EIP-AGRI Workshop
'Opportunities for farm diversification in the circular bioeconomy'

DAY 1 – 6 FEBRUARY 2019

13:00 – 13:50 **Welcome & introduction**

- Ms. Sarah Watson, Lead facilitator. Warm up: who is in the room?
- Mr. Darius Liutikas, Vice-minister - Ministry of Agriculture of Lithuania. Welcome to Lithuania
- Mr. Alberto D'Avino, European Commission DG AGRI. Introduction to DG AGRI and EIP-AGRI activities
- Interviews with:
  - Mr. Paolo Mantovi, EIP-AGRI Operational Group representative
  - Ms. Efthymia Alexopoulou, Researcher
  - Mr. James Gaffey, BBI project representative
- Introducing the event programme and the Open Space opportunity, Ms. Sarah Watson

13:50 – 14:20 **Presentations**

- Mr. Liutauras Guobys, European Commission DG RTD. Introduction to the EU bio-economy strategy,
- Mr. Jose Ruiz ESPI, European Commission DG AGRI. Feedback on a workshop for policy makers on the integration of primary producers in the bio-economy,
- Ms. Laura Jalasjoki, ENRD Contact Point. State of play on the ENRD Thematic Group on the bio-economy,

14:20 – 14:40 **The Bio-economy - a challenge and an opportunity for farmers**

- Mr. Kevin O'Connor, Chairperson Scientific Committee BBIJU. Utilising relevant case studies to highlight practical opportunities for diversification into the bio-economy, focused on the farmer's perspective.

14:45 – 15:45 **Presentations of four projects to highlight the broad variety of work being undertaken under the circular bio-economy theme**

- **Mr. Johan Sanders, CEO of Sannovations - Developer of small-scale bio-economy systems**
- Ms. Lucrezia Lamastra, Researcher at Università Cattolica Del Sacro Cuore - involved in two Operational Groups
- Mr. Fernando Sebastián Nogués, Coordinator of AGROINLOG - H2020 project
- Ms. Tuula Raukola - Involved in various innovative projects in circular bio-economy in Finland

15:50 – 16:20 Coffee break

funded by the European Commission

eip-agri
AGRICULTURE & INNOVATION

Johan Sanders

CEO of Sanovations - Developer of small-scale bio-economy systems

funded by the European Commission

Integrating primary producers in the bioeconomy

EIP-AGRI Workshop: Opportunities for farm diversification in the circular bioeconomy 6-7 February 2019 Vilnius, Lithuania

Em Prof dr Johan Sanders, Sanovations BV

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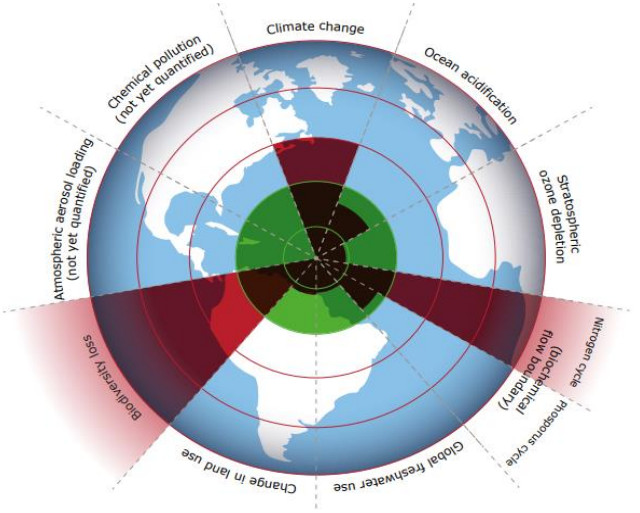
Long term trends = Market demand

- Paris 2015: Reduction of CO2 in 2050; this also holds for agriculture; Agriculture can contribute to other sectors, such as chemical industry
- Growing world population to 9 billion per 2050
- Today 2/3 of agricultural land is used for animal feed (exl grass land); use of more agricultural land is regarded as no option!
- Shortage of proteins is expected; EU imports about 40% of its feed-protein; China is sourcing more and more competitively

Of the 9 Planetary bounderies as defined by Rockstroem, 3 are in danger



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Design rules for a sustainable Bio-economy

- *Every project should fulfil People, Planet, Profit*
- *Improve our overall energy efficiency*
- Increase field yield but *keep components on the field that are required for soil fertility*
- Use all biomass components and *choose the right raw material*
- Use each component at its highest value:

