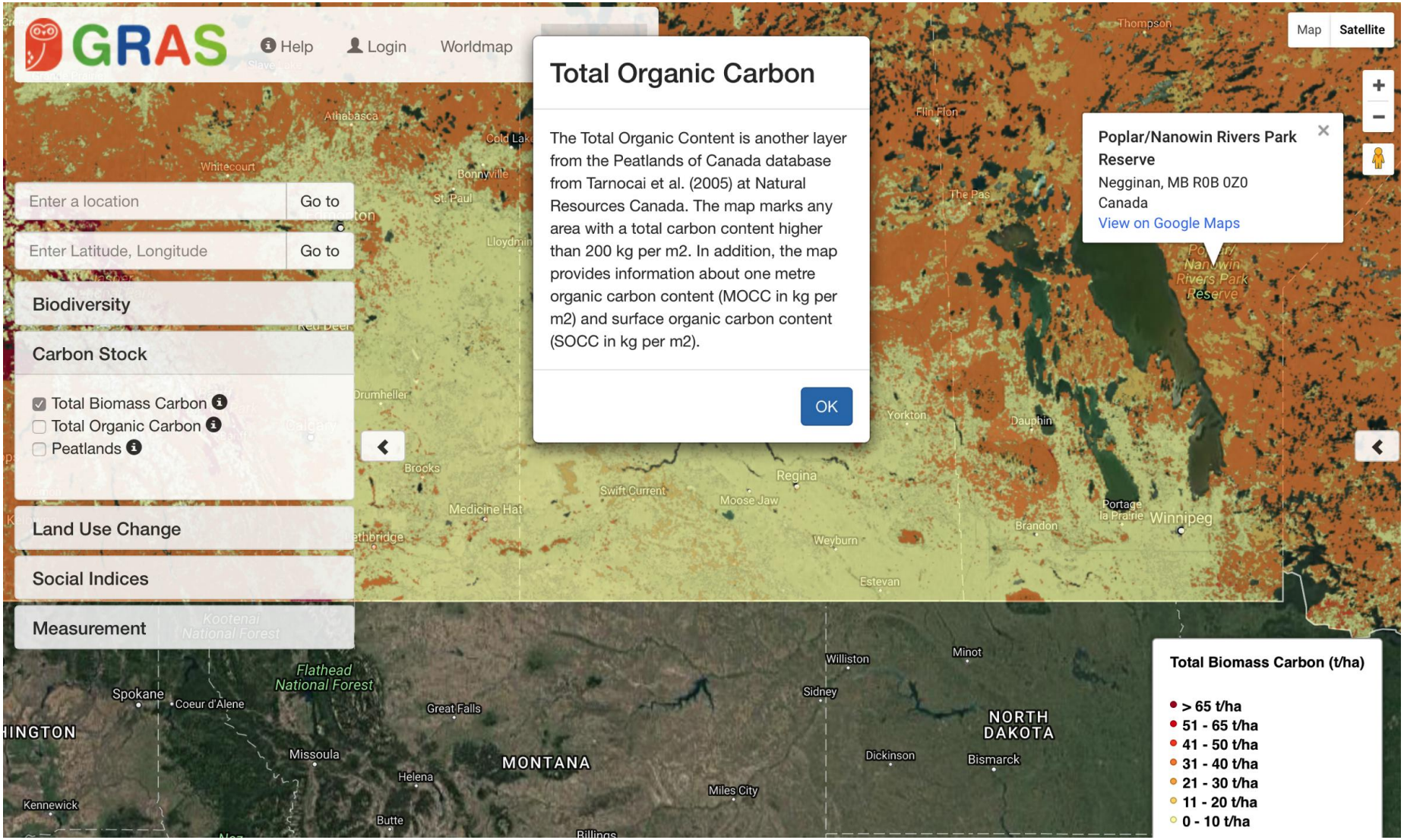
BirdLife INTERNATIONAL EUROPE AND CENTRAL ASIA

