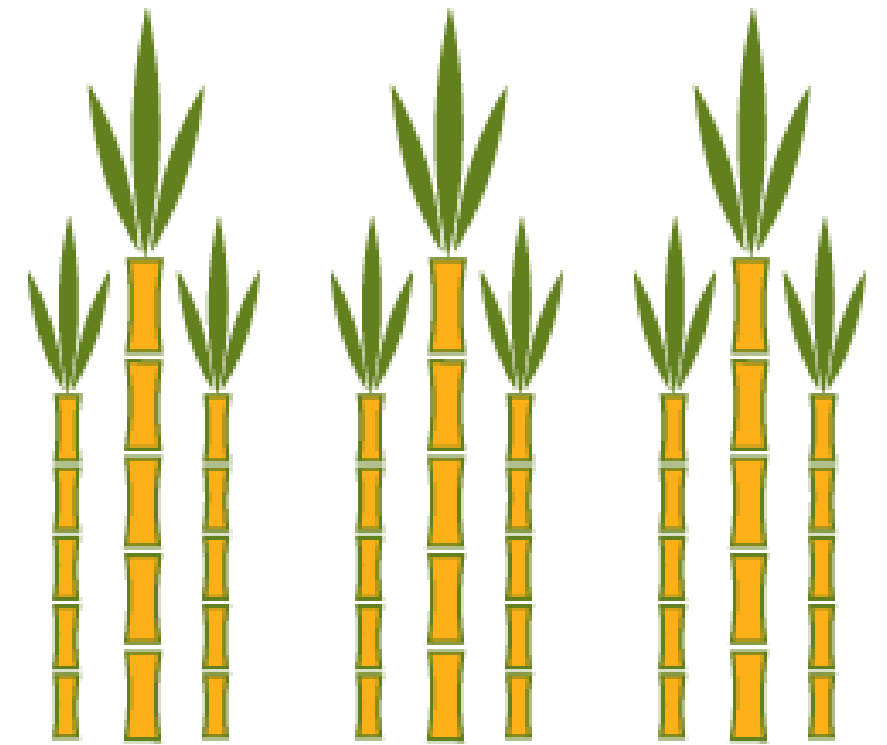

Sugar cane

Presented by:

Daniel Bachner

Global Head Sugar cane

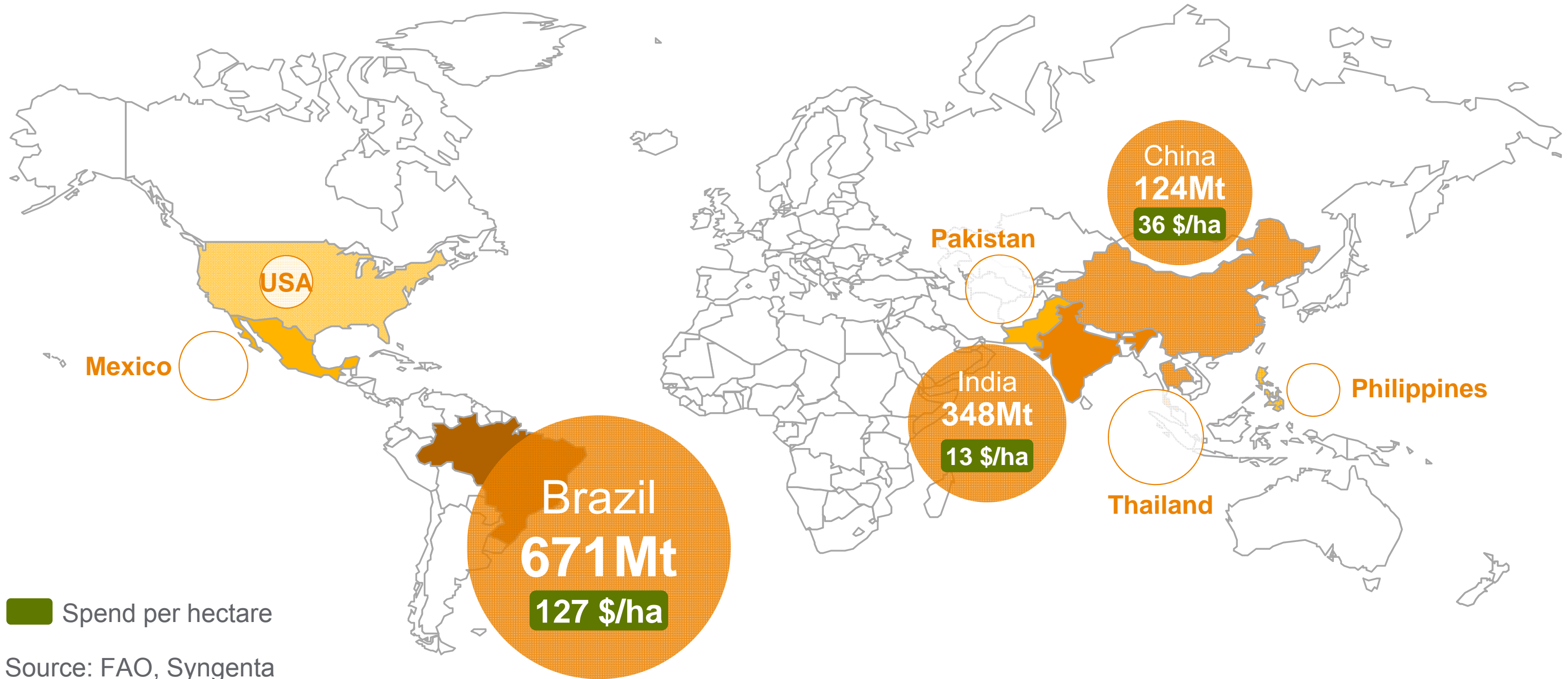


December 4, 2013

syngenta

Brazil: the world's leading sugar cane producer

2012 global sugar cane production: 1774Mt

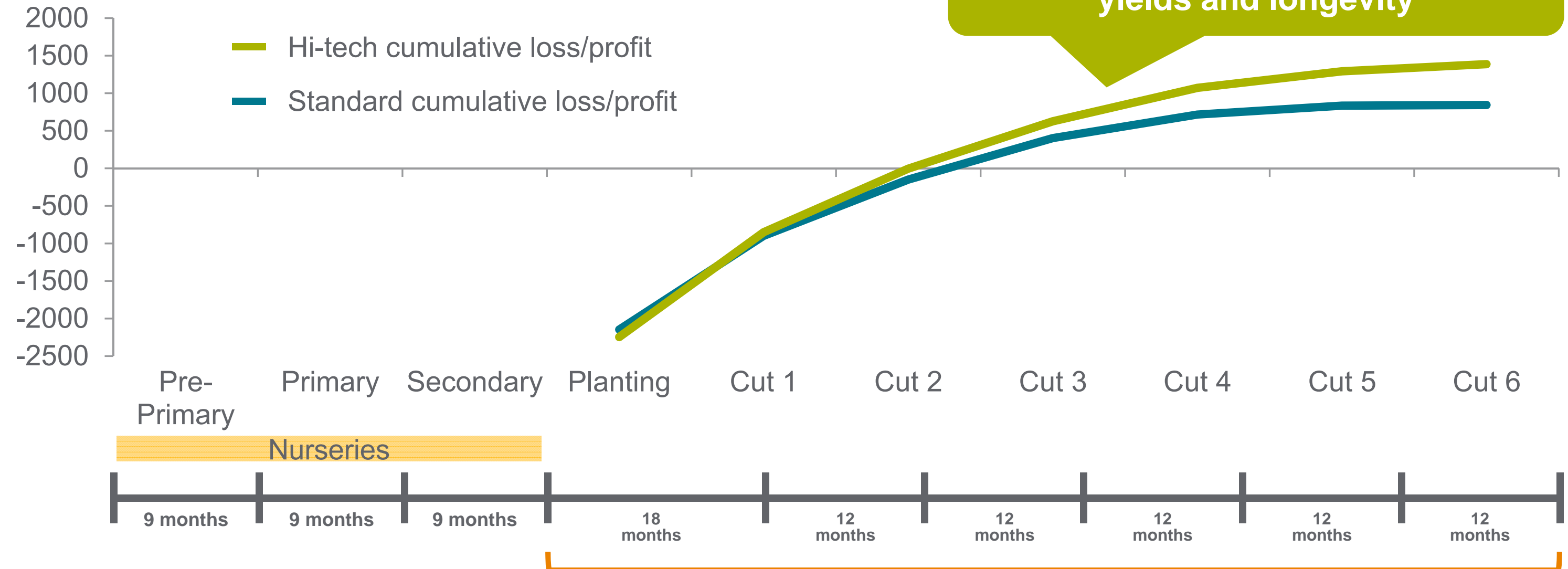


■ Spend per hectare

Source: FAO, Syngenta

Sugar cane: high upfront investments and long cycle

Complete sugar cane cycle
\$/Ha

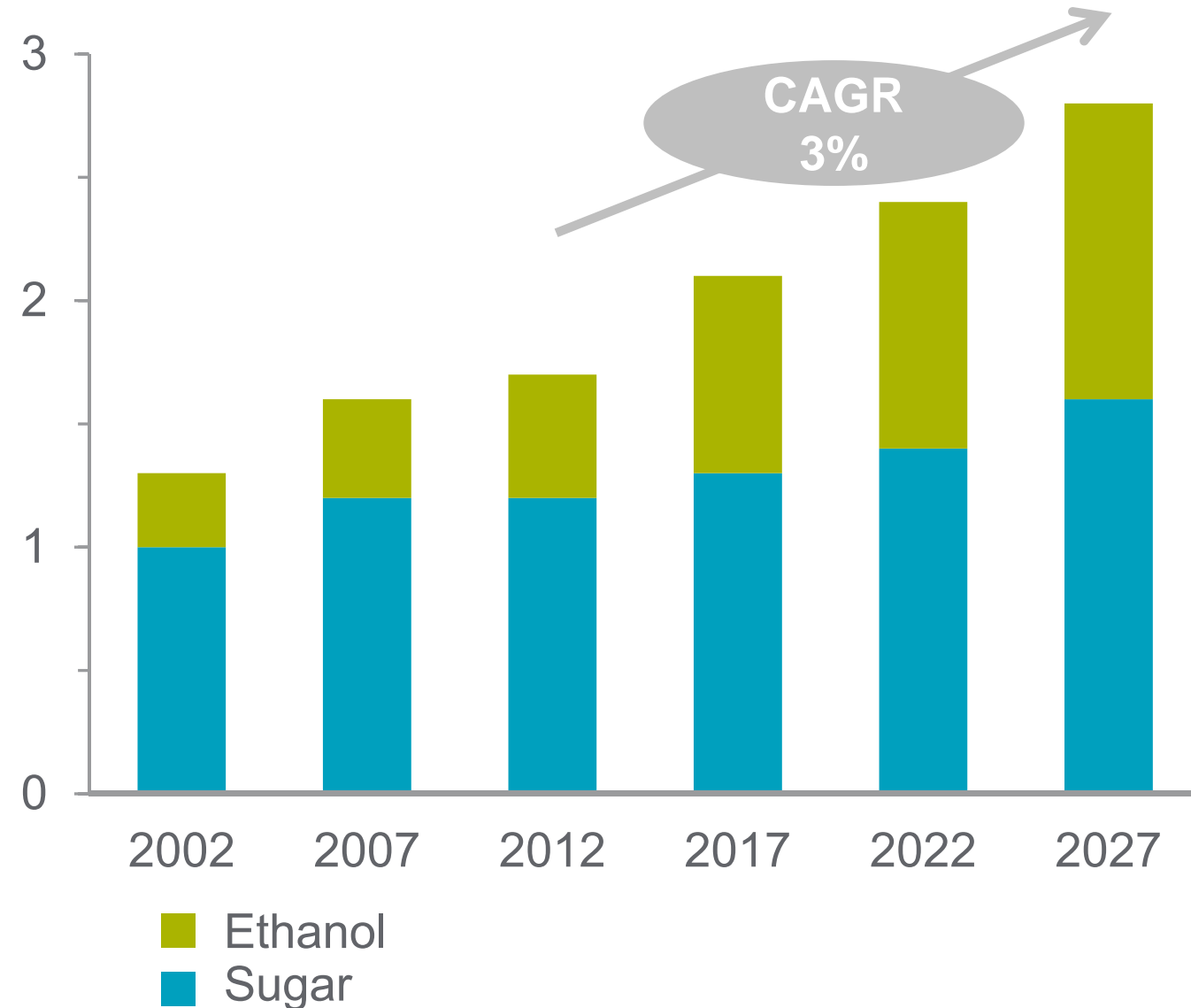