  (molecular) structure is much better than caloric
- Reduce capital cost to speed up innovation and *to benefit from small scale without the disadvantages*

Our daily food needs a 20-fold higher energy input

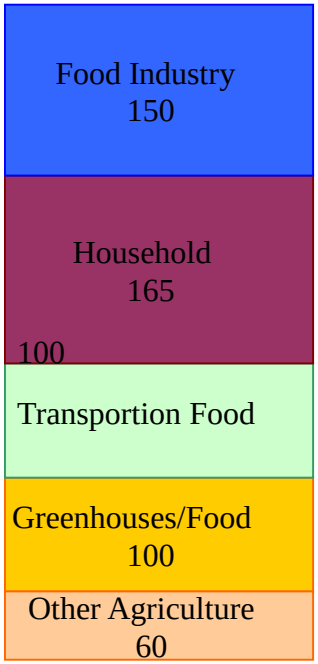
20 000PJ is more than 20% of our European energy bill!

Biomass
NL 635 PJ
EU 20.000 PJ

EU 1.800 PJ

2500 kcal/day = 55 PJ

Fossil
NL 575 PJ
EU 20.000 PJ



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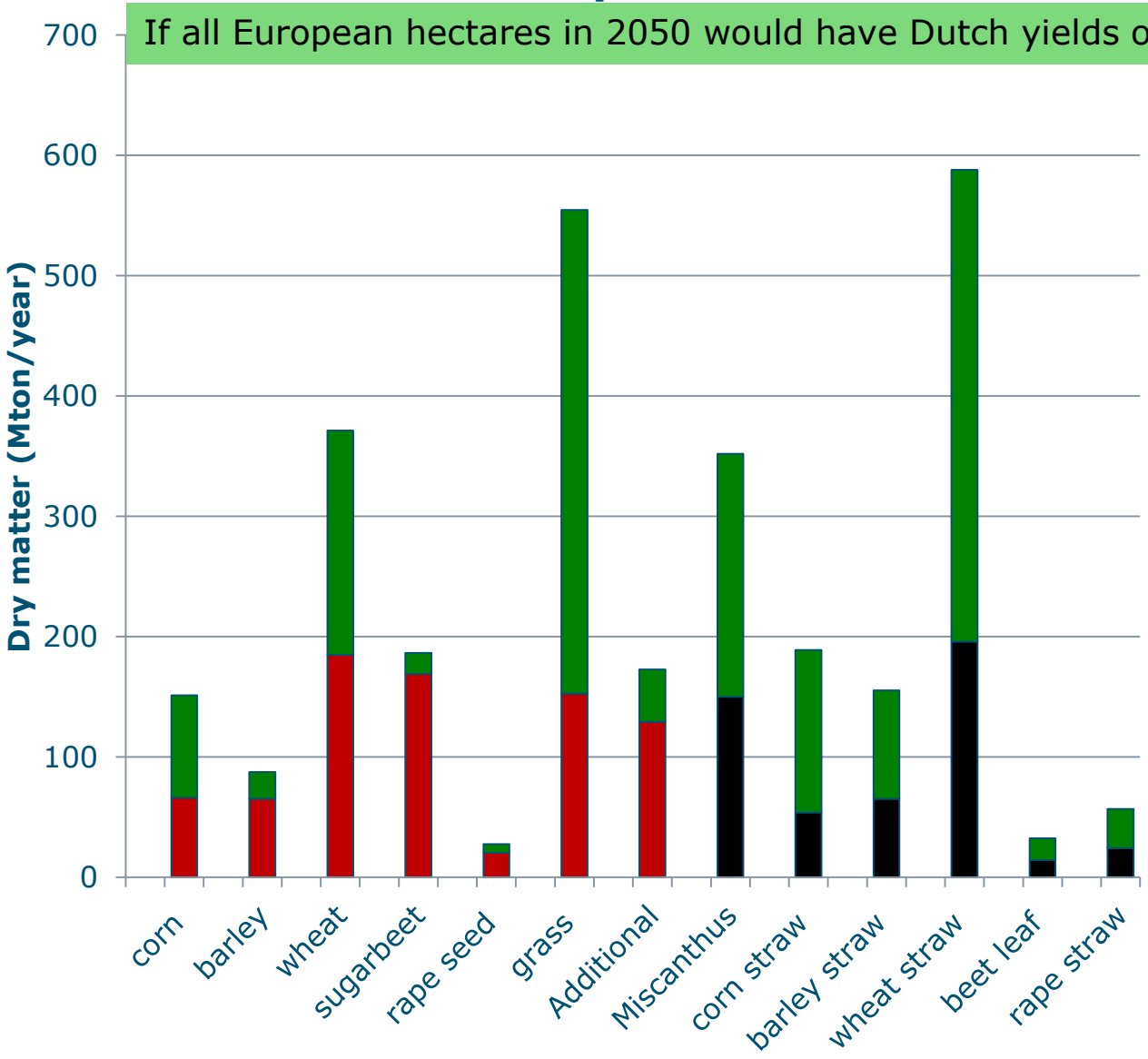
Actual and potential harvest in Europe

