Workshop 4
Responsible Production of Agroenergy

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BASF SE

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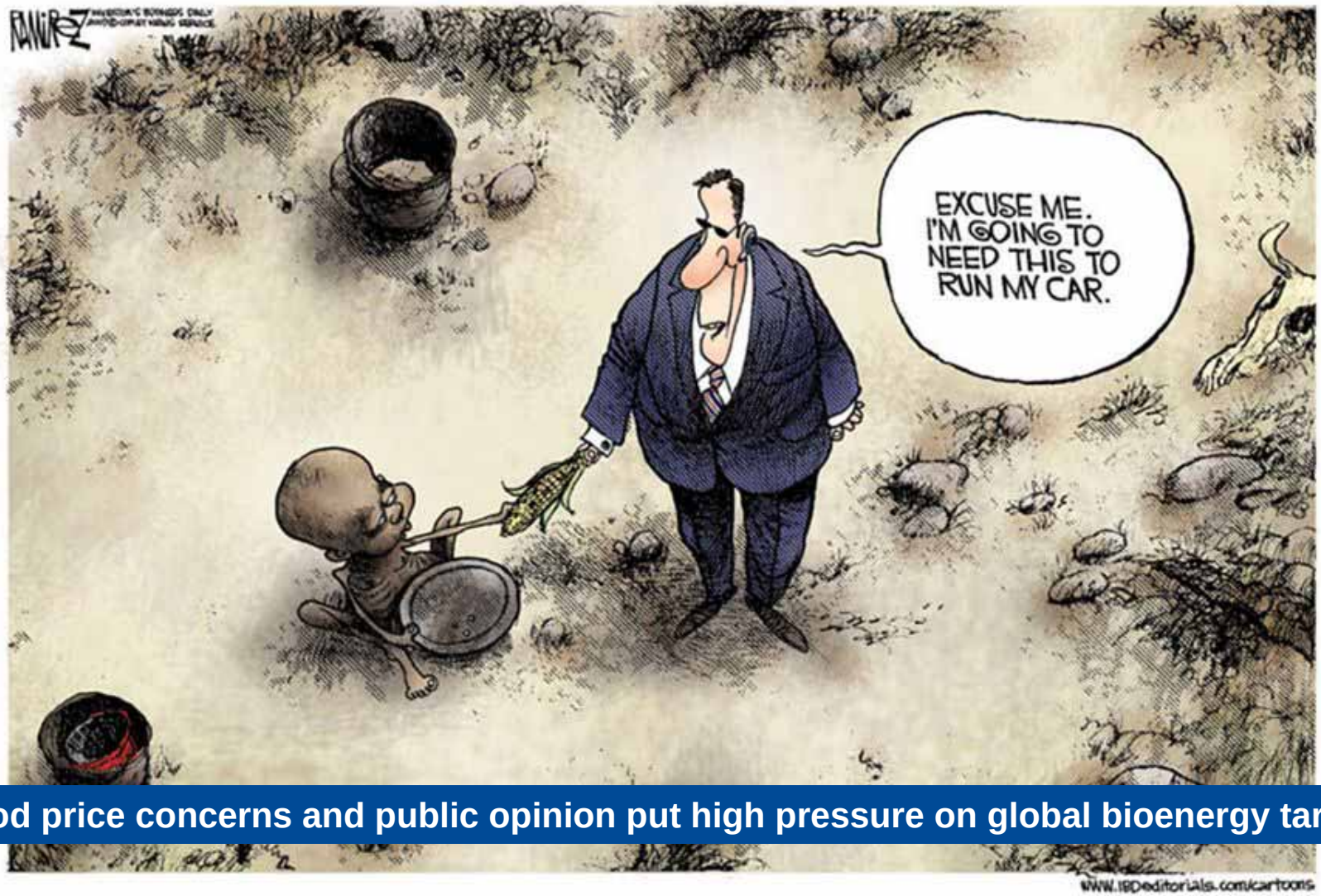
The Chemical Company

Why to invest into agriculture and energy crops? Polemic vs. Mega Trends



➔ **Food price concerns and public opinion put high pressure on global bioenergy targets**

Fact is, in Future We will have Less Land for More People...