Partnership for nature and people

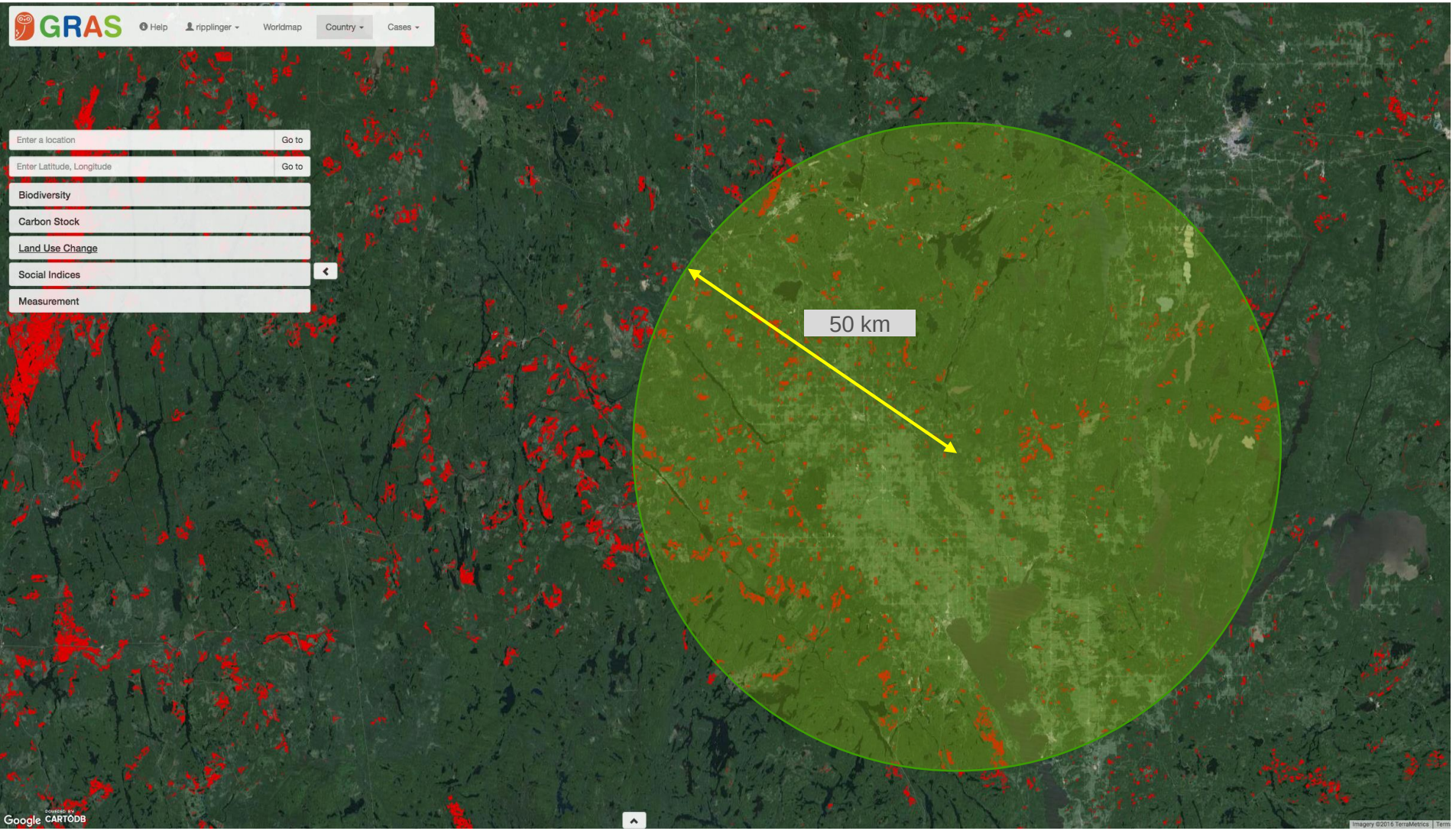
GRAS provides information about no go and risk areas