If all European hectares in 2050 would have Dutch yields of 2012



Mega hectares 2007

Corn	13.5
Barley	14.5
Wheat	56
Beet	3.6
Rape	8.1
Grass	69.4
Miscanthus	15

Additonal BBE yield Mton
Food crops Mton
Agricultural residues

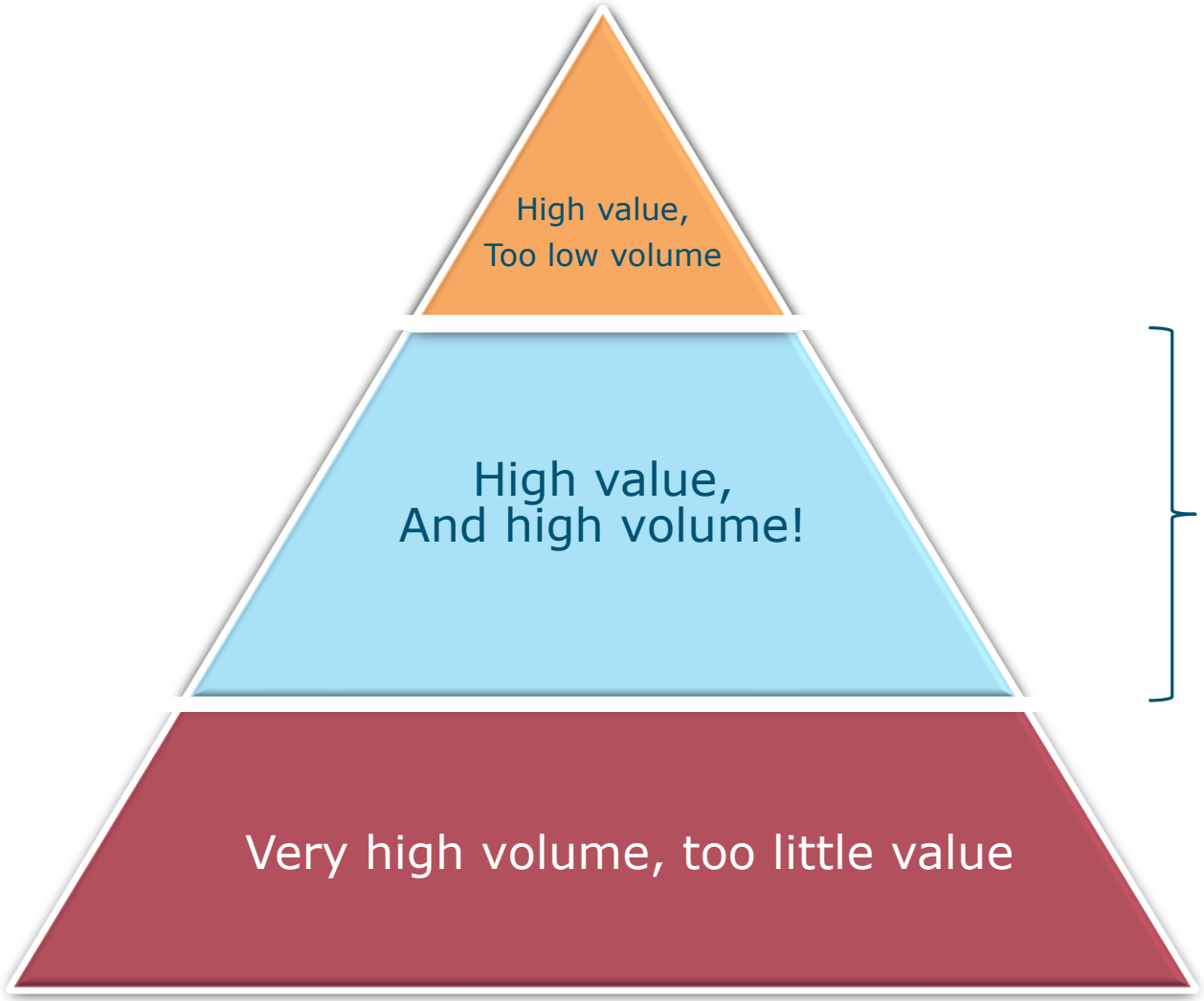
1070 Mton= 17EJ= 20%

Without additional land-use grass biorefining in the EU can yield **11.2 Mton** more protein;