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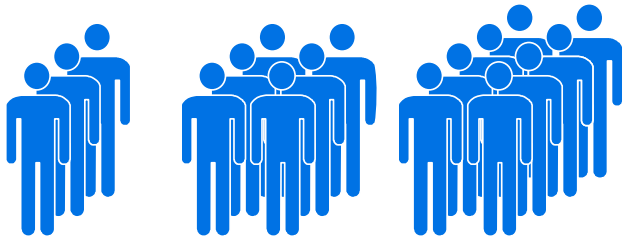
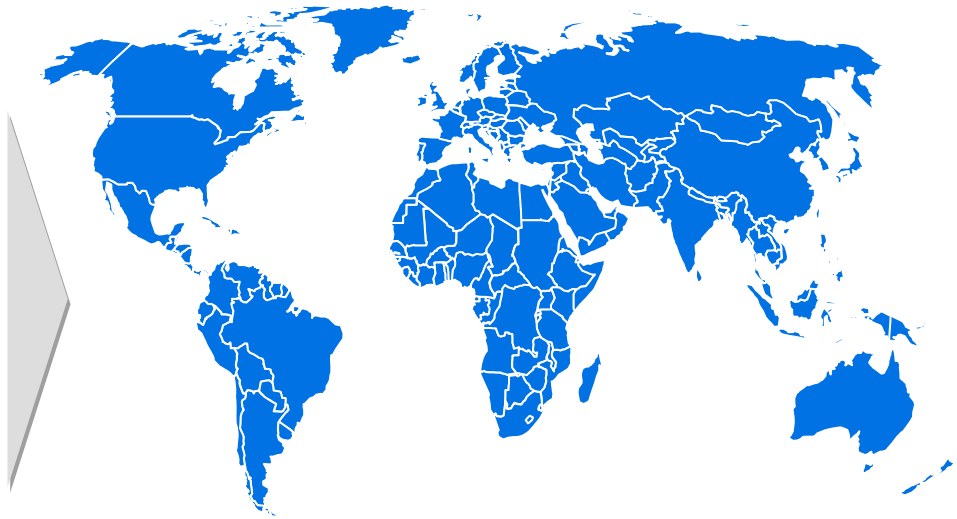
Population [billion]

1960	2005	2030
3.0	6.5	8.3



Available arable land per capita [m²]

1960	2005	2030
4,300	2,200	1,800

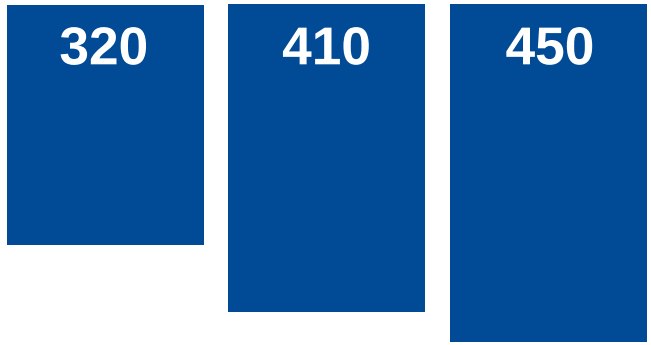


➔ **Arable land per capita is decreasing dramatically**

…As well as the Demand for Energy Increases Rapidly

World oil demand [billion barrels]

Arable land needed to substitute 10% of total oil demand [million ha]



- Increases in crude oil price make biofuels economically more attractive
- Focus on climate protection raise the prospects but also concerns on sustainable forms of using renewable resources
- Area needed for biofuels could be used for food production… but…

➔ **30% of global arable land* is needed to cover 10% of the world's oil demand in 2030**

Source: FAO, OPEC and BASF estimates

*global arable land = 1,4 billion hectare

... Today Crop prices are Driven more by Food Consumption Dynamics and the Availability from Harvests and Stocks

