



# Camelina - Sustainable Feedstock

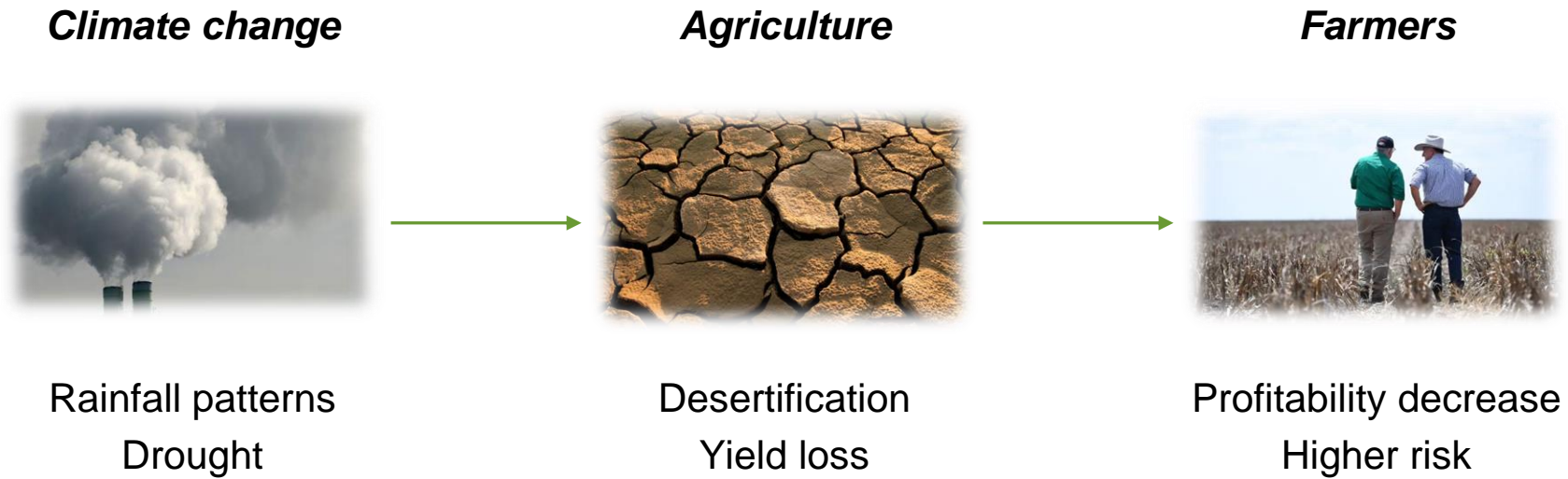
September 2023



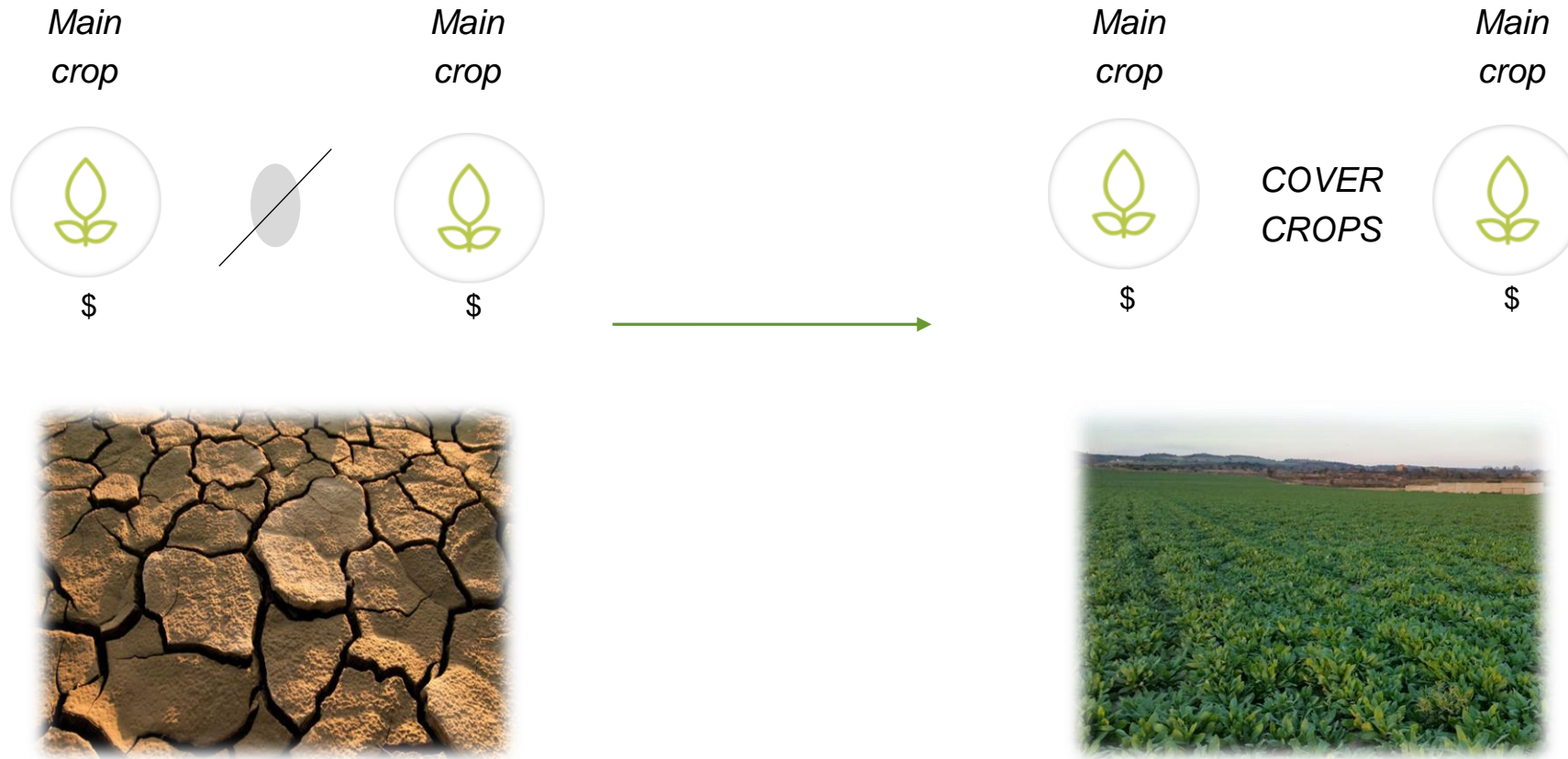
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# Farmer Profitability?



