



Going Gold with Oilseeds for all the Right Reasons...Health and the Environment

James Iademarco, General Manager,
BioMaterials, BioScience March 10th, 2008



Canola Council of Canada Annual
Conference

The Bayer Climate Program supplies various problem-solving approaches



- Offices and industry building with zero emissions
- Climate friendly production
- Safeguard harvests, increase yields, and crop-based energy solutions

Approaches to Solving the Problem



- Stress-tolerant plants
 - Significant increase in yields for canola
 - Research into application for corn, cotton, and rice
- Classical Crop Protection
 - Active ingredients with stress-reducing effects

Going Gold for all the Right Reasons...



- Ag Feedstocks and the Biotech Tool Box
- Integrated Crop Portfolio
- Consumer and Industry Drivers
- Future of Oilseeds in the Bioeconomy
- How do all the Pieces Come Together?



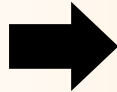
Feedstocks and the Toolbox



Feedstocks and the Toolbox



uses
biological feedstock



Carbohydrate



Oil

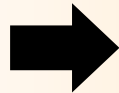


Protein

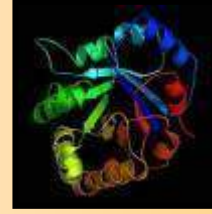


Biomass

and/or
biological processes



Fermentation

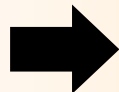


Biocatalysis



In-planta
production

to manufacture
new or existing
Bio-based products



Biofuels



Healthy
Oils



Coatings,
Adhesives
& Plastics

Today's Crop Management Factors



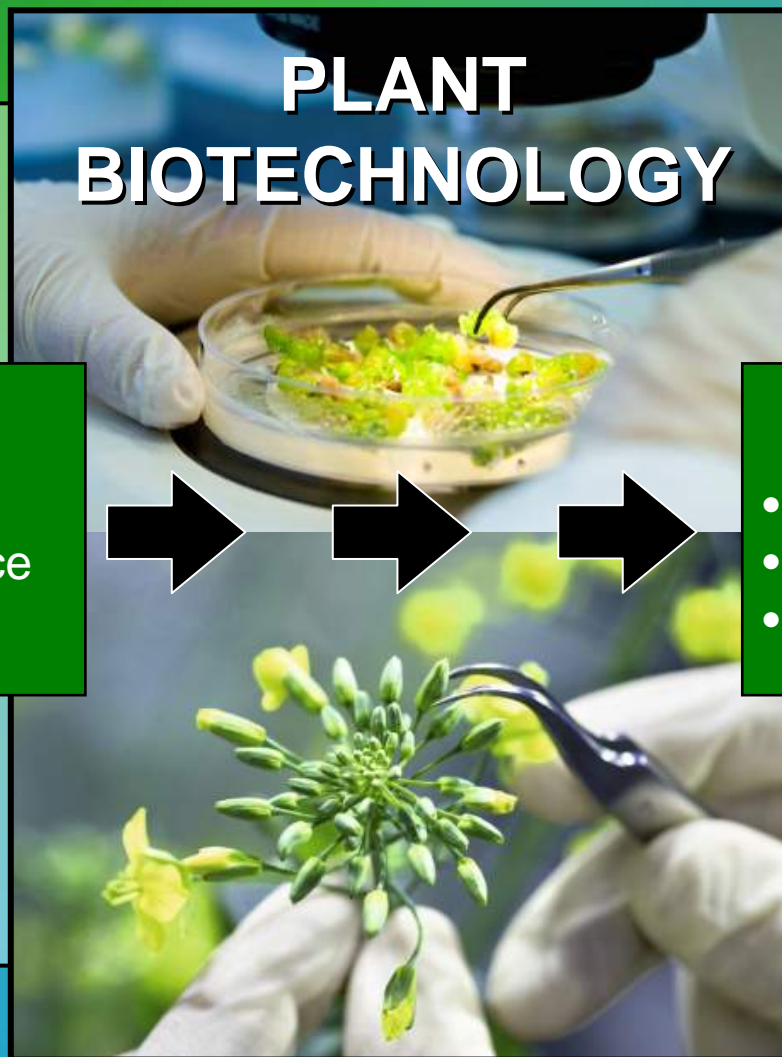
- Land Use
- Crop Rotation
- Water Availability
- Nutrients – Plant and Soil
- Crop Chemicals
- Plant Health
- Seed Varieties – Plant Genetics and Breeding
- Agbiotech → Single Gene Trait → Stacked Traits
- Crop Options/ Market opportunities



