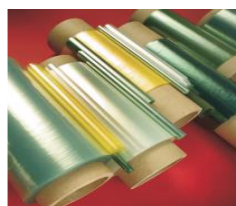


Innovations in Food and Bio-Economy



Fraunhofer Project Center at

ITAL in Campinas



Collaboration of Germany and Brasil to establish a sustainable food production chain and to generate value added with “**Innovations made in Brasil and Germany**”

Peter Eisner

Fraunhofer IVV
São Paulo, February 19nd 2016



Definition and activities all over the world

Bioeconomy Policies around the World



Bio-economy is the knowledge based production and use of biological resources to provide products, processes and services in all economic sectors within the frame of a sustainable economic system.

Background: Top 10. energy containing products in worldwide harvests (FAO 2013)



Product**)	Amount t/a	Energy kcal/a	kcal per human and day*)
1. Maize	1,016,736,092	$3.3 \cdot 10^{15}$	1276
2. Rice	745,709,788	$2.6 \cdot 10^{15}$	993
3. Wheat	713,182,914	$2.5 \cdot 10^{15}$	950
4. Soybeans	276,406,003	$1.2 \cdot 10^{15}$	469
5. Palm oil	55,800,940	$5.0 \cdot 10^{14}$	191
6. Barley	144,755,038	$4.7 \cdot 10^{14}$	179
7. Sugar cane	1,877,105,112	$4.7 \cdot 10^{14}$	179
8. Rapeseed	64,563,586	$3.6 \cdot 10^{14}$	138
9. Potatoes	368,096,362	$2.8 \cdot 10^{14}$	108
10. Sorghum	61,384,559	$2.1 \cdot 10^{14}$	82

*) based on
7.2 bn humans

4,531
kcal
human day

Source: **) FAO-STAT, Data from 2013 and 2012

TOTAL (141 Products): $1.47 \cdot 10^{16}$ kcal/a: ~ 5,460 kcal/human and day

But: shortage in resources



- Food- and agricultural waste
 - >100 Mio. Tons in the EU**)
 - **33% worldwide along the food chain**)**



- Production of animals
(Ressource-Factor~1:5)

- Meat*): 308 Mio. t/a
- Milk*): 753 Mio. t/a
- Eggs*): 81 Mio. t/a
- Fish from Aquaculture*): 67 Mio. t/a



- Use of agricultural goods for energy production

Sources:

*) FAO-STAT, Data from 2012

**) European Commission, 2014

Total use of these products for human nutrition (2,250 kcal/d)

**harvests 2013:
enough food to feed 17 billion (vegan) people!**





Worldwide challenges require collaboration



- **international R&D&I-collaborations** in **food processing and bio-economy** are required urgently.
- Long-term co-operation between Germany and Brazil opens lot of synergies in **food processing and bio-economy**.
- **Innovations** are needed to reach the market soon.
- Researchers should understand the language of industry -> **applied research** needed.

Co-operation between Brazil and Germany



Brazil

- One of the “greenest countries” in the world
- Highly developed agriculture, industry and petrol sector
- Benchmark for renewable fuel production
- Future food producer of the world

Germany

- Experienced in engineering and process technology
- Technology driver in bio-energy and sustainable production
- **São Paulo** – the largest German industrial region outside Germany



Let's join to create the urgently needed innovations



Joint R&D&I-Centre for Innovations in Food and Bio-Economy at ITAL, Campinas



Inauguration:
November 2014

Plan



Project Center, February 2016



Mission

- **Developing products and processes in area of Bio-Economy to reduce food waste and to maximize value added** in partnership with German and Brazilian companies.
- **Create “Innovations made in Brasil and Germany” in Bio-Economy** Joint generation of knowledge in the field, realize value added in Brasil and Germany and marketing the products worldwide.
- Delivering the basis for **creating new jobs in Brasil and Germany** in agriculture, food industry and energy/chemistry sector.
- **Partnerships between German and Brazilian companies** doing joint research, joint industrial production and marketing.

One
example

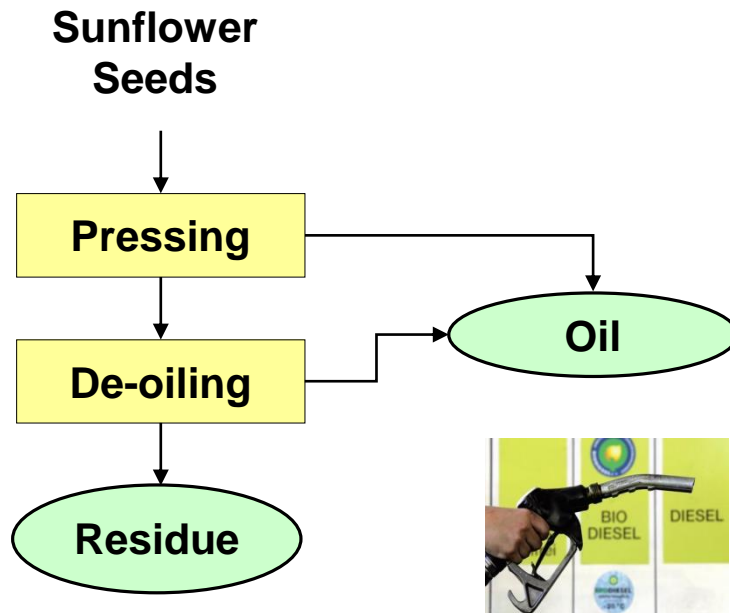


One example, sunflower oil production in Mato Grosso...