# Cover Crops

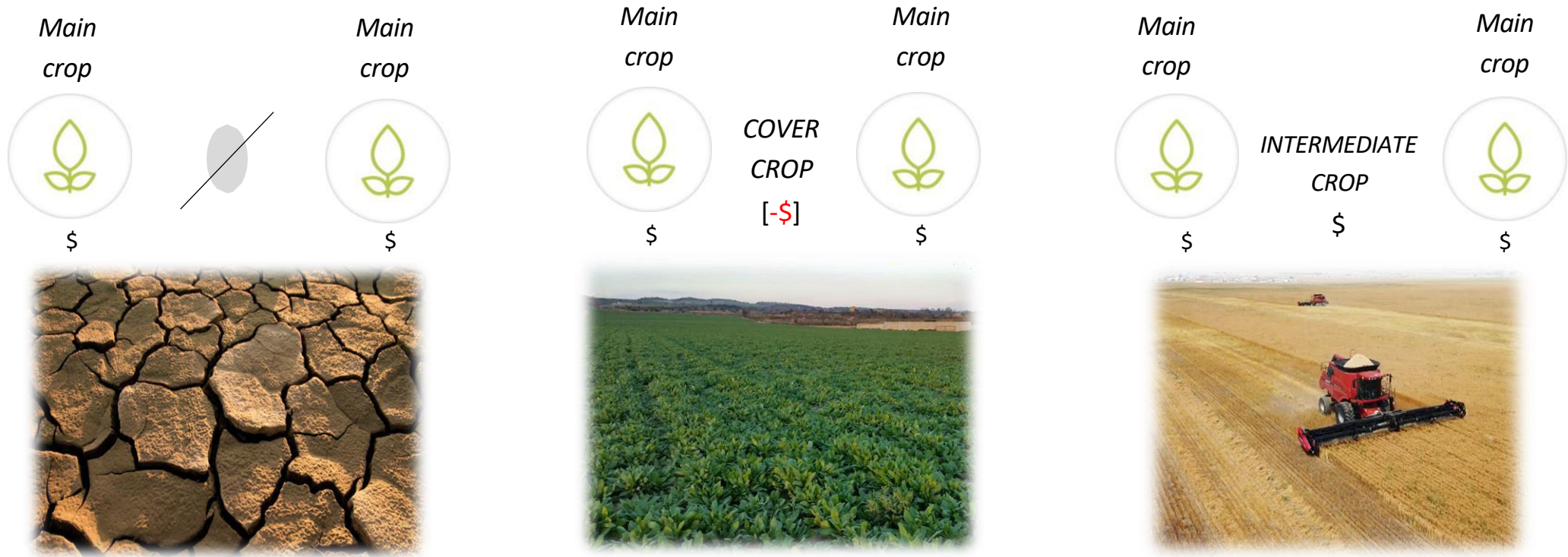


Cover crops are grown between successive production crops to provide ground cover, capture soil nutrients, improve soil characteristics and benefit the following crop.



# Opportunity – Intermediate Crops

Intermediate crops provide cover crop benefits but can be harvested allowing additional income for growers **and** providing additional renewable fuel feedstock supply.

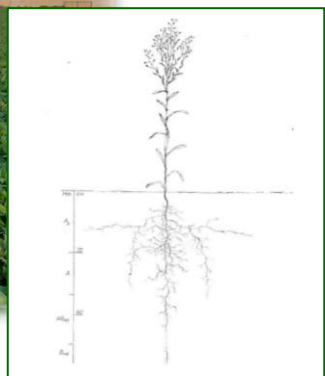


# Camelina

## Cover crop solution

- quick soil cover
- soil structuring
- nitrogen uptake
- melliferous species

Provide farmers with a sustainable COVER CROP as an agronomic solution.