Streams of Renewable Raw Materials today

Agriculture

95% Food Sector

5% Non-Food

Chemicals

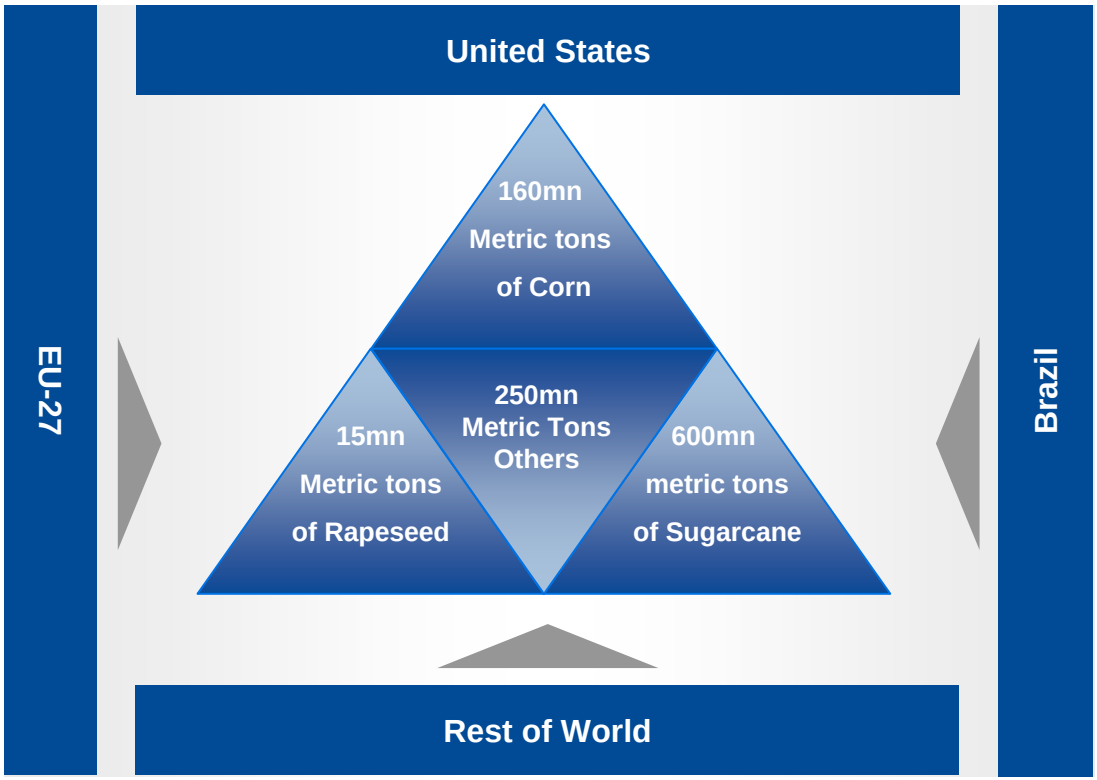
Energy

Growing demand on both sides, but...

... direct connection of Food with Energy prices questionable

Crop Demand Growth for Biofuels

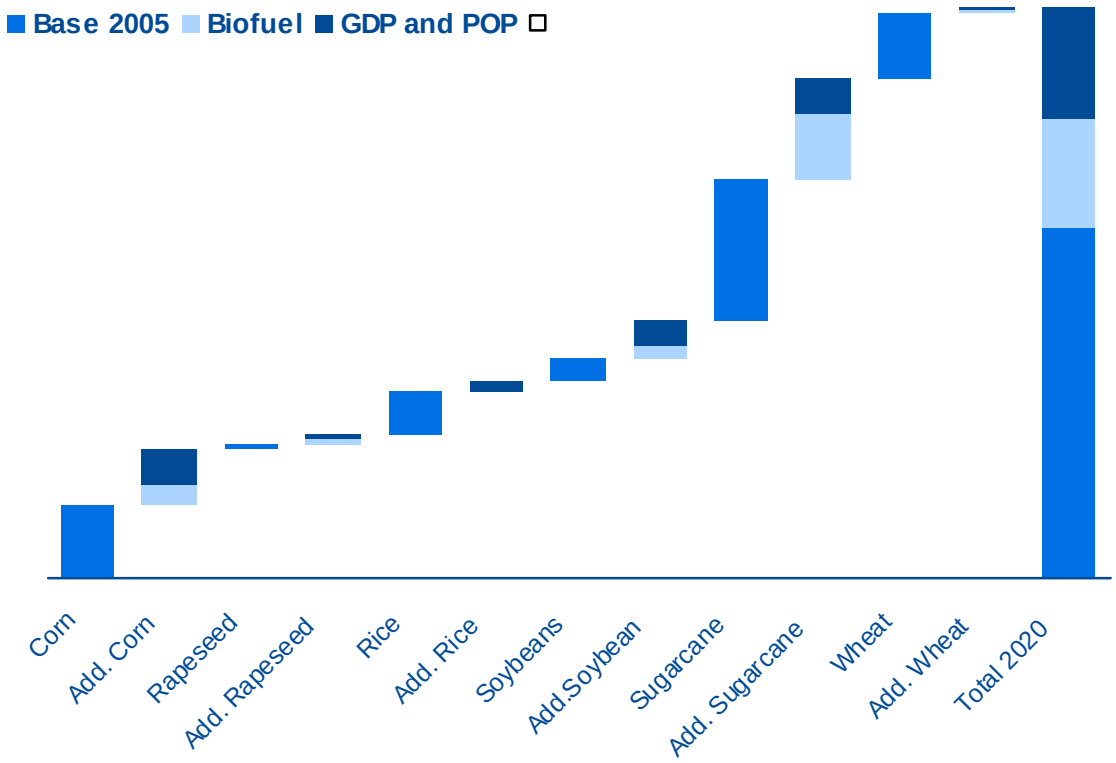
How much additional crop is needed to secure the biofuels demand in 2020 ?



