Keynote Agricultural Solutions

Saori Dubourg
Member of the Board of Executive Directors

Vincent Gros
President Agricultural Solutions

Dr. Peter Eckes
President Bioscience Research

BASF Capital Markets Day
Ghent, Belgium, September 27, 2019
Cautionary note regarding forward-looking statements

This presentation contains forward-looking statements. These statements are based on current estimates and projections of the Board of Executive Directors and currently available information. Forward-looking statements are not guarantees of the future developments and results outlined therein. These are dependent on a number of factors; they involve various risks and uncertainties; and they are based on assumptions that may not prove to be accurate. Such risk factors include those discussed in Opportunities and Risks on pages 123 to 130 of the BASF Report 2018. BASF does not assume any obligation to update the forward-looking statements contained in this presentation above and beyond the legal requirements.
Agenda

1. Market environment

2. Agricultural Solutions – focus area of BASF

3. The new BASF in agriculture in 2019

4. Target markets

5. Differentiators

6. Key measures

7. Targets
The world in 2030

Population growth
~9 billion people need food

Growing middle class
High demand for calories and protein rich diet

Climate change
High volatility in crop production and farmer income

Limitations in arable land
Arable land under pressure, limited expansion possible

---

1 GDP growth per person 2018–2030: China +80%; India +90%; Indonesia +60%
2 World Bank: hectares per person 1994–2016: -23%
The society in 2030

- Increased urbanization
  Acceptance of digital technologies; ag labor shortage

- Demand for healthy, sustainable food
  Consumers demand transparency and sustainability

- Increasing regulatory requirements
  Drive for innovative solutions

- Trade conflicts
  Increased trade frictions and local food demand

Increasing regulatory requirements
Drive for innovative solutions
Demand for healthy, sustainable food
Consumers demand transparency and sustainability
Trade conflicts
Increased trade frictions and local food demand
Increased urbanization
Acceptance of digital technologies; ag labor shortage

September 27, 2019 | BASF Capital Markets Day
The farm in 2030

50% higher productivity required
Drives growth in high-quality seeds and crop protection

Increased farm professionalization
Strong focus on digitalization and farm management systems

Resistance to existing crop protection products
Strong demand for novel modes of action

Drives growth in high-quality seeds and crop protection

50% higher productivity required

Increased farm professionalization
Strong focus on digitalization and farm management systems

Resistance to existing crop protection products
Strong demand for novel modes of action
Agricultural solutions is an attractive market driven by increasing demand for food

- Crop protection and seeds continue to grow
- Main drivers are increasing yields and growing technology adoption
- Lower growth in crop protection products due to higher regulatory pressure and increasing application of precision farming tools
- Digital applications market grows rapidly, potentially reaching €10 billion by 2030
- Farmers will look to combine crop protection, seeds, digital and application technologies while fulfilling societal requirements

Market size
billion €

<table>
<thead>
<tr>
<th>Year</th>
<th>Market Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>62 billion</td>
</tr>
<tr>
<td>2018</td>
<td>92 billion</td>
</tr>
<tr>
<td>2030</td>
<td>130 billion</td>
</tr>
</tbody>
</table>

CAGR

- 5%
- 3%
All regions are of significant size and will contribute to market growth

Regional market size
billion €

North America

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2018</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>16</td>
<td>27</td>
<td>36</td>
</tr>
<tr>
<td>CAGR</td>
<td>+7%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Europe, Middle East, Africa

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2018</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>15</td>
<td>22</td>
<td>29</td>
</tr>
<tr>
<td>CAGR</td>
<td>+5%</td>
<td>+2%</td>
<td></td>
</tr>
</tbody>
</table>

South America

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2018</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>13</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>CAGR</td>
<td>+3%</td>
<td>+3%</td>
<td></td>
</tr>
</tbody>
</table>

Asia

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2018</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>18</td>
<td>28</td>
<td>41</td>
</tr>
<tr>
<td>CAGR</td>
<td>+6%</td>
<td>+3%</td>
<td></td>
</tr>
</tbody>
</table>

Source: BASF estimates and AgbioInvestor/PMD
1. Market environment
2. **Agricultural Solutions – focus area of BASF**
3. The new BASF in agriculture in 2019
4. Target markets
5. Differentiators
6. Key measures
7. Targets
Agricultural Solutions is strongly contributing to BASF’s purpose “We create chemistry for a sustainable future”

- **~5%** Sales to 3rd parties CAGR 2012 – 2018\(^1\) (organic growth +3%)
- **~23%** Average EBITDA margin before special items 2012 – 2018\(^1\)
- **~13%** Average return on capital employed 2012 – 2018\(^1\)
- **~€2.3 billion** Average annual sales with products on the market for less than 5 years 2012 – 2018
- **€6 billion** Peak sales potential of innovation pipeline 2018 – 2028