# Camelina – Resilient Oilseed

## Cover crop solution

- quick soil cover
- soil structuring
- nitrogen uptake
- melliferous species

## Resilient oilseed

- drought resistant
- cold tolerant
- pest & disease tolerant
- Low inputs required
- Commercial machinery



Allowing farmers to cultivate during stress/fallow periods assuming lower risk

# Camelina - Unique maturity

## Cover crop solution

- quick soil cover
- soil structuring
- nitrogen uptake
- melliferous species



## Resilient oilseed

- drought tolerant
- cold tolerant
- pest & disease tolerant
- Low inputs required
- Commercial machinery



## Unique maturity

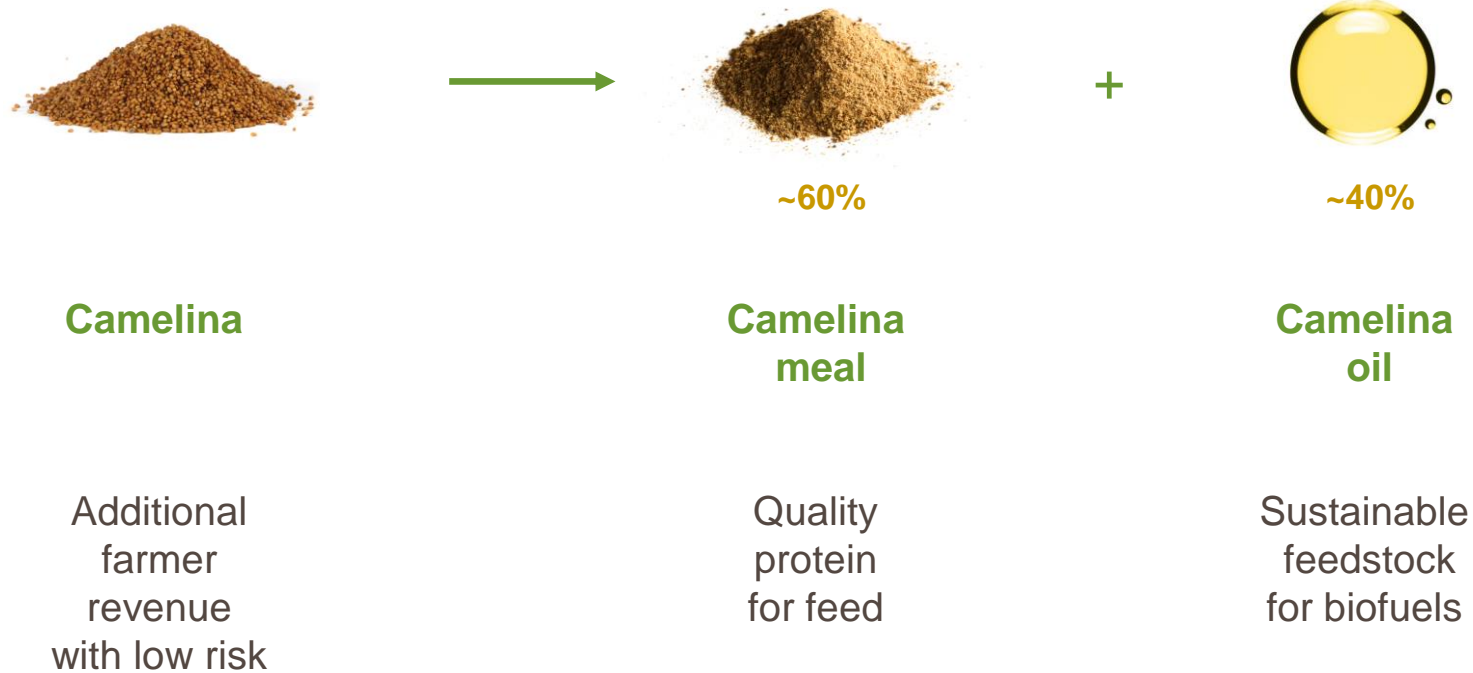
- Short cycle varieties
- Winter & spring varieties