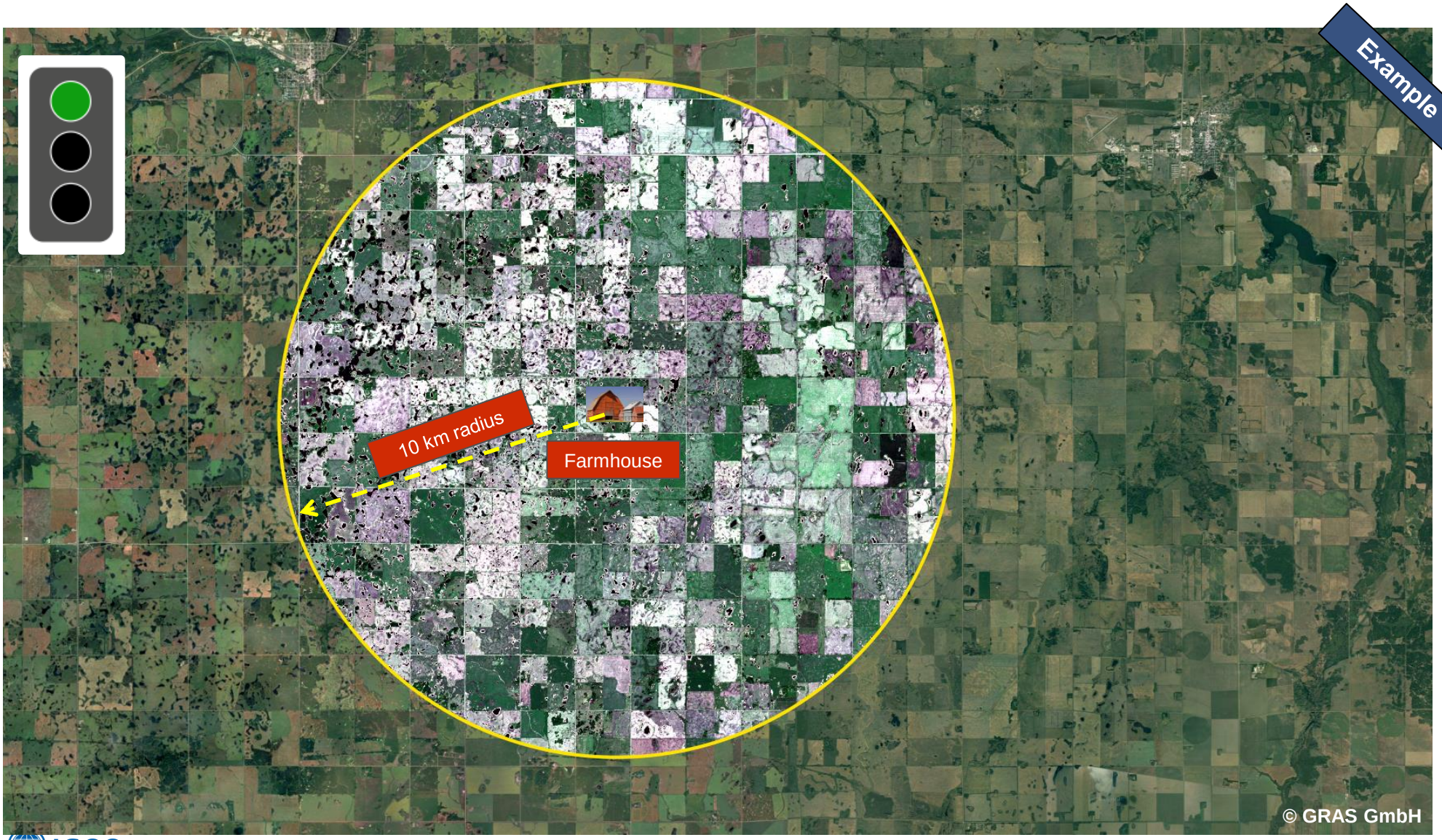
GRAS displays different maps showing carbon stock and peatlands in Canada



