



*Perspectives on the future of Biotech  
Crops in Europe and worldwide*

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# Context

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*The evolution of global agriculture in the world*

# Global Agriculture in the world-

## A lot of extremes

### *Average Farmsize*

<b>Asia</b>	<b>Von Braun</b>	<b>2005</b>	<b>1.6 Ha</b>	<b>NA</b>	<b>Von Braun</b>	<b>2005</b>	<b>121 Ha</b>
<b>China</b>		<b>1999</b>	<b>0.4 Ha</b>	<b>USA</b>		<b>2002</b>	<b>178.4 Ha</b>
<b>India</b>		<b>1996</b>	<b>1.4 Ha</b>	<b>Canada</b>		<b>1991</b>	<b>349.1 Ha</b>
<b>Pakistan</b>		<b>2000</b>	<b>3.1 Ha</b>				
<b>Europe</b>	<b>Von Braun</b>	<b>2005</b>	<b>27 Ha</b>	<b>LA</b>	<b>Von Braun</b>	<b>2005</b>	<b>67 Ha</b>
<b>France</b>		<b>1989</b>	<b>31.5 Ha</b>	<b>Brazil</b>		<b>1996</b>	<b>73.09 Ha</b>
<b>Germany</b>		<b>1997</b>	<b>32.11 Ha</b>	<b>Argentina</b>		<b>1988</b>	<b>467 Ha</b>
<b>Austria</b>		<b>1997</b>	<b>16.25 Ha</b>	<b>Chile</b>		<b>1996</b>	<b>83.7 Ha</b>



# Global Agriculture in the world-

## A lot of extremes

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### *Other Extremes*

- Climate and Seasons e.g. Canada vs Yantzee river China.
  - Heath Units
- Soil.
- Water availability.
- Altitude.
- Plant disease patterns.
- Hybrid vs Open Pollinated Variety crops.
- Rotation Schemes
  
- Labour cost and availability.
- Supply chain structure of farm inputs
- 'Product' distribution and processing logistics.
- Product demand of consumers.

# Global Agriculture in the world- One consistent drive

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- Farmers and farmer families in the world have to present for themselves a **positive Profit & Loss account** in the majority of the years.
- In some instances that is 100% translated in monetary value, giving the farmer and his family buying power in the local economy.
- In other instances a significant portion of the harvest is retained for 'in house' consumption and any surplus represents an option for trade with other 'life essential goods'.  
E.g. majority of rice farmers in India.

How do farmers globally adapt to this economic reality?

# Global Agriculture in the world- Differential response to the extremes

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- Farmers in different areas of the world adapt differently to the extremes they are confronted with.
- The farming economy in different parts of the world is structured differentially, supporting farmers in a diverse manner.
- The impact of Innovative Technology is very different in these circumstances. The 'Drivers to Implement' new Technology are very different.

# Global Agriculture in the world- Differential response to the extremes

Farm size ↑

- Extensive farming
- Lower Productivity
- High level of mechanisation
- Technology > profitability
- The 'sleep well at night' factor-insurance



- Intensive farming
- Very labour intensive
- Higher Productivity
- Technology > risk
- Technology > high



# Agriculture in Europe

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- Squeezed in the middle
- Lack of pan- European vision on the future of agriculture.
- The subsidy legacy.
  - Farmers do not have to be excellent in agriculture but excellent in administration.
- The ‘excuses’ for farming in Europe.
  - Protection of the Environment.
  - Managers of Nature.
  - The social Agenda.
  - Preservation of the landscape.
  - Rural Development
  - And... what about production of products?

# The future of agriculture in the world

## The Americas

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- **More of the same**
- **Reduction of global subsidies will be compensated with further increase in farm size > economy of scale.**
- **The Americas will be the primary location for the production of low margin, high volume commodities both in the food sector (commodity grains) as in industrial production (Bio-Energy).**
- **Interesting observation:**
  - **The 'rat' race between NA (USA) and SA (Argentina & Brazil).**