Harvest  
without impacting  
the main crops





# Key Industry Drivers



# Camelina Potential Market Size



Summer crop  
Winter crop in degraded land

Summer 5 - 10 M ha  
Degraded 8 M ha



Winter crop

20 - 40 M ha



Winter or Spring crop

10 M – 19 M ha

# Camelina Company

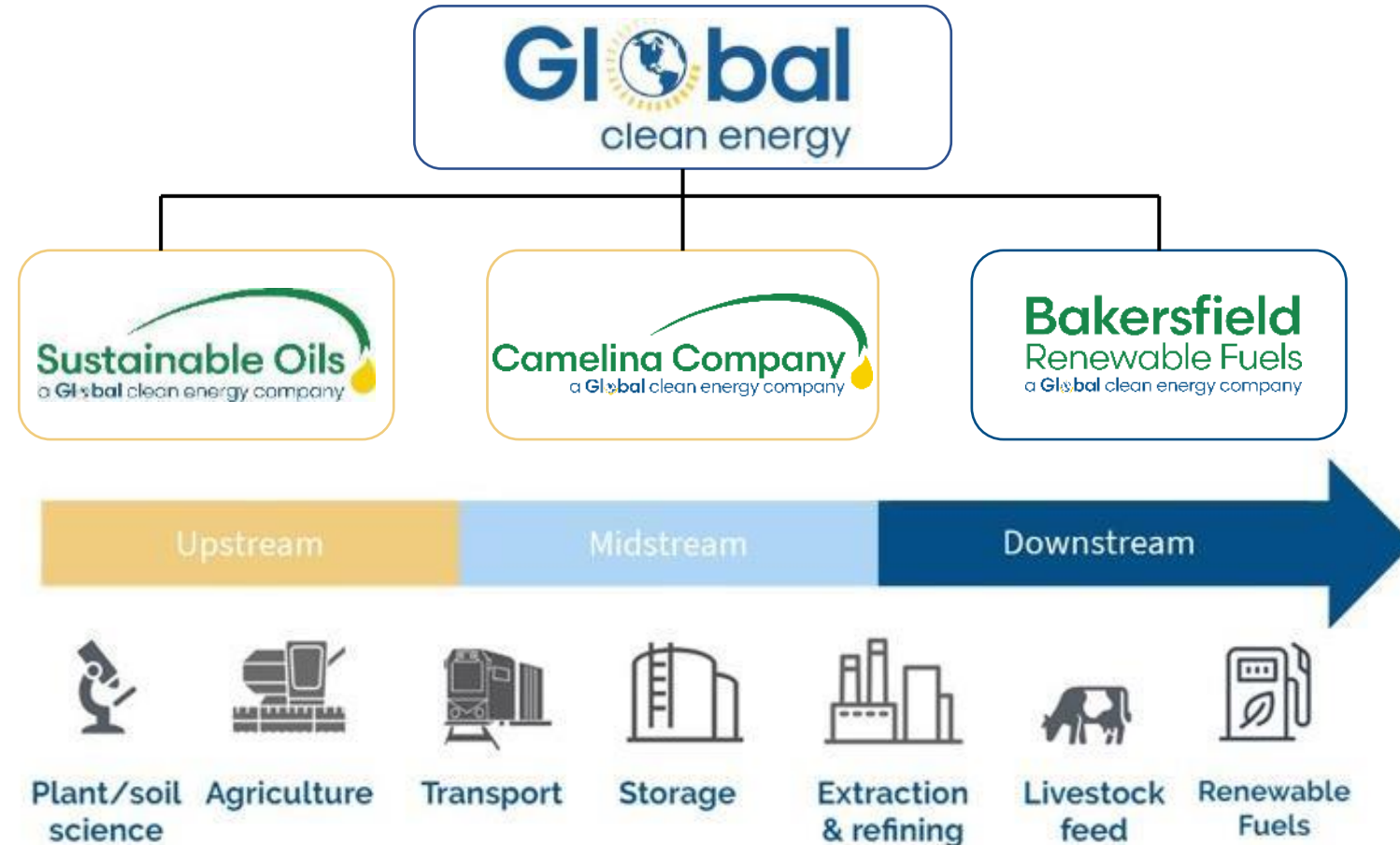


# Who We Are

Global Clean Energy is a vertically integrated renewable fuels innovator who aims to produce ultra-low carbon renewable fuels from patented nonfood camelina varieties.