Integrated Crop Portfolio



Input Traits – Farmer Focused



PLANT BIOTECHNOLOGY

INPUT TRAITS (1st Generation)

- Herbicide Tolerance
- Insect Resistance

BENEFITS

- Higher productivity
- Greater efficiencies
- More options

Integrated Crop Portfolio



CANOLA

Seeds



Chemicals



rovralflo

decis

Sevin XLR

Liberty

Centurion

Traits



WHEAT

Chemicals

Raxil

VITAFLO 280



Folicur

BUCTRIL M

Thumper

INFINITY

STRATEGO

Input Traits – Farmer Focused



Second Generation

Biotic Stress

- Disease Resistance
- Nitrogen Utilization
- Yield Optimization/Quality
- Insect / Herbicide Tolerance

Abiotic Stress

- Heat Tolerance
- Cold Tolerance
- Drought Tolerance
- Soil Salinity Tolerance



2nd Generation Input Traits in Canola



Blackleg Leaf



Pod Shatter

2nd Generation Input Traits in Canola

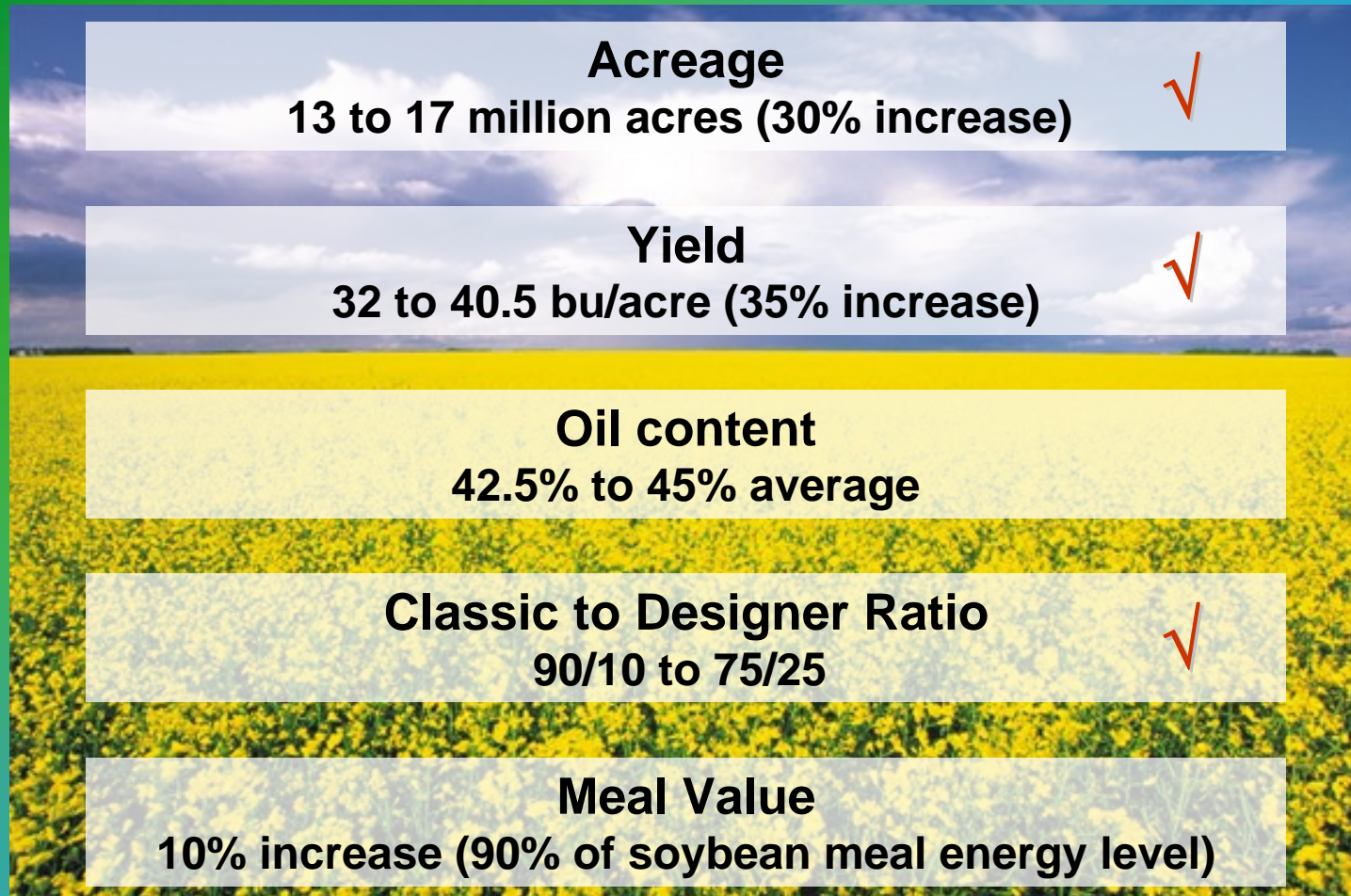


Abiotic Stress

Canola Council of Canada Goals for 2015 in Comparison to 2006



15M Tonnes Production





Consumer and Industry Drivers



Consumer and Industry Drivers



NUTRITION & HEALTH

Increasing Regulatory Requirements

Population Increasing

Rising Health Care Costs

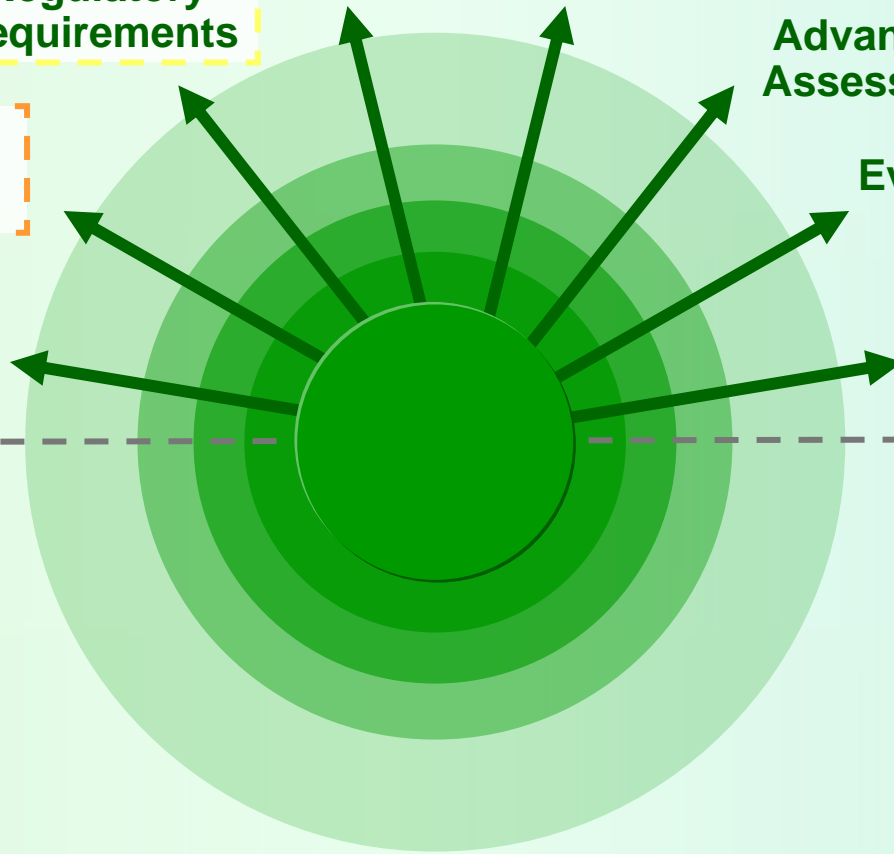
Advancing BioMarker & Assessment Technology