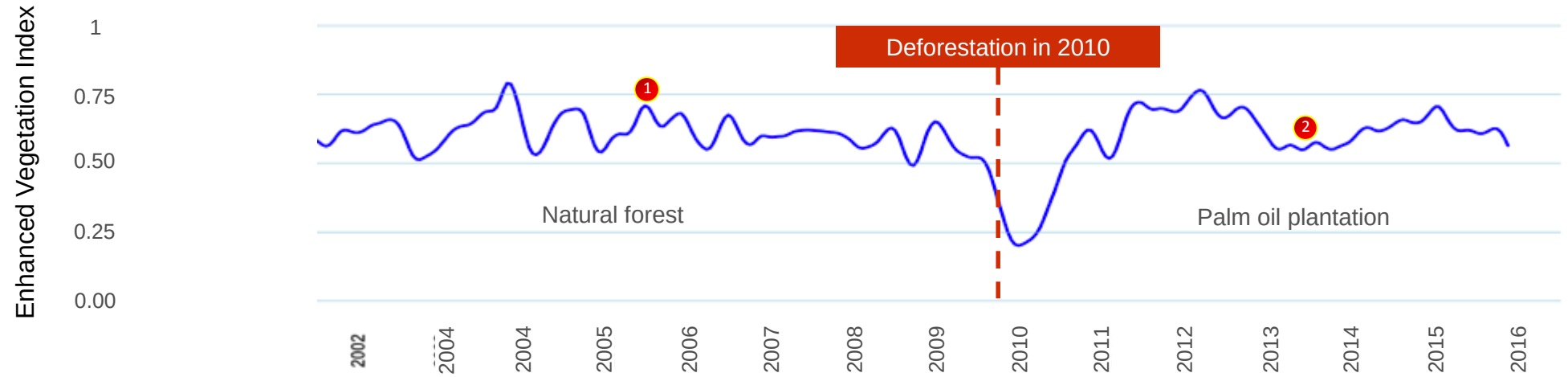
Sourcing areas can be analysed according to sustainability risks. This map shows land use change within the sourcing region

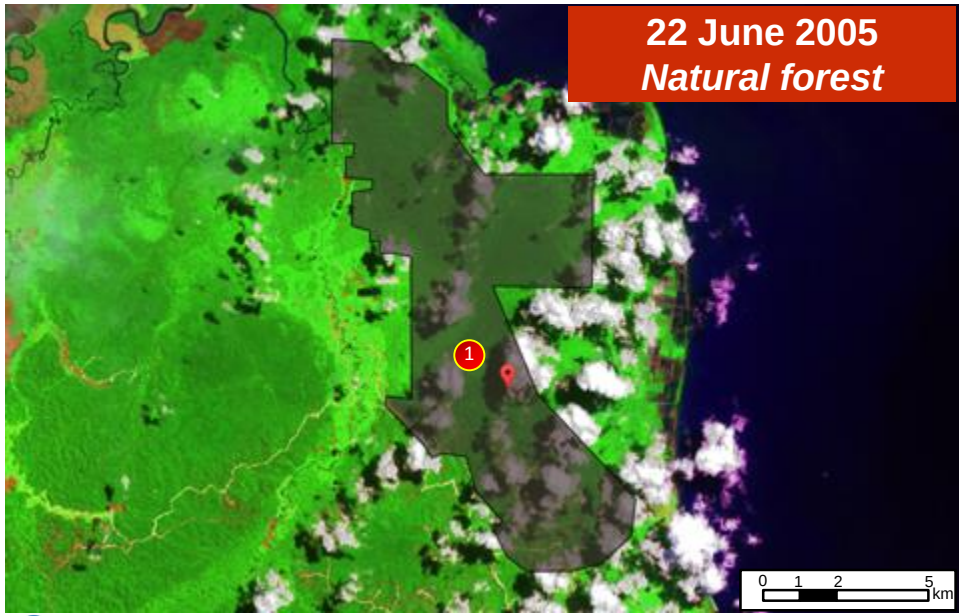


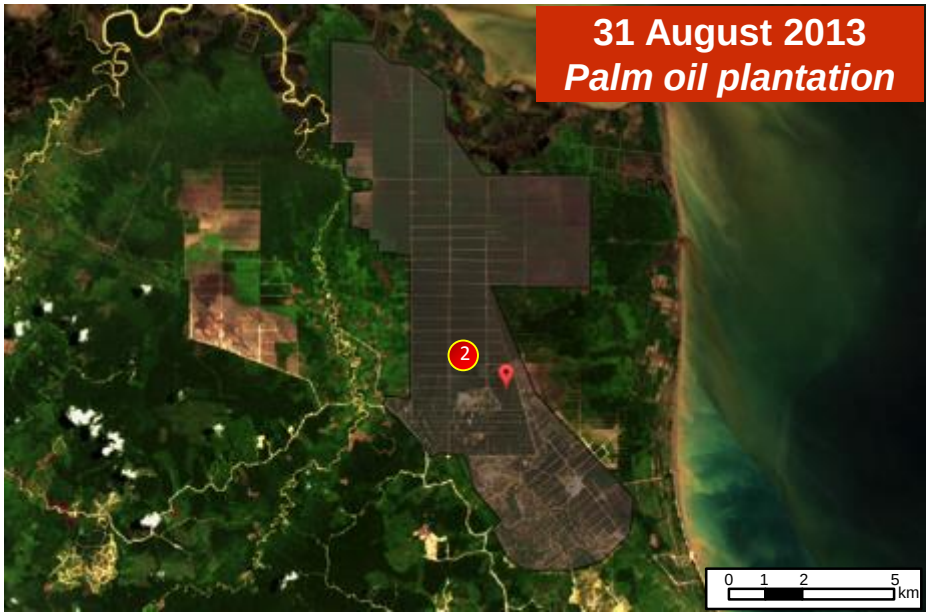
Example of No Risk Sourcing Area in Canada: No LUC has been detected