On average 6.5 years for entire crop cycle

Based on cane price \$22/ton, exchange rate \$1=R2.30

Continuing growth in global demand driven by ethanol use

World sugar cane demand
bn tons



Source: FAPRI, Datagro, Syngenta analysis

Ethanol

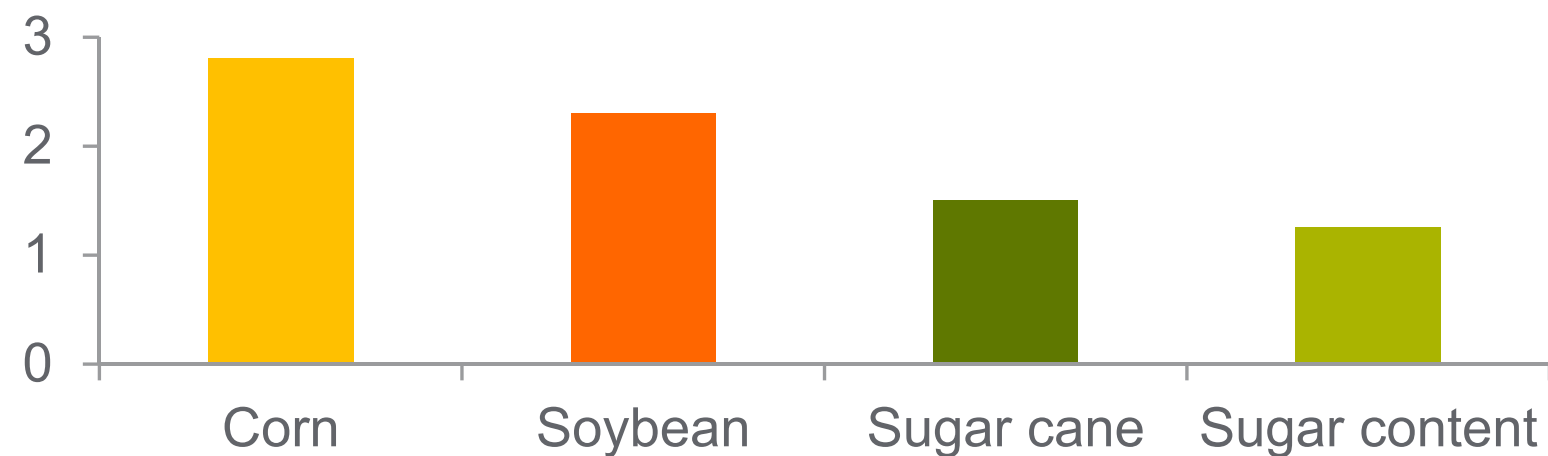
- Expanding base of flex-fuel cars in Brazil
- Blending mandates worldwide
- Growing use for other products such as bioplastics