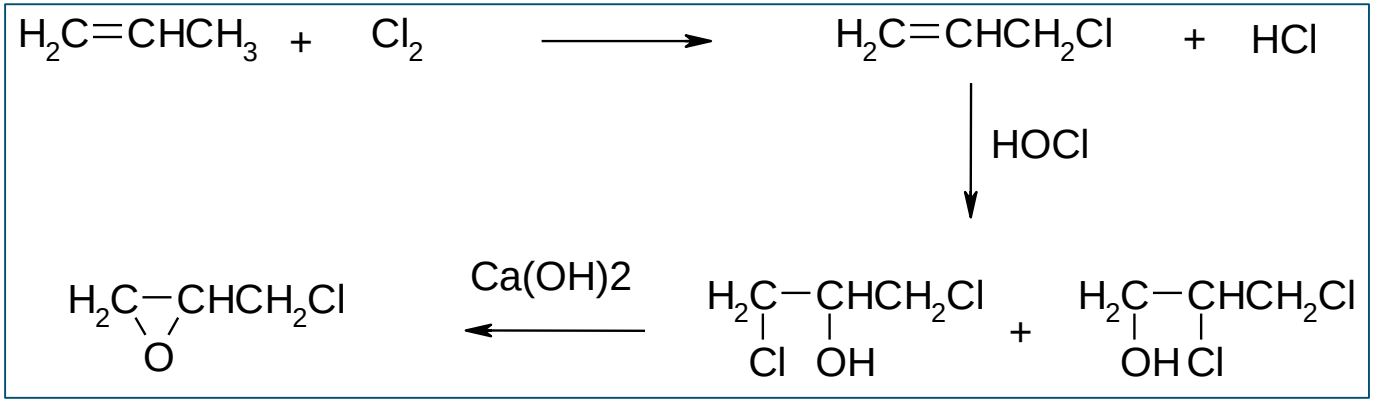
After Increasing the field yield this could even be **87 Mton** more

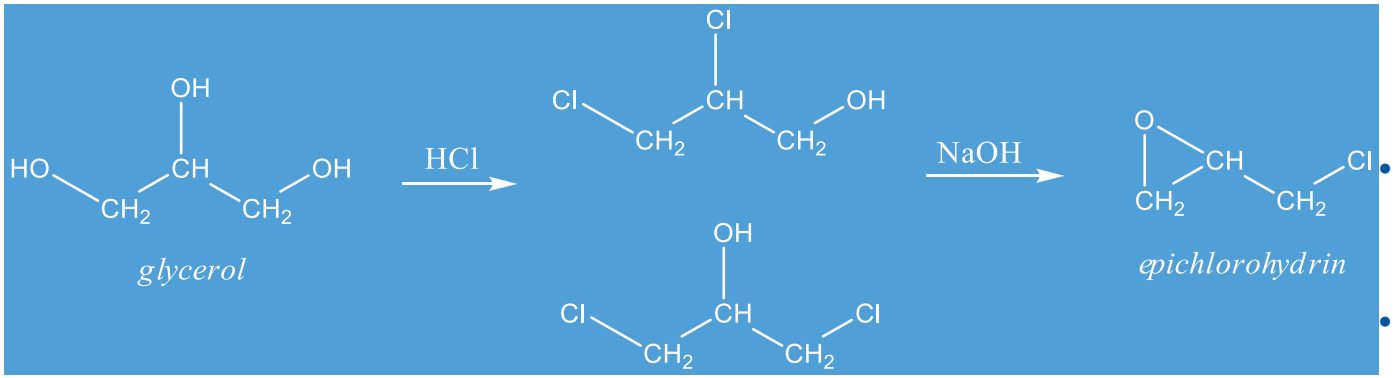
Bos, Sanders BioFPR 2013;