Increasing Nutrition Awareness

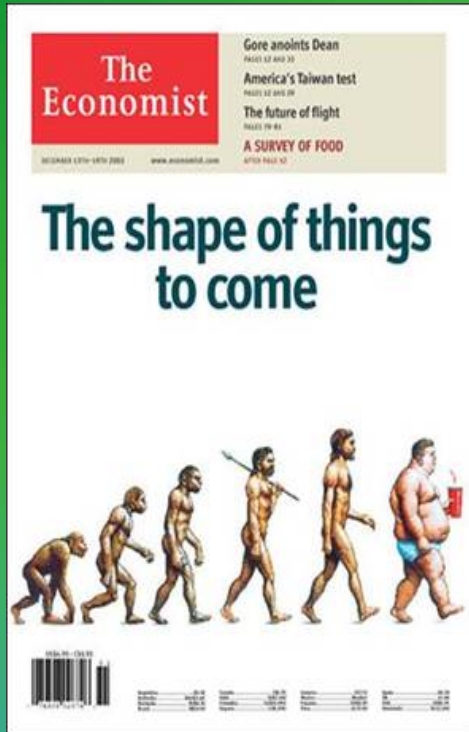
Evolving Nutrition Science

Obesity & Related Diseases

Consumer Needs: Simplicity Trust



Food for Thought: Who Will Lead ?



Transfat Reduction

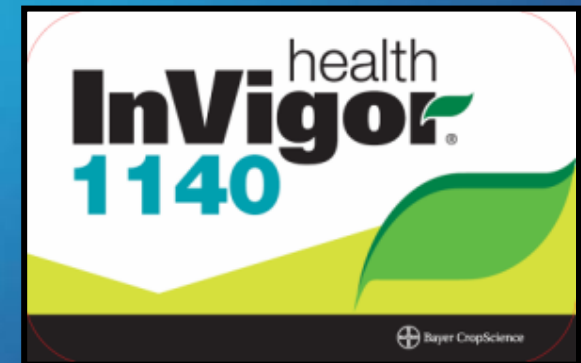
Not only a consumer demand but becoming public policy

Leading through Partnerships



Cargill +  **Bayer CropScience**

- 1st Gen available in 2008
 - High oleic and low linolenic (<3%)
- Bayer developing top producing InVigor hybrid seed varieties
- Cargill bringing market expertise and know-how in



InVigor® Health will be used in frying as a Zero Transfat Oil

Leading Through Partnerships



Cargill™ +



CNNMoney.com
McDonald's fries lose the trans fats

The world's largest fast-food chain is getting rid of artery-clogging trans fats on its menu; plans to have healthier oil in use at all U.S. restaurants within a year.

March 25, 2007

BUNGE +



KFC's Fried Chicken: Same great taste, but now with

0 GRAMS OF TRANS FAT
per serving



0 Grams Trans Fat
per serving

Output Traits - Consumer and Industry Driven



Markets: Health



Needs: Consumer & Industry

- Healthier oils
- Nutritional fortification
- Quality and elimination of allergens



Sustainable Solutions: Plant-based via Output Traits

- Modified oil profiles
- Up-regulation of vitamins and other compounds
- Functional groups
- Gene silencing