\(^1\) In 2018, earnings were impacted by integration costs due to the acquisition of businesses and assets from Bayer and the timing of the acquisition.
Agricultural Solutions is a major earnings contributor to BASF Group

Sales, last 12 months\(^1\)
- Agricultural Solutions: 12%
  - €62.5 billion

EBITDA before special items, last 12 months\(^1\)
- Agricultural Solutions: 18%
  - €8.4 billion

Capex budget 2019–2023
- Agricultural Solutions: 6%
  - €21.3 billion

Expected annual R&D expenditures
- Agricultural Solutions: 39%
  - ~€2.3 billion

\(^1\) H2 2018 + H1 2019 as reported; the acquisition of businesses and assets from Bayer was closed in August 2018
Agricultural Solutions is a focus area of BASF and benefits from the integration into the production and know-how Verbund

- Agricultural Solutions sources ~25% of its raw materials, formulation components and catalysts from other BASF businesses
- Integrated biotechnology research platform
- Formulation know-how and development platform
- Synergies in digitalization

1 Until signing of a transaction agreement Construction Chemicals will be reported under Surface Technologies
BASF Verbund is key success factor to accelerate development, registration and launch of innovative crop protection products

**Revysol®**
> €1 billion estimated peak sales potential

**Inscalis®**
Low triple digit million euro estimated peak sales potential
Providing innovative solutions that enable agricultural productivity, environmental protection and value to society

Societal requirements

- CO₂-neutrality
- Ability to cope with extreme weather events
- Maintain and increase biodiversity
- Foster trust in science

Contribution of BASF Agricultural Solutions

- Optimized crop production and higher yield (lower inputs, higher outputs)
- High-yield and stress-tolerant crops
- Digital technologies for targeted applications
- Sustainability in practice
- Industry-leading sustainability criteria
- Increased transparency
AgBalance™ – supporting farmers in measuring, demonstrating and improving their sustainability performance

- Holistic method for life-cycle assessment in agricultural and food value chain production processes
- Enables assessment of all three sustainability pillars (ecology, society and economy)
- Helps farmers make informed decisions to improve sustainability of farming practices
- AgBalance™ has been used to improve sustainable cultivation of crops such as oilseed rape/canola, corn, soybean, wheat and vegetables

Example:
Application of urease inhibitor Limus® in wheat farming in Germany

- Greenhouse gas emissions -4%
- Acidification -40%
- Eutrophication -8%
Finding the **right balance**

for **success**

for **farmers, agriculture and future generations**
Agenda

1. Market environment
2. Agricultural Solutions – focus area of BASF
3. The new BASF in agriculture in 2019
4. Target markets
5. Differentiators
6. Key measures
7. Targets
Structural integration of acquired businesses and assets successfully completed

Business continuity from **Day 1** onwards

Around **€2 billion** sales in 12 months after closing

More than **4,500** colleagues integrated

All **key personnel** joined BASF

**200** sites in **60** countries integrated

**Complementary portfolios** of products and services

Enhanced **R&D** pipeline, capabilities and scale

**ERP** system migration completed
Following structural integration, the focus is now on realizing synergies and measures to further increase competitiveness.

Focus on realization of top-line synergies:
- Significant contribution in North America expected from combining seeds and crop protection products
- Brazil is aiming for synergies from seeds business
- Asia and Europe to contribute to synergies through connected offers and new customers
- Realization of synergies in 2019 on track

Measures to increase efficiency and commercial excellence:
- More than 350 measures identified in the areas of commercial excellence, R&D and regulatory, inventory and capital expenditures, procurement and organizational efficiency
- Improving performance short-term, strengthening BASF in agriculture for long-term success

Top-line synergy potential by 2025: mid triple-digit million euro
Earnings contribution from efficiency program by 2022: ~€200 million
BASF transformed from a crop protection company into a provider of agricultural solutions

- Ability to provide connected offer of crop protection products, seeds and digital solutions in selected crops
- Global number 3 position in crop protection strengthened (e.g., in herbicides, seed treatment)
- Relevant number 4 position in seeds with leading position in canola and, in future, hybrid wheat

New competitive position

Legacy BASF Agricultural Solutions portfolio

Acquired businesses and assets
Following the acquisition, BASF is fully enabled to offer innovative solutions with strong brands in all indications and sectors. 