➔ **An additional 1.000mn mt of crop is needed to secure the biofuels demand in 2020**

Crop Demand Growth for Food, Feed and Energy

Overall the demand of crops will increase to 5.400 mn Metric Tons in 2020

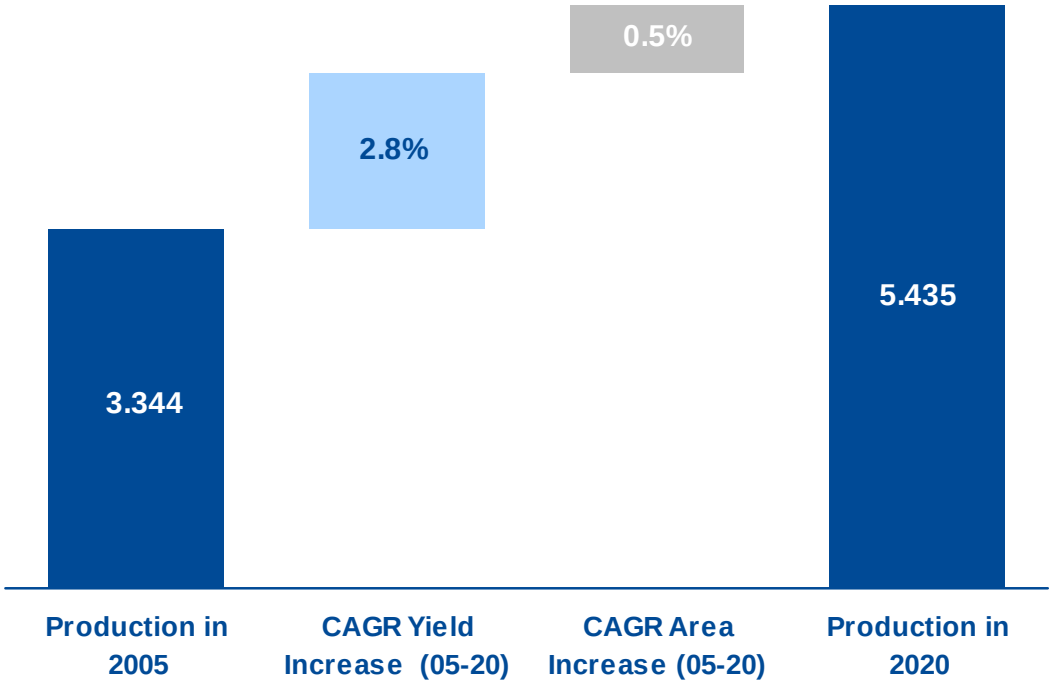


- 1.000mn mt additional Demand Food/Feed
- 1.000 mn mt additional Demand Bioenergy
- 3.350 mn mt demand in 2005

➔ **Biofuels will make up 20% of the demand – how can we reach the production needed?**

A strong Increase in Yield is Necessary to Achieve the Growth in Demand

As the area is limited an increase of the growth in yield to almost 3% p.a. is needed



➔ **Which means we have to triple the speed in yield growth – how can we achieve it ?**

How to Achieve that Sustainably?

- Responsible use of modern agrochemicals paired with applying agronomical best practice in broad scale, increasing yields of row crops in all regions
- Responsible use of green biotechnology to further explore yield potentials in row crops as maize, wheat or new energy crops (miscanthus, switchgrass, etc.)
- Use of available arable land reserves, in particular in Brazil, Argentina and Black Sea region, where most promising reserves are located
- Long term – develop new energy crops, non-food and stress resistant, growing on marginal lands
- Long tem – develop second generation bioenergy, using whole plant carbohydrate conversion
- Politics, Industry and Agri Community need to cooperate in fostering the application of agreed on sustainability criteria, such as to prevent illegal deforestations, as well as supporting the use of available technological means and the use of yield fostering chemistry

➔ **Industries need to input R&D in partnership with other agricultural stakeholders as well as politics in order to achieve feeding the world and utilizing bioenergy sustainably**

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