## Largest camelina producer worldwide:

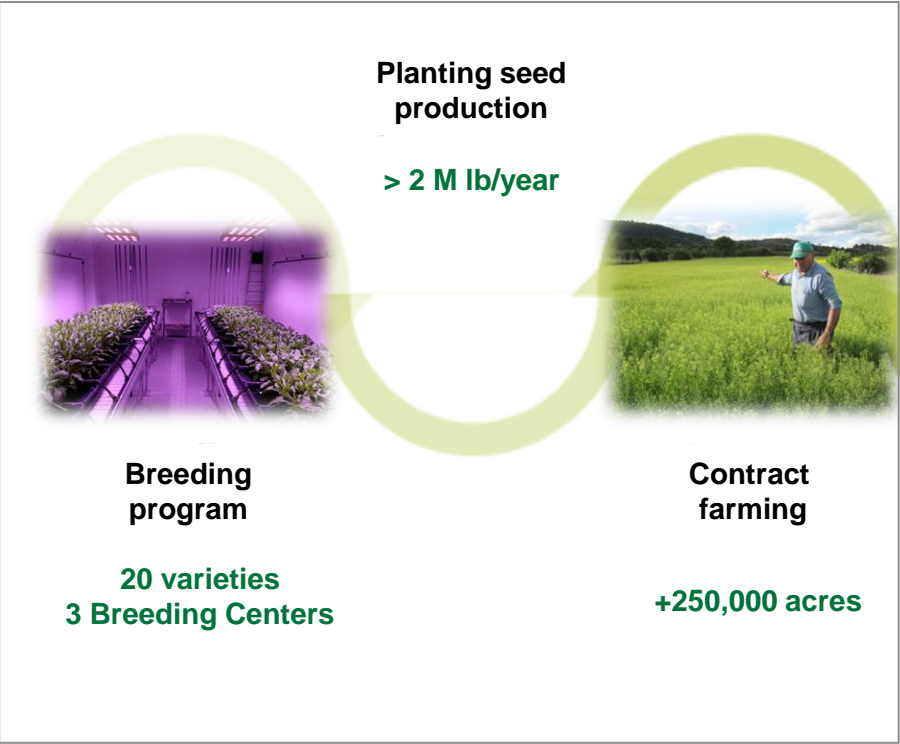
- Sustainable Oils (2005) acquired in 2013.
- Camelina Company (2010) acquired in 2021.
- Combined breeding program (20 years total).  
World's **largest camelina variety portfolio**.
- Over **15 years of cultivation**, with acreage currently under cultivation in **eight US states** and **four countries**.