Sugar

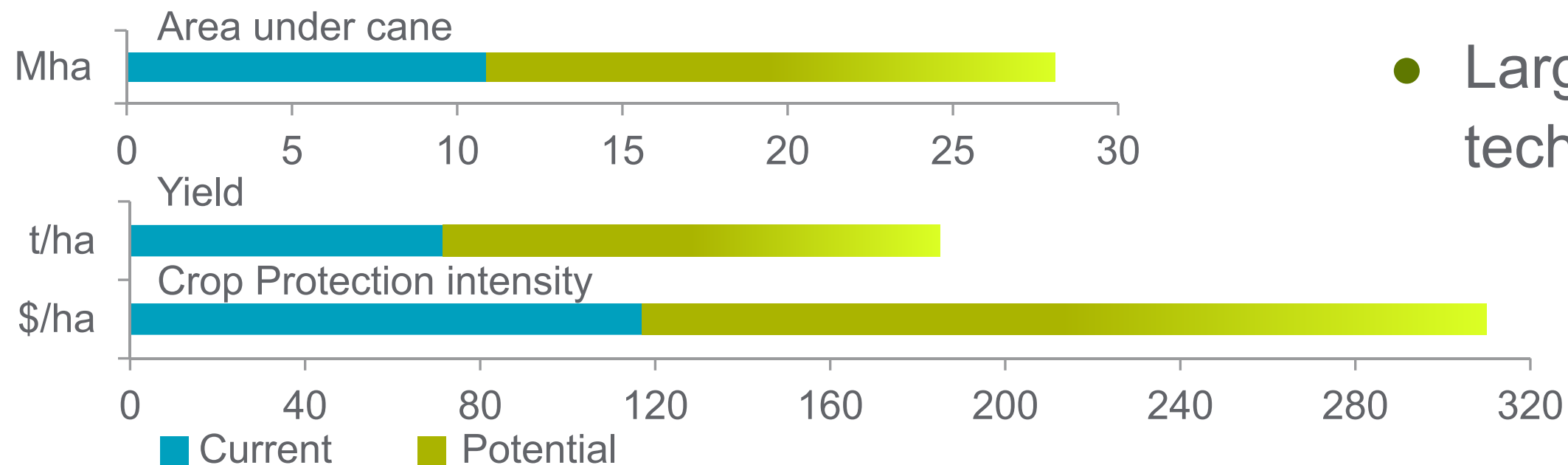
- Population growth
- Diet shift in large and fast growing emerging markets