Environment and Industry Drivers



Industry and Environmental Drivers



NUTRITION & HEALTH

Increasing Nutrition Awareness

Obesity & Related Diseases

Increasing Regulatory Requirements

Growing & Aging Population

Rising Health Care Costs

Advancing BioMarker & Assessment Technology

Evolving Nutrition Science

Consumer Needs: Simplicity Trust

Rising Input Costs

Technological Breakthroughs

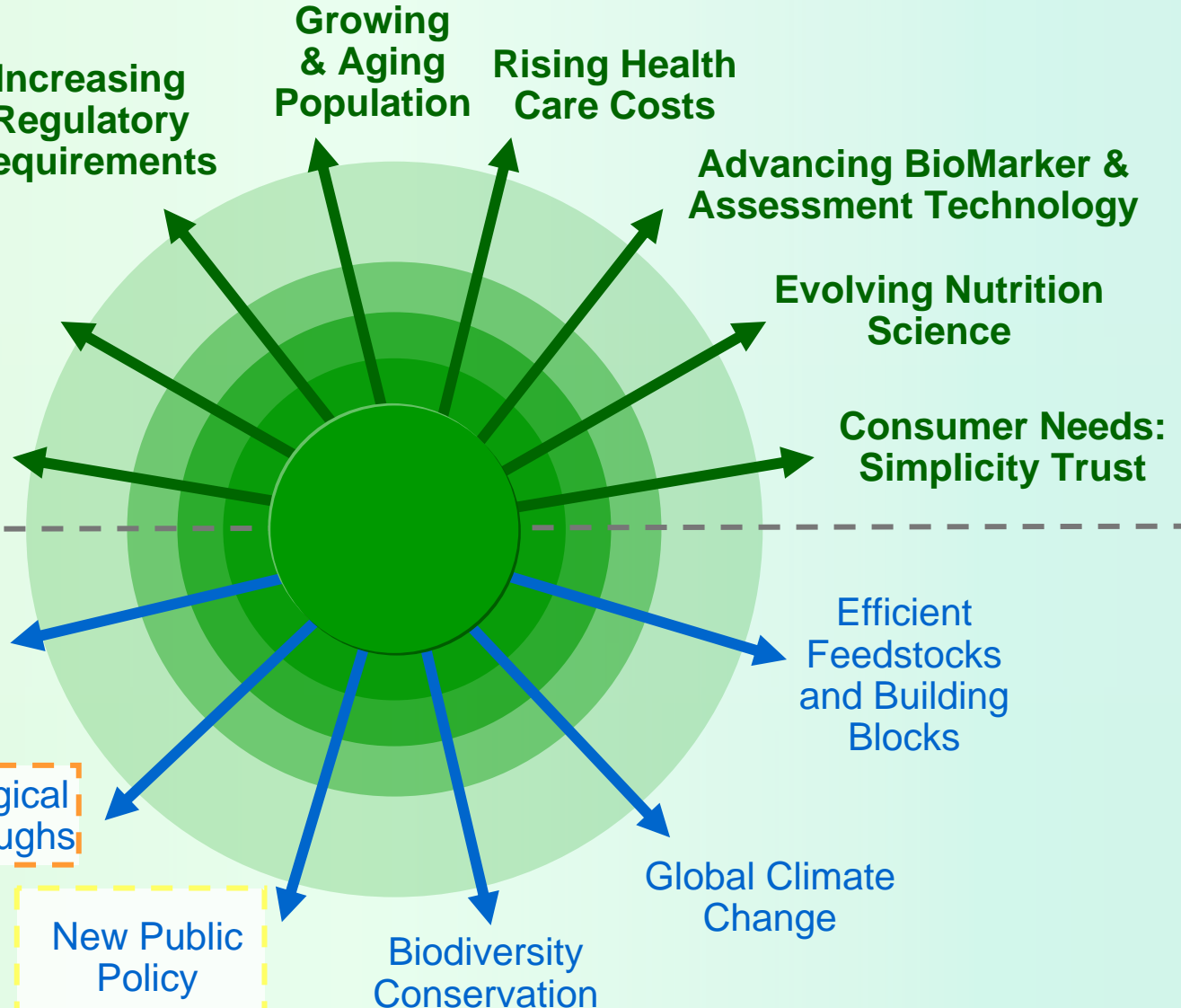
New Public Policy

Biodiversity Conservation

Global Climate Change

Efficient Feedstocks and Building Blocks

INDUSTRY & ENVIRONMENT



Who will Lead?



Süddeutsche Zeitung

Mittwoch, 9. Jänner 2008

ADM, Bayer und Daimler erforschen Jatropha-Biodiesel

Die Archer Daniels Midland Company (ADM), Bayer CropScience und Daimler planen, gemeinsam die Einsatzmöglichkeiten von Jatropha (*Jatropha curcas* L.) in der Biodieselindustrie zu erforschen. Eine entsprechende Vereinbarung wurde dazu unterzeichnet.