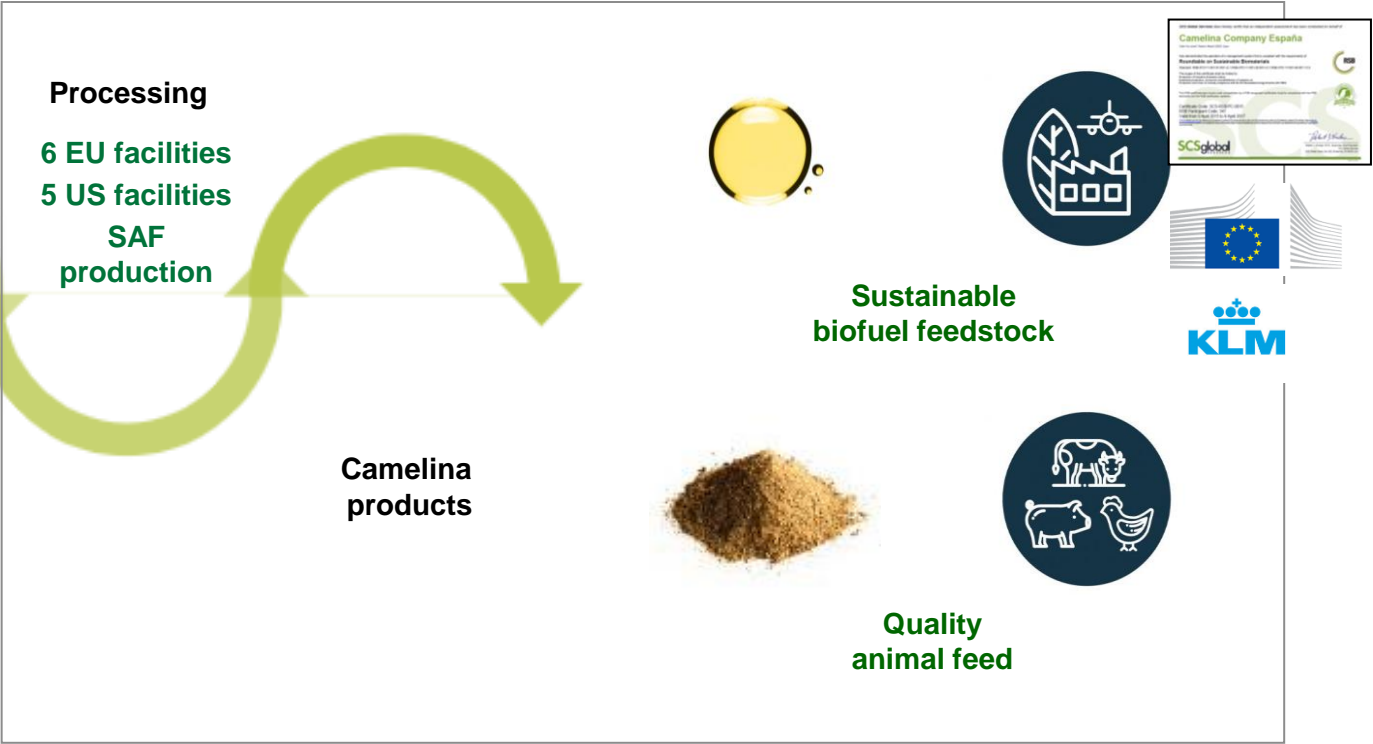


# Value Chain experience

## UPSTREAM



## MIDSTREAM



# 2023 acreage



**Planted: ~45,000 acres**



**Planted: ~12,000 acres**



**Planted: ~8,000 acres**



# Field Trials



# European R&D Consortia Grants

32.5 M€  
projects



Horizon 2020  
European Union Funding  
for Research & Innovation



- Marginal land
- Drought resistance
- Biochar



- Epigenetic marks
- DNA sequencing
- Transcriptomics
- Metabolomics
- Lipodomics
- Proteonomics
- Enzyme activities
- Cellular redox status
- Antioxidant capacity
- Physiological status



- Testing in 7 Med countries
- Screening program
- Crop rotations
- Agronomic protocol



- Camelina & Carinata
- Testing in 7 Med countries
- Screening program
- Crop rotations
- Intercropping trials
- Marginal land
- Value chain testing
- Co-product development