Major opportunity for productivity improvement in Brazil

Brazil yield increase factor since 1960



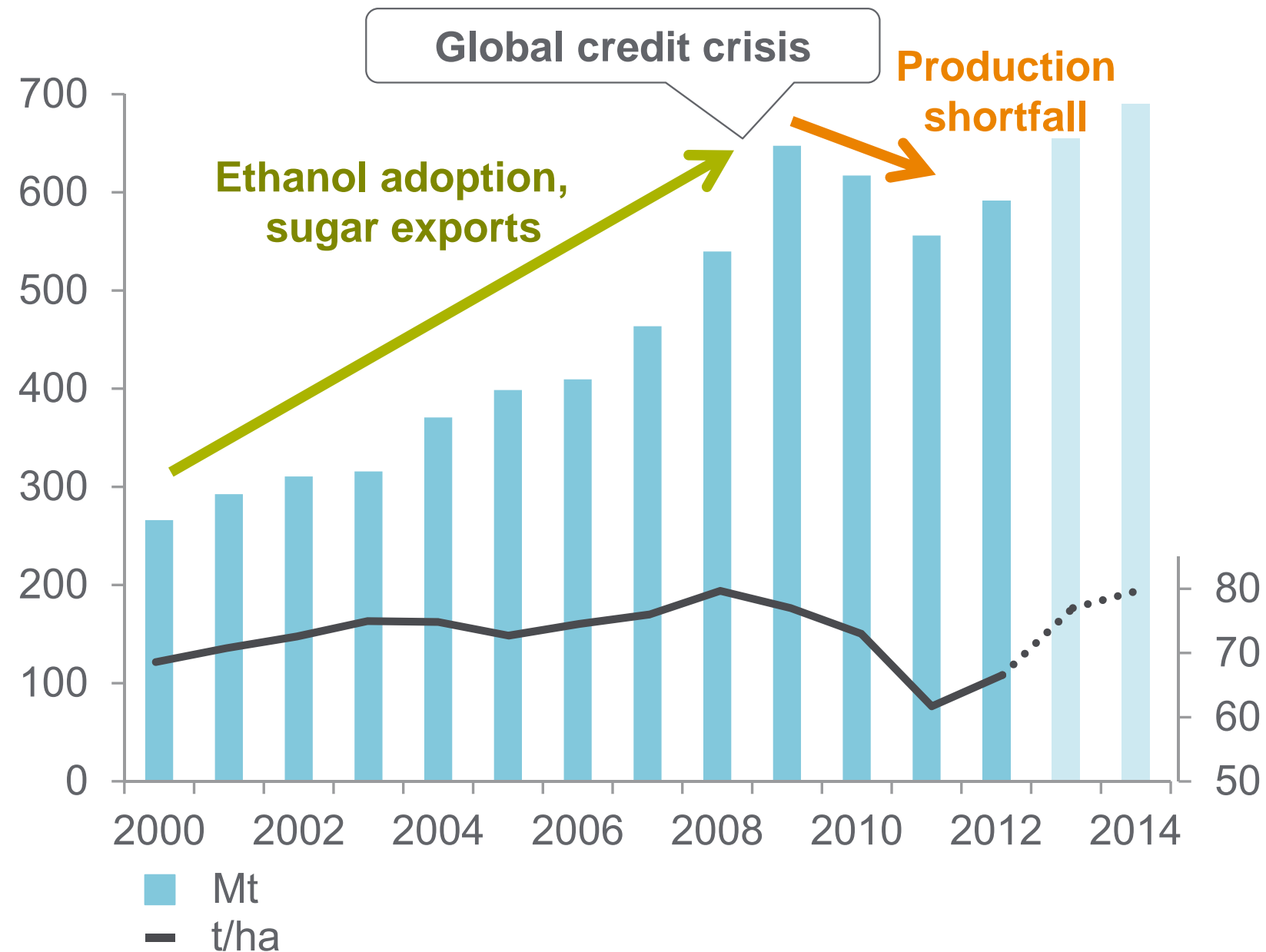
Brazil market opportunity to 2027



- Lack of investment has impacted sugar cane yield and quality
- Only country able to support large area expansion
- Large scale growers with technology mindset