where Planet & Profit meet



Epichlorohydrin a good example of using biomass functionality





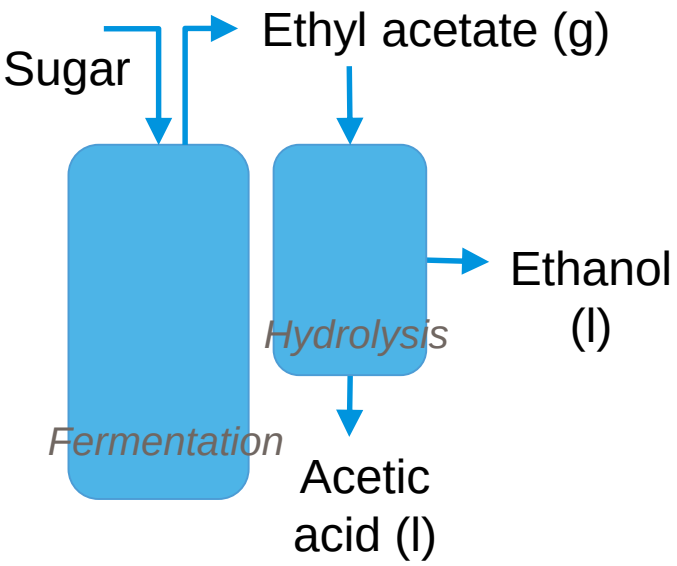
- Solvay 'Epicerol' process: glycerol to epichlorohydrin

- Price:
  € 1300 - 1500 per tonne
- Volume:
  0.5 mln tonnes per annum
- Capital required:
  300€/ tonne ?
- Raw material cost:
  glycerol, HCl, NaOH

Margin??

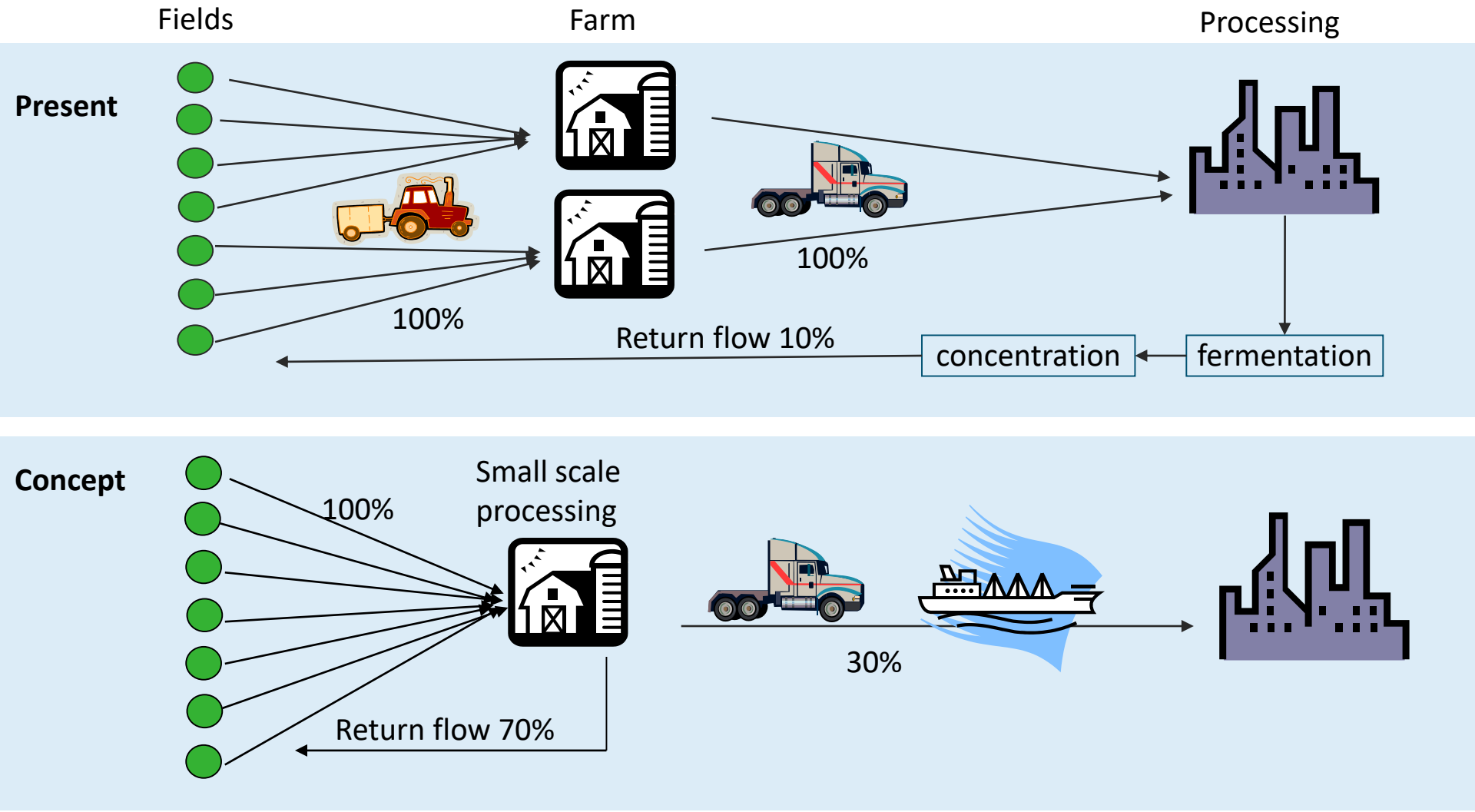
Acetic acid and Ethanol via Anaerobic fermentation of Ethyl acetate