Jatropha ist die Kooperationspartner sehen die tropische Pflanze aus der Familie der Wolfsmilchgewächse als einen viel versprechenden Rohstoff zur Erzeugung von Biodiesel. Aus den Samen der Jatropha-Nuss hergestellter Biodiesel hat ähnliche Eigenschaften wie Treibstoff aus Ölsaaten. Er zeichnet sich zudem durch eine positive CO₂-Bilanz aus



Examples of Leading Through Partnerships



DONALD DANFORTH PLANT SCIENCE CENTER
DISCOVER • ENLIGHTEN • SHARE • NOURISH

Bioplastics from oilseeds



Enzymes for refining oilseeds



JV for bio-based chemicals



Higher value canola proteins

Output Traits- Consumer and Industry Driven



Markets: BioMaterials, Biochemicals, Biofuels



Needs: Consumer & Industry

- Enhanced performance
- Sustainable clean-tech solutions
- New compounds



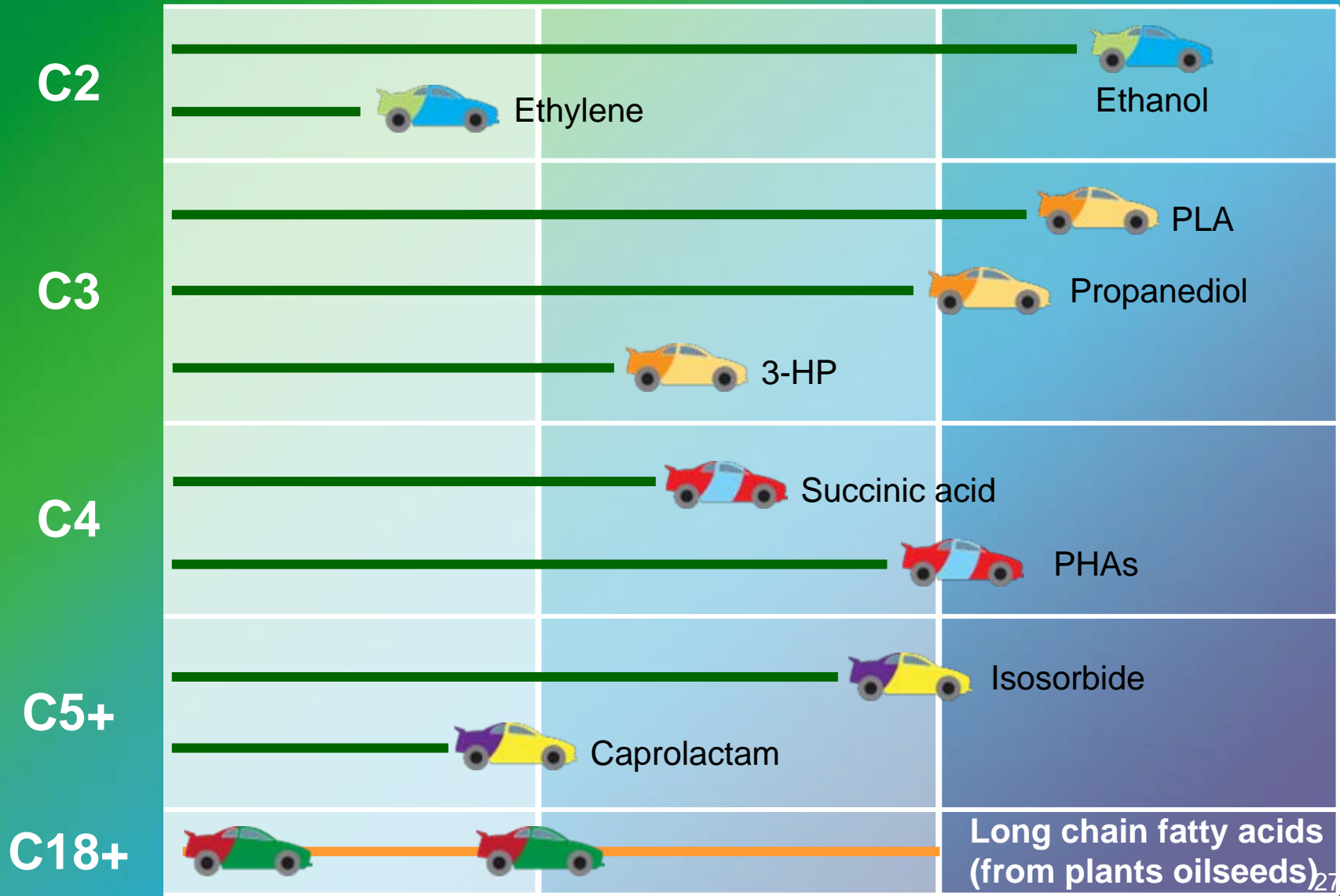
**Sustainable Solutions:
Plant-based via Output Traits**