# The future of agriculture in the world

## The Americas – Competition amongst Giants

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<b>Non-land costs</b>	<u>Cost per acre</u>		<u>Cost per bushel</u>	
	<b>Iowa</b>	<b>Mato Grosso</b>	<b>Iowa</b>	<b>Mato Grosso</b>
Seed	\$21.00	\$11.00	\$.42	\$.20
Fertilizer & lime	25.00	70.00	.50	1.27
Herbicides & insecticides	30.00	36.00	.60	.65
Labor	14.00	5.00	.28	.09
Machinery	34.00	29.00	.68	.53
Other	<u>15.00</u>	<u>16.00</u>	<u>.30</u>	<u>.29</u>
Total non-land costs	\$139.00	\$167.00	\$2.78	\$3.03
<b>Land cost</b>	<u>\$140.00</u>	<u>\$23.00</u>	<u>\$2.80</u>	<u>\$.42</u>
Total cost	\$279.00	\$190.00	\$5.58	\$3.45
<b>Yield per acre</b>	50	55		

# The future of agriculture in the world

## The Americas – impact of technology.

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- The use of new technologies (incl. GM) will be further intensified/diversified:
  - Compensate disappearance of subsidies in P&L with yield increasing technologies (stress tolerance).
  - Technologies that help to save costs. (pod shatter resistance).
  - Technologies that re-commoditize the crop at a higher value plateau vis-à-vis 'slow competitor crops ('specialty oils in canola and soybean vs palmoil).
  - Technology as insurance factor. (broad insect resistance)

# The future of agriculture in the world

## Asia

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- Further alleviation of the ‘family workload’ will be essential
  - Growing economies push workers from country side to cities.
  - Negative impact of global diseases e.g. HIV on workforce.
  - Social need: reduction of child labor.
- Intensive agriculture will further ‘smarten up’.
  - Water use efficiency.
  - Rotation management and agronomy optimization.
  - Better locally adapted varieties with better product placement.
    - Role of marker assistance in breeding.

# The future of agriculture in the world

## Asia – Impact of Technology.

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- New technologies (incl. GM) will be key innovation drivers > use will explode in Asia:
  - Creation of added value for the entire chain (incl. farm families).
    - Top line growth with ‘yield genes’ (hybridization, insect resistance)
  - Food safety factor: insect/disease resistant crops show lower fungal infestation > lower toxic fungal compounds (mycotoxins).
  - The workload alleviation factor and the social impact factor. (HIV, child labor reduction).
    - E.g. insect resistant cotton.

# The future of agriculture in the world

## Asia

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### Use of insect resistant cotton in South Africa.

- Increase yield / ha
- Decrease insecticide spraying from 10 to 2-3 times:
  - 1000l water/ha/year less needed
  - Lower costs (added value only partially recuperated through seed cost)
  - 12 -15 days less needed for spraying, mainly done by woman means > more time for aids patients in the family



# The future of agriculture in the world .....and Europe

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- Unstable future unless.....

# The future of agriculture in the world .....and Europe

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- ....European agriculture is drastically re-oriented through
  - Technology innovation
  - Business innovation

# European Agriculture- the challenges

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- Downward pressure on agricultural subsidies.
- Not competitive with extensive farming in the Americas.
- Complex political climate in Europe: Europe do not make decisions anymore. Lack of simplified constitution!!!
- The 'luxury' syndrome of European consumers.
- The negative image of agriculture in European society.
- The inertia of European regulations.
- The complete lack of a (unified) vision on European Agriculture.

# European Agriculture- an option

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- European agriculture as a growth engine for a bio-based knowledge economy:
  - The good news: Technology Innovation has started:
    - ‘Plants of the future’ in the 7th framework program.
    - Several technology developers work on ‘third generation products’.
  - The challenge: The biobased economy has to be invented and developed

# European Agriculture- an option

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- This option will only survive on condition a broad platform is developed where ONE vision is shared by
  - Politicians and Policy makers
  - Consumers
  - Industry
  - Regulators
  - Scientists

# What is the future of GM in Europe?

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- Genetic Modification is ONE of the modern breeding tools that can, if smartly used, create significant value in a bio-based economy.
- But... today the plant genome knowledge in combination with the broadened 'toolbox' will form a much broader and diverse technology base driving innovation.
- And ... one will also see a strong revival of 'forgotten' sciences like physiology, biochemistry, plant breeding and organic chemistry. Integrated in a broadened technology base, this will be the real basis of the knowledge BIO based Economy.

# Conclusions

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- Use of new technologies (incl. GM) will further increase in all regions of the world but... for different reasons.
  - Americas: driver of profitability and insurance factor.
  - Asia and Africa: driver of farm economy, workload alleviation and social impact.
  - Europe: ??? As a business innovation driver towards a Bio-based economy ??? If .... (Western) Europe can overcome it's luxury syndrome.

# Thank you for your attention

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