Recent production shortfall set to reverse

Brazilian sugar cane production



Source: Datagro

Factors affecting production since 2008

Global credit crisis

- Low renewal rates
- Under-usage of crop protection

Unfavorable weather

- 2009: floods
- 2010-2012: drought

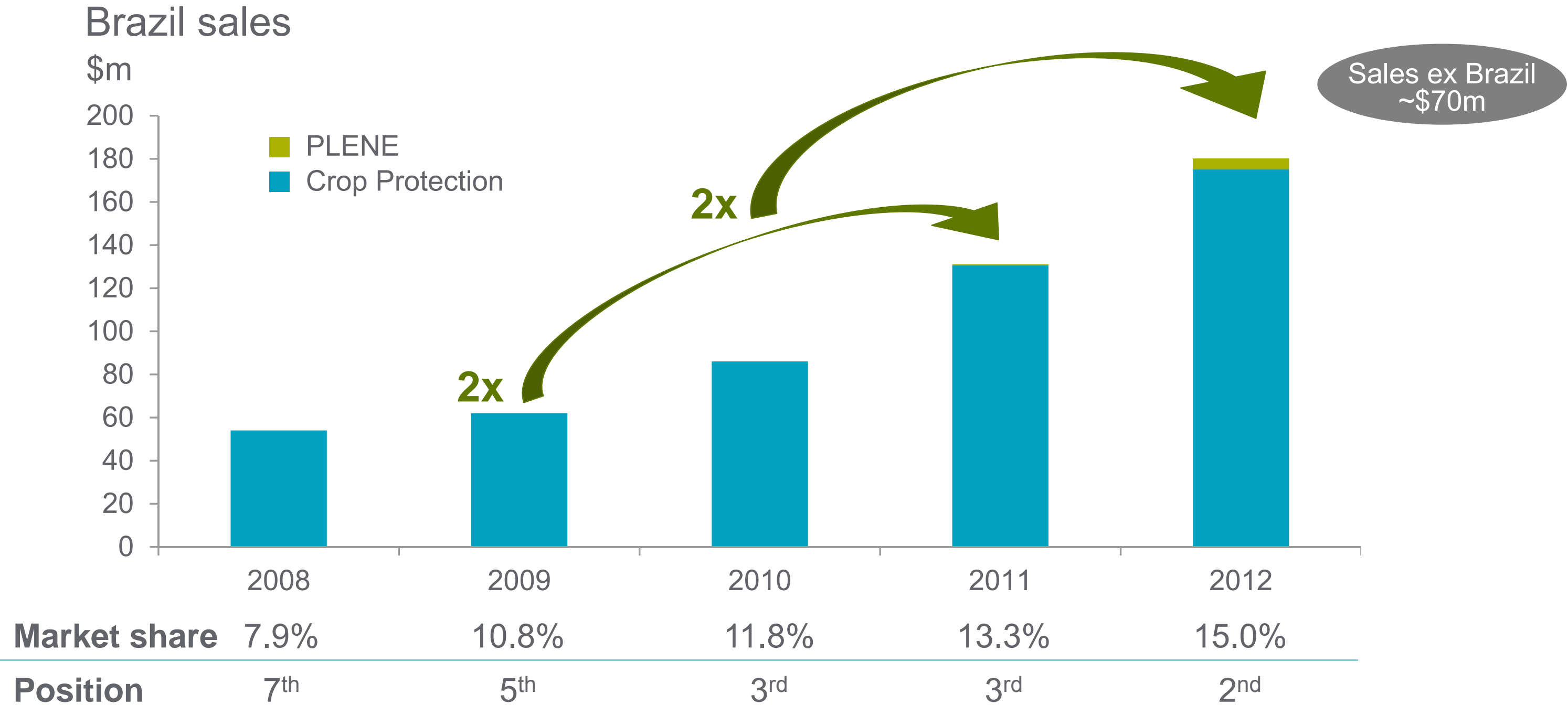
Environmental commitments

- Adoption of mechanization

Key consequences


- Yield decrease
- Idle industrial capacity
- Increase in unit costs

Syngenta Sugar cane Brazil: sales doubling every two years



Sugar cane faces many yield-limiting factors

Pests

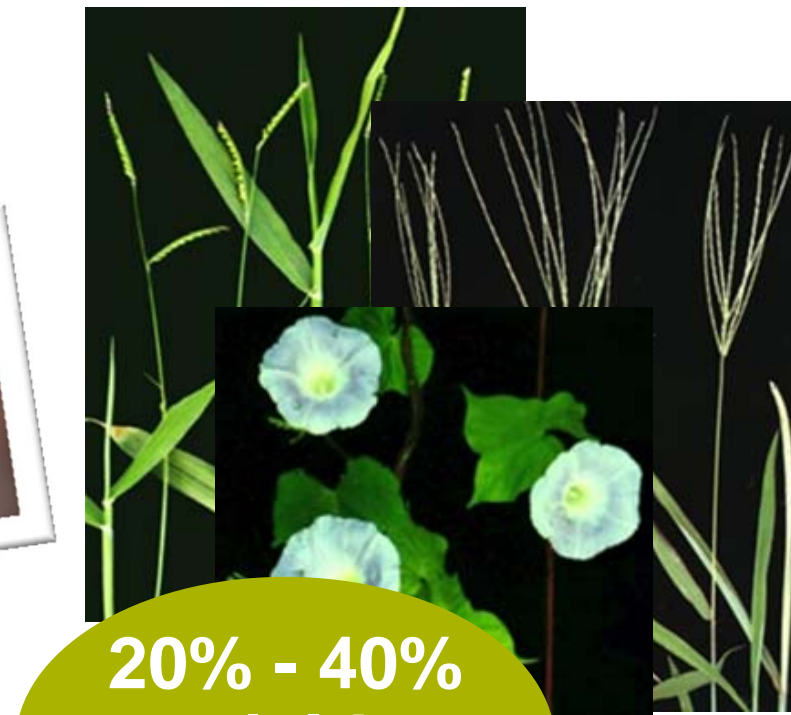


Sphenophorus
Migdolus
Termites
Leafhopper
Borer