- Up-regulation fatty acids or other compounds
- Functional groups
- Plant modification for superior processing

Where Can Plant Biotech Contribute?



Chain Length *Feasibility* *Development* *Commercial*



Multiple Products and Markets from Production Crop

High Value Seeds



Biomass



Targeted Fatty Acid



Glycerin



Biodiesel



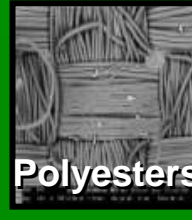
Purified Monomer



Adhesives



Polyesters



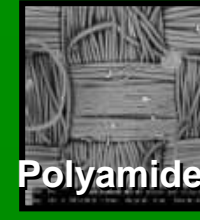
Bio and chemical derivatives



Flavors
Fragrances



Lubricants
Anti-corrosion



Polyamides



Future of Oilseeds in the Bioeconomy



Future of Oilseeds in the Bioeconomy



Palm



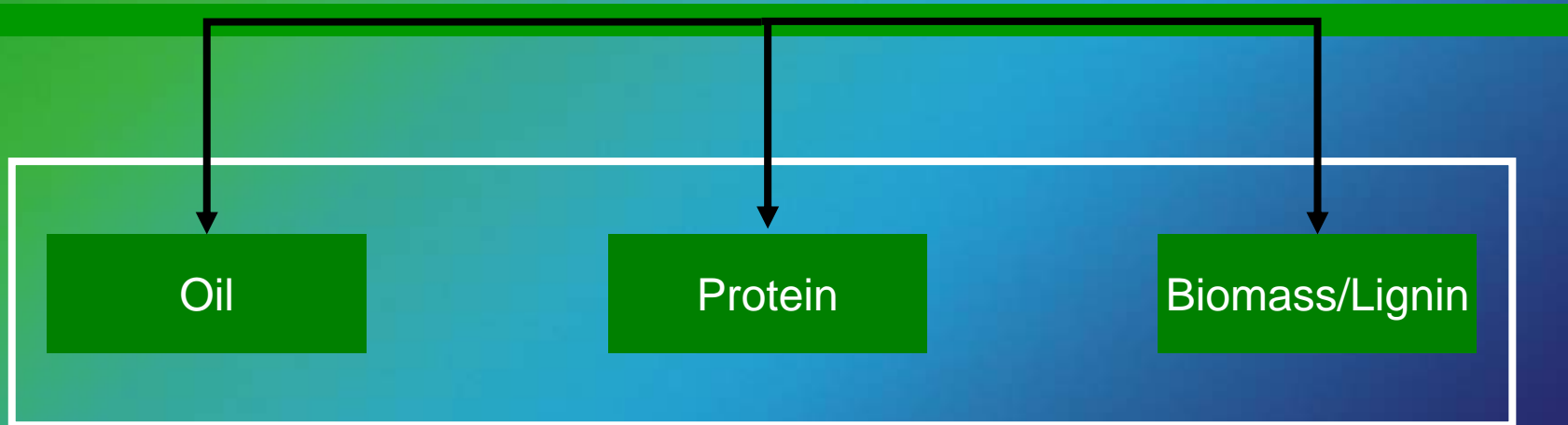
Soybeans



Rapeseed



Small Acreage



Future of Oilseeds in the Bioeconomy



Canola



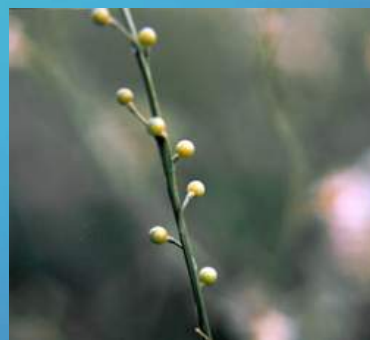
Flax



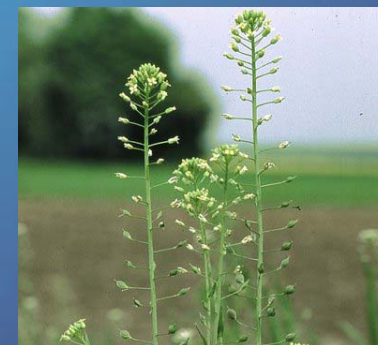
- Higher oil content and zero saturates
- DHA functionalized - enhanced nutrition
- Protein isolates for nutrition and personal care

- Good starting profile for industrial fatty acids
- Non-food crops with lower inputs and adaptation to diverse climates
- Integrated crop management options

Crambe



Camelina



Ongoing Industry Research in these Small Acreage Oilseed Crops



Common name	Latin name
Jojoba	<i>Simmondsia chinensis</i>
Sunflower	<i>Helianthus annus L</i>
Jatropha	<i>Jatropha curcas</i>
Flax	<i>Linum usitatissimum</i>
Ethiopian mustard	<i>Brassica carinata</i>
Castor	<i>Ricinus communis L., Euphorbiaceae</i>
Safflower	<i>Carthamus tinctorious L.)</i>
Crambe	<i>Crambe abyssinica</i>
Cuphea	<i>Cuphea viscosissima Jacq</i>
Camelina	<i>Camelina sativa</i>
Lesquerella	<i>Brassicaceae Cruciferae</i>



Bayer's Core Seed Platforms



Vegetables

No. 4 in the world

Focus on hybrids and consumer driven traits



Rice

No. 1 in hybrid seeds in India. Expansion into new Asian markets

Focus on hybrids, high yields and superior quality



Cotton

A leading cotton seed company in the U.S. and globally

Focus on high yields and superior fiber quality



Canola

No. 1 canola seed company in North America.

Focus on high yields and superior agronomic characteristics