Sugar available for 250€/ ton



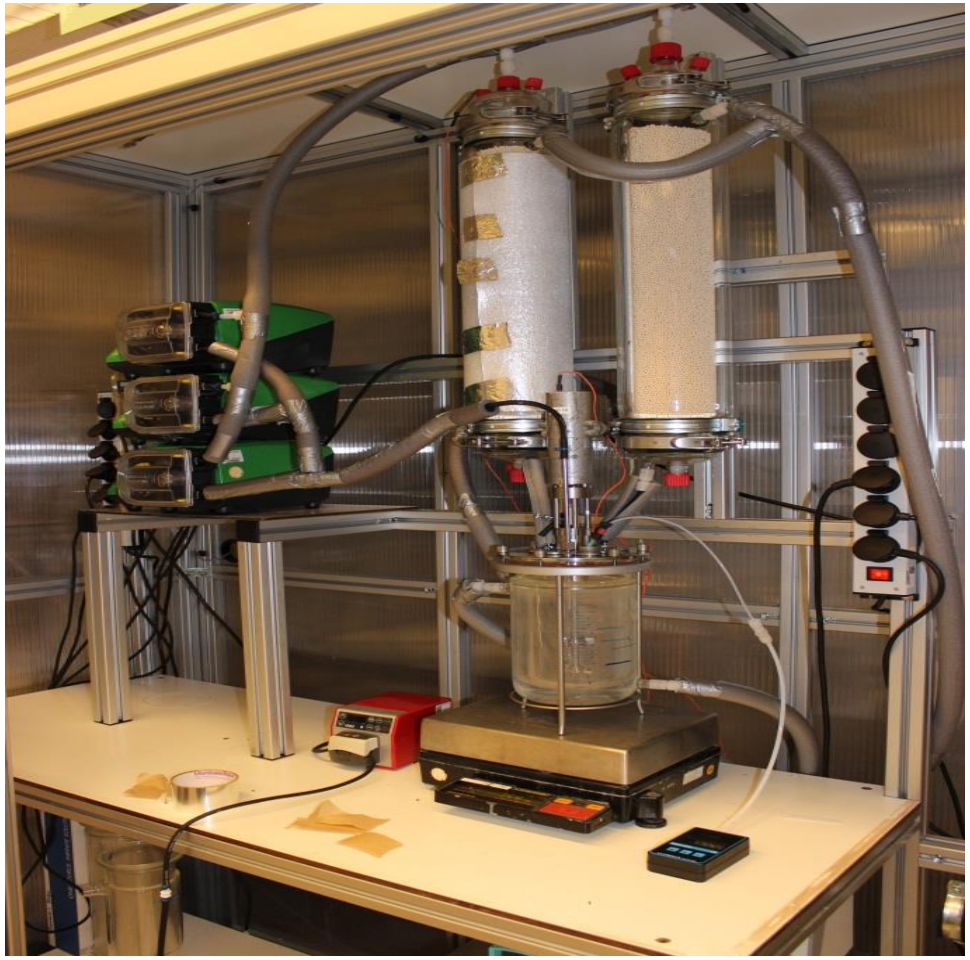
- No product accumulation in broth
- Easier recovery
- Glacial acetic acid as product
- Ethanol as product