Up to 50% yield impact

Equivalent to 6 tons sugar/ha

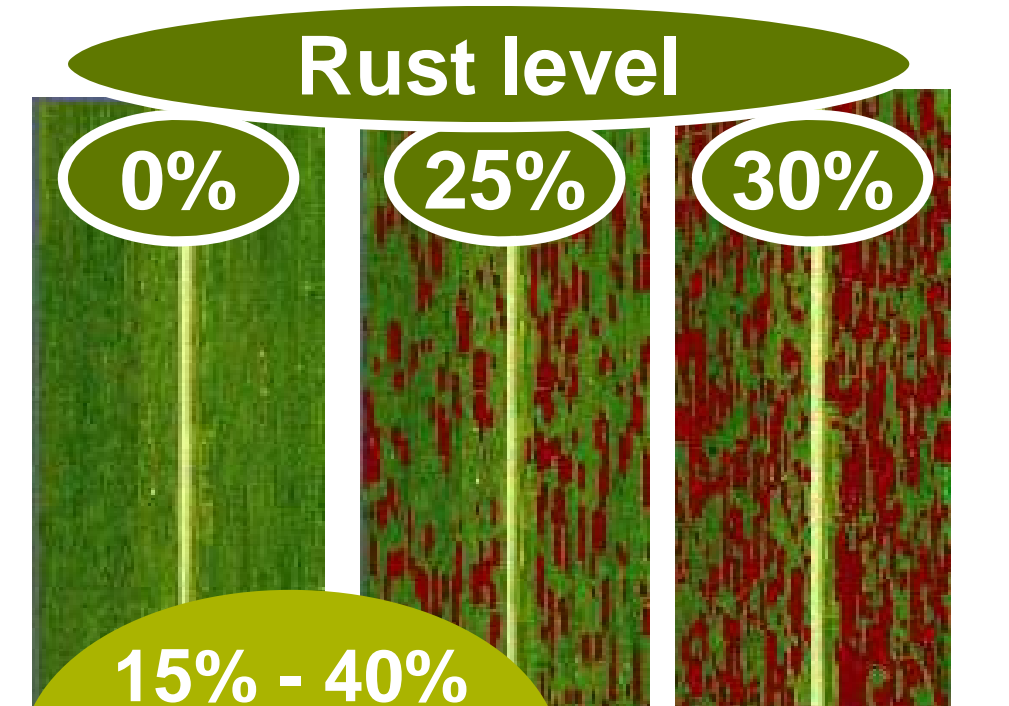
Weeds



20% - 40% yield impact

Equivalent to 4 tons sugar/ha

Diseases



Rust level

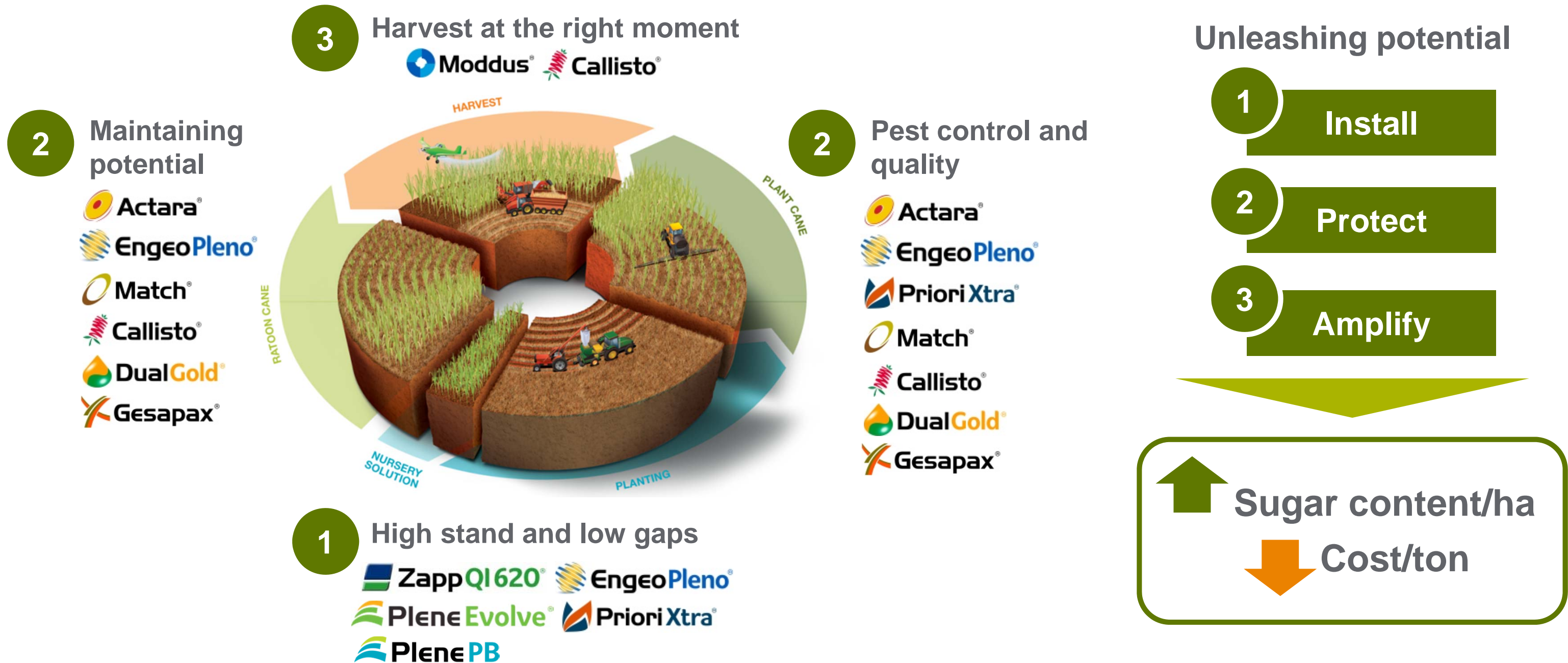
0% 25% 30%

15% - 40% yield impact

Equivalent to 3.5 tons sugar/ha

Source: IAC, Kuva et al (2003), Syngenta analysis

Addressing yield-limiting factors in an integrated way



Innovating beyond products: ACTARA example

Proprietary spray solution



- Environmental benefits
- Enhances competitiveness against generics

Key benefits

- Application at harvest
- Chemical becomes available when needed
- Substitutes aerial application
- Saves water and diesel