Success Realized as All the Pieces Come Together



Success Realized as All the Pieces Come Together



Success Realized as All the Pieces Come Together



THANK YOU



Planning Families  Enjoying Love

Science For A Better Life



How many have had a greater impact on their lives than the introduction of the birth control pill? ...

... As one of the early pioneers, Bayer's pioneering Pharma has become the world's largest and most innovative company in the field of birth control today. This means more than just the traditional oral pill - a wide range of hormone-based methods for preventing pregnancy already exist - even in such together with the traditional pill.

Find the right one for you at www.bayer.com

Securing Harvests  Preserving Nature

Science For A Better Life



Today, agriculture is about more than just growing food for a growing, growing world population. It's about protecting the environment, too. ...

... Bayer's CropScience division has already made significant contributions to the world's food supply. ...

The New Bayer | HealthCare | CropScience | MaterialsScience

Exploring Life  Fulfilling Dreams

Science For A Better Life



Did you know people already live on our planet, and the number is growing by 200,000 every day. How can we provide food for more and more people without damaging the environment? ...

... How can we improve everyone's health and prevent disease? How can we develop new medicines to help us overcome resistance? ...

... Bayer has responded: that's to provide better answers to these questions. The New Bayer consists of three subsidiaries: HealthCare, CropScience and MaterialsScience. Fields in which Bayer is already a global leader - and whose importance to the future of humankind grows by the day. www.bayer.com

HealthCare | CropScience | MaterialsScience | The New Bayer

Optimizing Plastics  Increasing Safety

Science For A Better Life



... The world is full of plastics. ...

... Bayer's MaterialsScience division is working to make plastics safer and more sustainable. ...

The New Bayer | HealthCare | CropScience | MaterialsScience

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