Example palm: GRAS identifies when palm plantations were installed and distinguishes between replantation and deforestation







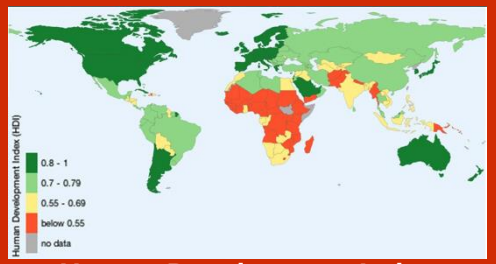
GRAS provides information on many kind of social indices and compiles them into a GRAS Social Factor

THE GLOBAL SLAVERY INDEX

GLOBAL HUNGER INDEX

International Labour Organization

UNICEF Access to Drinking Water and Sanitation



Human Development Index

Environmental Performance Index

WORLDWIDE GOVERNANCE INDICATORS

GRAS Global Risk Assessment Services

GRAS Social Factor

A sustainability risk factor can be calculated for each sourcing area. They can be ranked according to their risk

Calculate risk factor of assessed sourcing areas

$Factor_{Biodiversity}$		0.03
$Factor_{Carbon}$		0.72
$Factor_{LUC}$		0.27
$Factor_{Social}$		0.26
GRAS Index	GRAS Global Risk Assessment Services	**0.31**

Weighting Factors

Factors	Weighting factor (WF)
Biodiversity	0.35
Carbon Stock	0.15
Land Use Change	0.35
Social	0.15

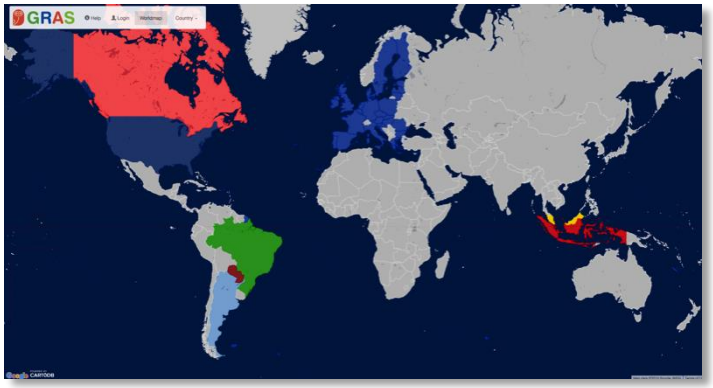
Risk level of the GRAS Index

< 0.2	0.2 – 0.4	> 0.4
Low Risk	Medium Risk	High Risk

GRAS is an independent and comprehensive web-tool for risk assessments, land use change assessments and mapping of supply chains

GRAS Services

- **Mapping** of:
  - Supply chains (e.g. palm oil or soy)
  - Biodiversity and protection areas
  - Carbon stocks (e.g. peatlands)
  - Land Use Change (e.g. deforestation, grassland)
  - Social indices
- Calculation of **sustainability risk factors and** sustainability **rankings**
- **Monitoring of sourcing regions** and smallholder development
- **Certification support**
- Provision of sustainability **assessment reports**
- **Customized solutions** (e.g. supply chain mapping)
- **Quarterly updates**



GRAS currently covers 35 countries

Contact

Dr Norbert Schmitz
ISCC System GmbH
Hohenzollernring 72
D-50672 Cologne, Germany
Email: schmitz@iscc-system.org
Tel: +49 221 3799 8487
Fax: +49 221 941 5863

ISCC
International Sustainability & Carbon Certification