New PLENE opportunities opening up



- Expanding biofactory capacity to exploit germplasm quality advantage
- Adapting and rescaling manufacturing
- Ongoing collaboration with growers
- Launching new offers

 **Plene Evolve**[®]

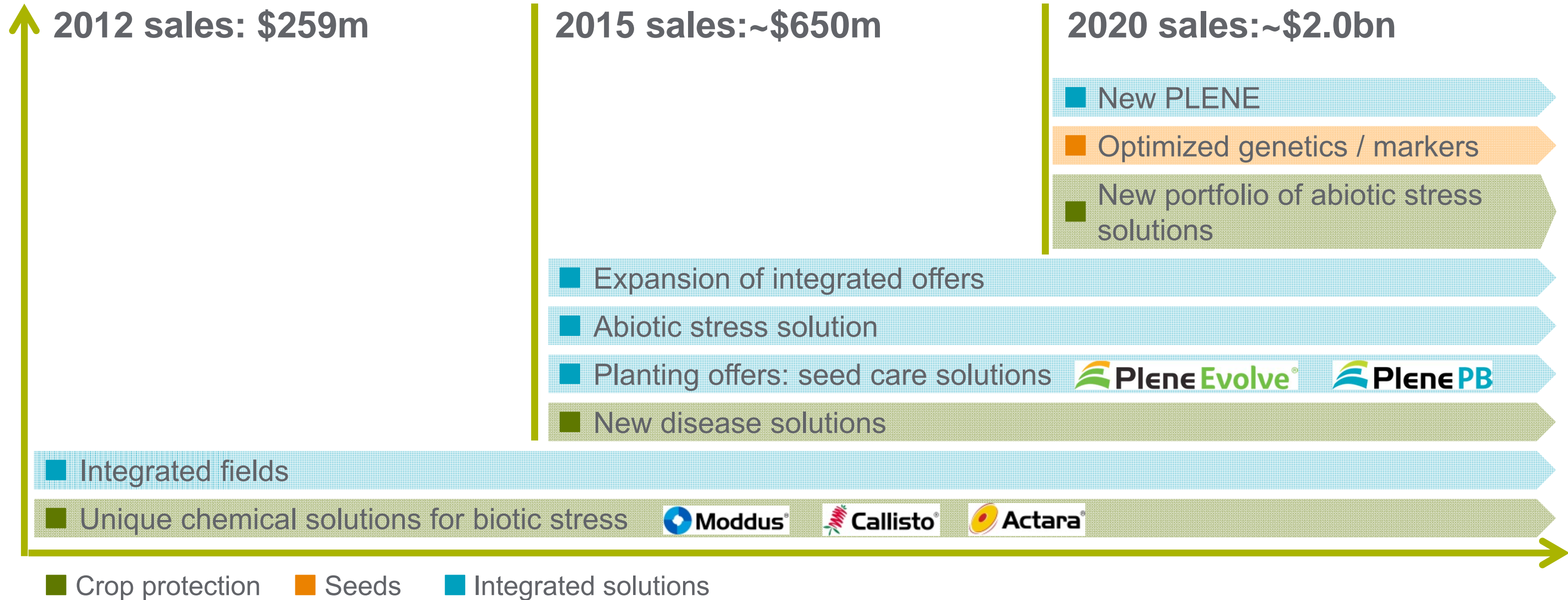
 **Plene PB**

At the forefront of biotech development



- Leveraging global biotech expertise
- Herbicide tolerance and insect resistance expected soon after 2020
- Evaluation of sugar, biofuel and second generation insect traits

Value creation horizons: Sugar cane



Somos

cana

Por uma **cana plena.**

**We are cane
For top cane productivity**

syngenta

Bringing plant potential to life