Small scale biorefinery reduces transport cost and seasonality

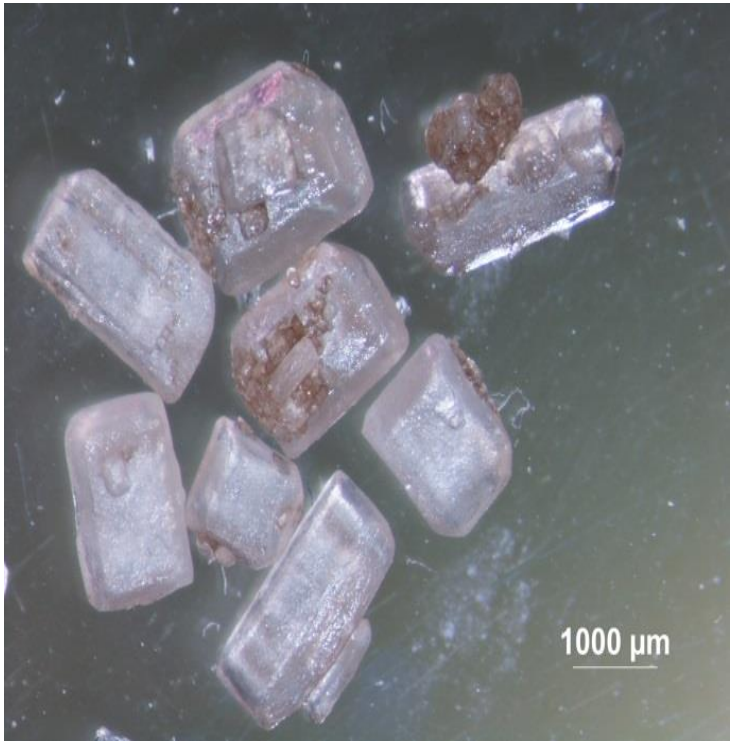


small scale beet sugar production(2-500ha)

can beet large scale factories !



Less energy
Less transport
Minerals recycled to field



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Kolfschoten et al

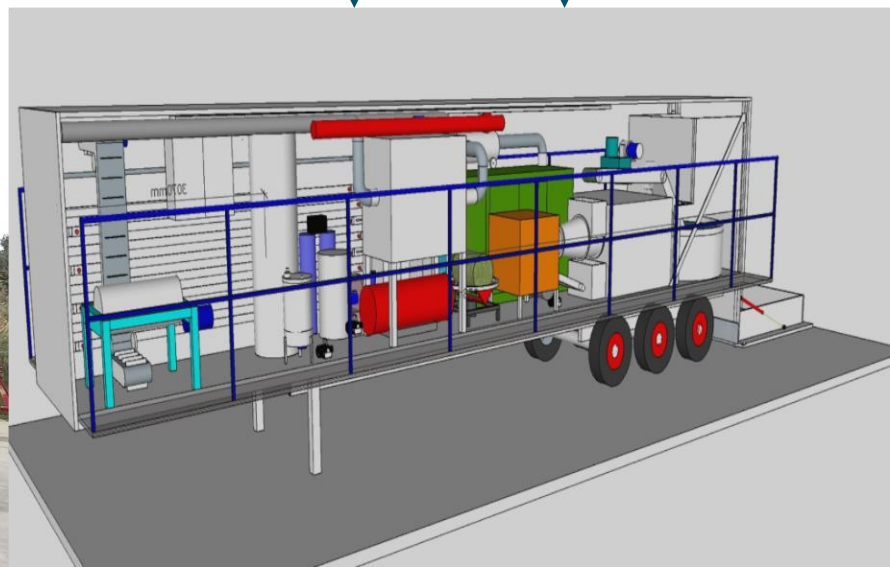
4 generations Grassa!refining

1st Generation (2011)
(Friesland)

2nd Generation (2015)
(Uganda)

3rd Generation (2016, NL)

4th Generation (NL & Arg)



The GRASSA! process is unique and proven

By means of this machine GRASSA! breaks apart green residual waste streams into a variety of high value products such as protein, via a partly patented process

Fibre / Protein combination Rich in 'resistant' proteins	
Juice Soya replacement in liquid feed with pigs. Contains prebiotic: FOS	
After further processing the juice produces:	
Whey Replacement for water. Nutritional value and tasty. Contains prebiotics	
Proteins Replaces soya. More favourable amino acid profile and a higher protein level	
The whey can be further processed:	
Sugars and edible fibres including FOS Prebiotic for improved animal health care	
Mineral concentrate Fertiliser	

GRASSA! provides more efficient agriculture: 50% increase in animal protein per ha

MOWING AND TRADITIONAL ENSILING

15% LOSS (STAYS BEHIND ON THE PASTURE)

=

NO DISCHARGE OF PHOSPHATE

15 000liter/ ha

Feed value of silage = 1750€

ONLY MOW AND SHAKE IN DRY WEATHER | PHOSPHATE IS CONCENTRATED (ON DRYING)

GRASSA!