# Climate Smart Camelina

## USDA Climate-Smart Commodities Grant Program

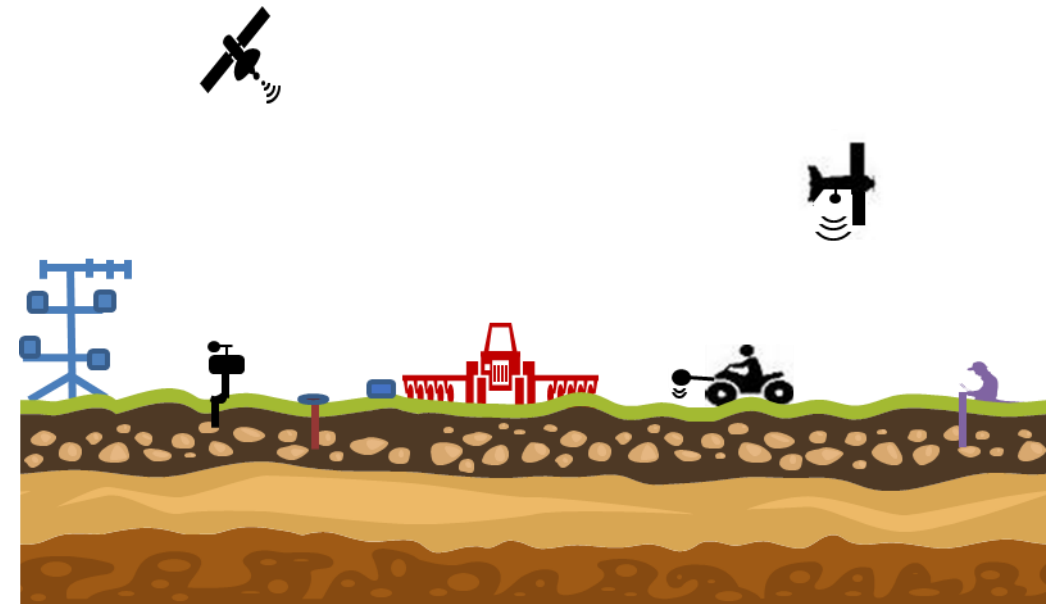
### Unique Project Attributes:

- Multiple methods of data collection in order to cross reference approaches as well as calibrate sensors and validate models for **long-term, low-cost scalability**.

### Outcomes:

- To **increase overall soil health, increase the total carbon sequestered** and **decrease the carbon intensity** from growing camelina.
- Obtain more accurate measurements to **prove environmental benefits** of growing camelina.
- Provide growers with access to **affordable and reliable measurement**.

30 M\$  
grant







**Camelina oil & meal**



# Camelina Meal - Quality Protein for Feed

	Rapeseed	Camelina	Soy
			
Protein	~33%	~40%	~47%
Amino acids	++	++	+++

## Crushing ✓

Crushing can be performed in existing soft seed crush plants.

## High-protein ✓

Camelina meal has high protein content with a good amino acid profile, similar to rapeseed meal.

## Anti-nutritionals ✓

Directive 2002/32/CE sets a maximum 30 µmoles/g for camelina products.

# Animal Feed Inclusion Trials



Laying hens



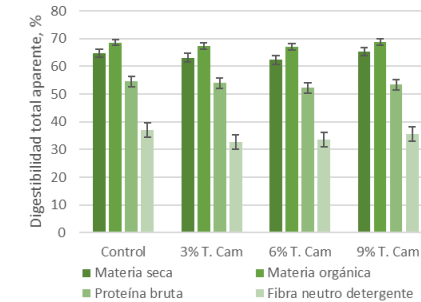
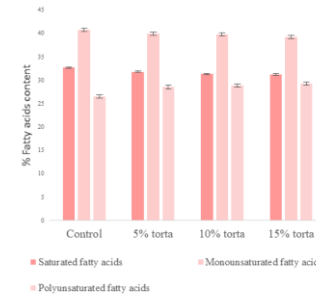
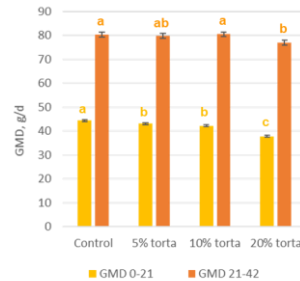
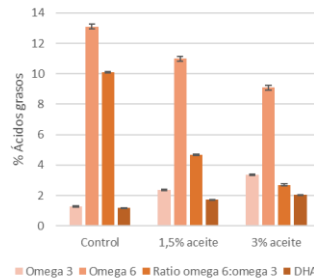
Broilers



Swine






Beef cattle



3 year trials  
Chemical composition  
Energy value, Digestible nutrients  
Palatability  
Inclusion limit



# Sustainable camelina oil – RED II

	Palm oil	Rapeseed oil	Camelina oil Intermediate crop
			
Food & Feed	YES	YES	NO ✓
ILUC risk (Indirect Land Use Change)	High	Medium	Low ✓
GHG savings	~19-32%	~47-52%	~60-80% +esca ✓
Annex IX	NO	NO	YES*

# Thank you

## Watch us grow!

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