150.000 m³/a of Protein-Waste



Short overview of the SunPro-project: Sunflower Seeds – Present Use



Sunflowers



Oil

Sunflower Seeds

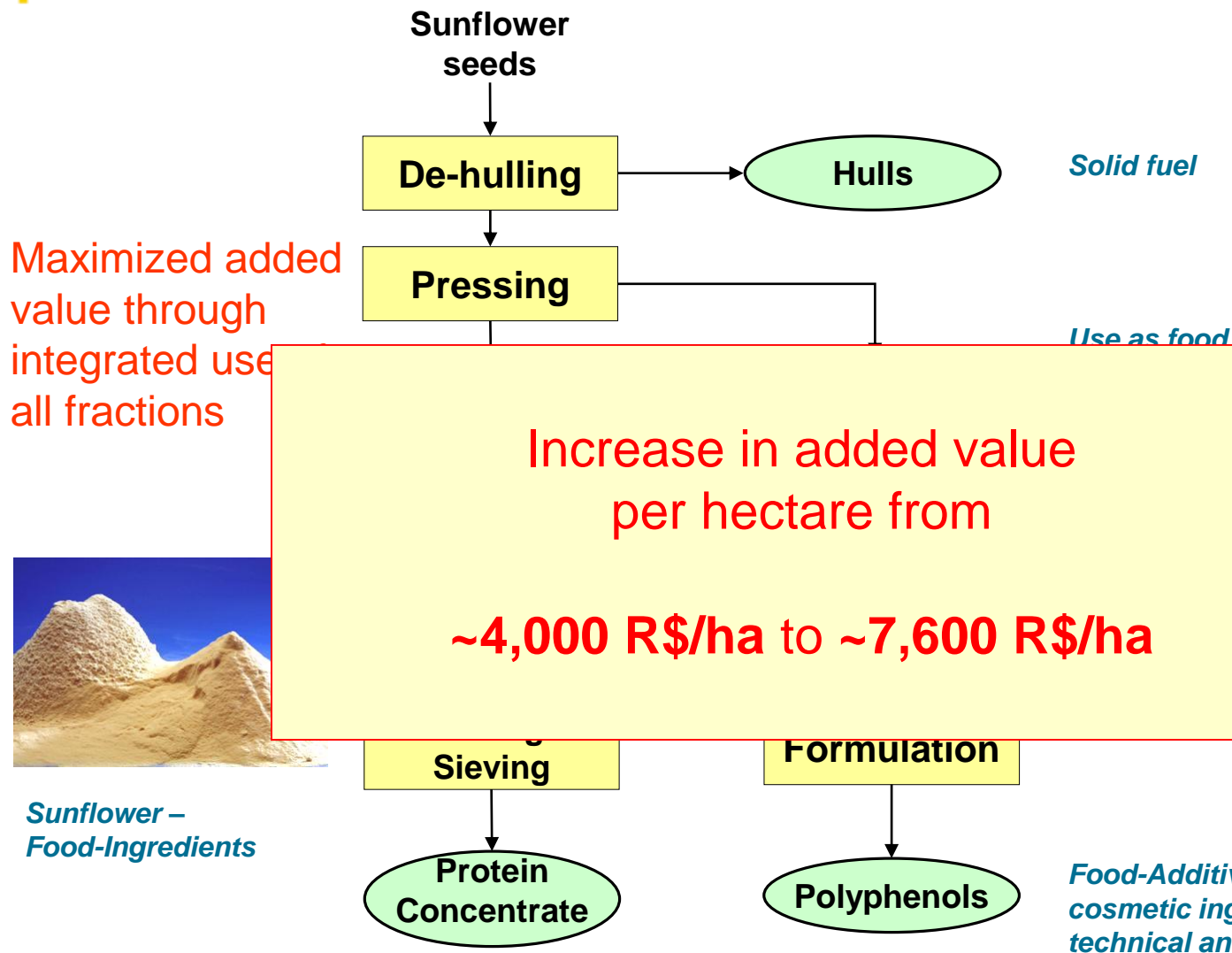


De-oiling residue

Low
valuabl
e
Animal
Feed



Bio-economy research Germany-Brasil: SunPro: New processing of sunflower seeds



Raw materials available? Sunflower seed production



- Sunflower as an intercrop e.g. for soy to be grown in Mato Grosso or other regions
- Available Area in Brazil
~20 Mio Hectares in Brazil
Potential for 30 Mio. t/a Sunflower Grains
- potential Main Fractions
9 Mio. tons of Hulls, 12 Mio tons of Oil,
9 Mio. tons Protein Meal
- Products for existing Markets

Enough Raw Material
to reach a global Market

Market available? Long-term possible Market Volume for SunPro-Meal in Brasil and Europe (700 Mio people; 0.5% share of protein demand)



Application	g/Capita a	Total (t/a)	Revenue for Protein Meal (R\$/a) Price 10 R\$/kg
Bakery	30	21,000	210,000,000
Fine bakery	25	17,500	175,000,000
Meat alternatives	100	70,000	700,000,000
Dairy substitutes	100	70,000	700,000,000
Total	255	178,500	1,785,000,000

This Market could be developed
with Sunflower Kernels from Mato Grosso



Thank you very much!