NO LOSSES

MOW

GRASSA! REFINING

WEATHER INDEPENDENT

WITH FIBERS AND RESISTANT

+

LOWIN PHOSPHATE

=

15 000 liter/ ha

=

+ protein for 15 pigs

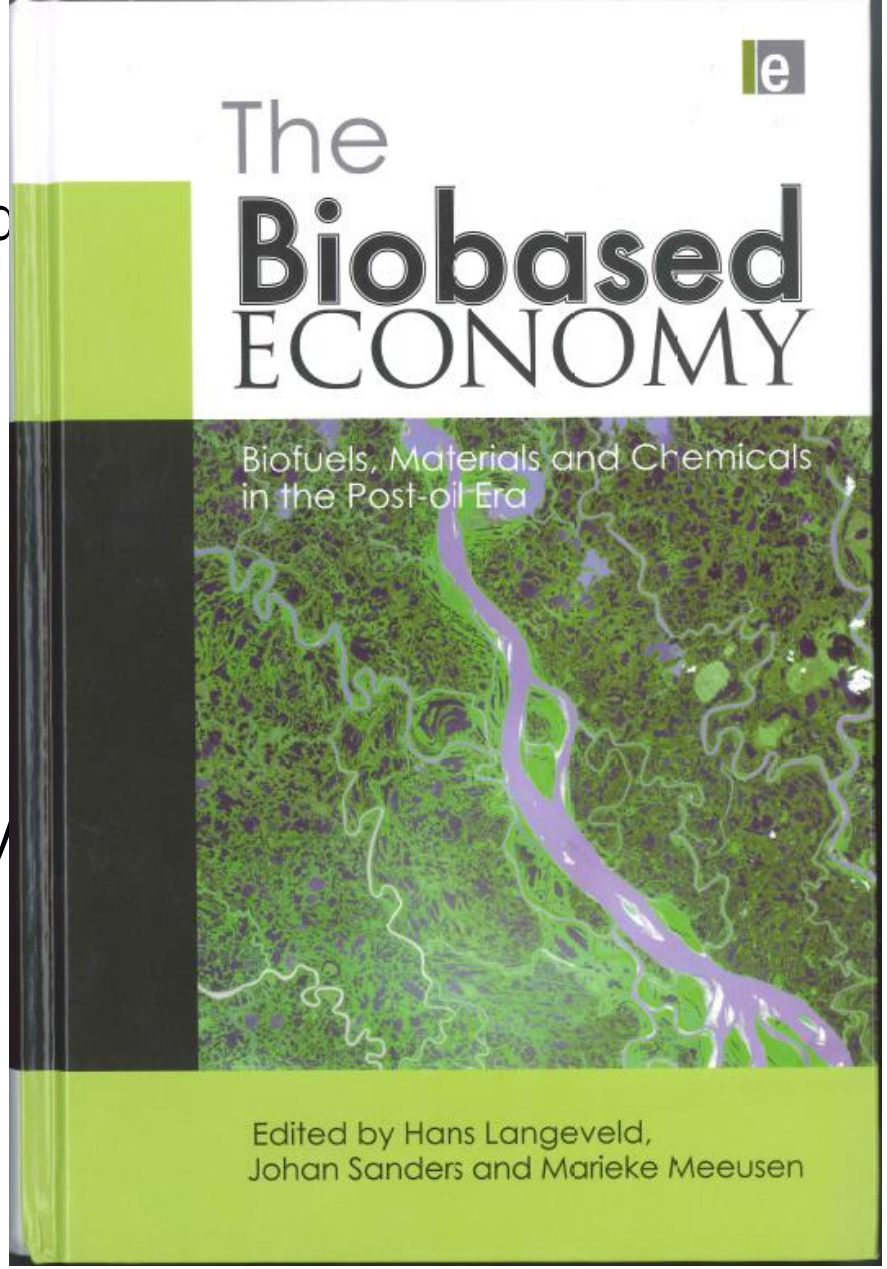
=

=

Total Feed value 3350€/ha

Conclusions

- Biorefinery for feed, materials and chemicals will create good income for agriculture and enables even to compete with coal, natural gas and soy meal from South America!
- Small scale processing reduces capital as well as costs for energy and transportation and
- will lead to higher employment
- Biorefining is not easy because we have to collaborate



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