Seeds & traits
- Stoneville
- FiberMax
- Credenz
- InVigor
- LibertyLink
- Clearfield
- Provisia

Seed treatment
- Standak® Top
- Nodulator® PRO

Crop protection
- Basta®
- Liberty®
- F500®
- Inscalis®
- Revysol®
- Nealta®
- Initium®
- Kixor®
- Xemium®
- Engenia®

Digital farming
- SCOUTING
- FIELD MANAGER
- HEATHLY FIELDS

1 Representative selection of brands and active ingredients
Well-balanced portfolio with significant presence in all regions, indications and sectors

Sales by region, last 12 months\(^1\)

<table>
<thead>
<tr>
<th>Region</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>South America</td>
<td>20%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>10%</td>
</tr>
<tr>
<td>Europe</td>
<td>29%</td>
</tr>
<tr>
<td>North America</td>
<td>41%</td>
</tr>
</tbody>
</table>

€7.4 billion (+€1.8 billion vs. prior last 12 months)

Sales by indication and sector, last 12 months\(^1\)

<table>
<thead>
<tr>
<th>Sector</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds &amp; traits</td>
<td>18%</td>
</tr>
<tr>
<td>Herbicides</td>
<td>35%</td>
</tr>
<tr>
<td>Fungicides</td>
<td>30%</td>
</tr>
<tr>
<td>Insecticides</td>
<td>10%</td>
</tr>
<tr>
<td>Seed treatment</td>
<td>7%</td>
</tr>
</tbody>
</table>

€7.4 billion (+€1.8 billion vs. prior last 12 months)

---

1 H2 2018 + H1 2019 as reported; the acquisition of businesses and assets from Bayer was closed in August 2018.
Acquired seeds business with record sales in canola, cotton and vegetables in H1 2019

Sales Agricultural Solutions by region, H1 2019

<table>
<thead>
<tr>
<th>Region</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>South America</td>
<td>10%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>10%</td>
</tr>
<tr>
<td>Europe</td>
<td>36%</td>
</tr>
<tr>
<td>North America</td>
<td>44%</td>
</tr>
</tbody>
</table>

€4.4 billion (+€1.2 billion vs. H1 2018)

Sales by indication and sector, H1 2019

<table>
<thead>
<tr>
<th>Sector</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds &amp; traits</td>
<td>23%</td>
</tr>
<tr>
<td>Herbicides</td>
<td>34%</td>
</tr>
<tr>
<td>Insecticides</td>
<td>9%</td>
</tr>
<tr>
<td>Fungicides</td>
<td>28%</td>
</tr>
<tr>
<td>Seed treatment</td>
<td>6%</td>
</tr>
</tbody>
</table>

€4.4 billion (+€1.2 billion vs. H1 2018)
Legacy crop protection business impacted by adverse weather conditions and trade conflicts in H1 2019

Challenging season in North America
- Global trade conflicts impacted market development
- Severe drought in Canada burdened fungicides business
- Delayed planting and unfavorable crop conditions in the U.S. due to adverse weather conditions and flooding
- Negative mix effect due to weak demand for crop protection products and less soybean acres
- Substantial destocking by distributors; BASF managed to reduce channel inventories

Good business development in South America
- Good start into the season 2019/2020 with low channel inventories
- Above-market growth expected, particularly in Brazil
Strong profitability of Agricultural Solutions with distinct seasonality

The acquisition of businesses and assets from Bayer was closed in August 2018.
Agenda

1. Market environment
2. Agricultural Solutions – focus area of BASF
3. The new BASF in agriculture in 2019
4. Target markets
5. Differentiators
6. Key measures
7. Targets
BASF is well positioned in the group of market-leading companies

Competitive landscape, sales 2018

Combining crop protection, seeds and digital

Focusing either on crop protection or seeds

Crop protection  Seeds & traits  Generics

Bayer¹  Corteva  Syngenta²  BASF¹  FMC  UPL¹  Adama²  Japanese companies³  Nufarm  Sumitomo  Vilmorin⁴  KWS⁴  Albaugh  Sipcam

¹ Proforma sales; BASF Agricultural Solutions: legacy plus acquired business (FY) based on internal estimates ² Part of ChemChina ³ R&D-driven Japanese companies within TOP 30 AgChem companies and sales <€1bn; ⁴ incl. 50/50 AgReliant Genetics JV split; Source: AgbioInvestor 2018
BASF Agricultural Solutions to strategically focus on four crop systems, covering ~70% of the total market

- **Crop system soybean – cotton – corn**
  - in the Americas: 30%
  - BASF ambition: Strong innovator

- **Crop system rice**
  - in Asia: 8%
  - BASF ambition: Recognized player in Asia

- **Crop system wheat – canola – sunflower**
  - in Europe, North America: 12%
  - BASF ambition: Market leader

- **Crop system fruit and vegetables**
  - in all regions: 18%
  - BASF ambition: Global number 3

Total market\(^1\) ~€92 billion

---

\(^1\) Total crop protection/seed market 2018
Farmers manage their land in an integrated approach to optimize yield, earnings and the use of natural resources.

**Farmer benefits from growing different crops**
- Maximize farm profitability
- Balance risks within a season, e.g., weather
- Optimize farm management and workload distribution
- Maintain soil quality season after season

**Crops are managed in a system to**
- Minimize pest and weed pressure
- Increase yield with crop rotation
- Improve nitrogen and soil management
- Optimize equipment usage
- Address societal challenges, e.g., biodiversity

**BASF’s connected offers across…**
- Seeds
- Crop protection
- Digital
- Sustainability

… integrated into the farmers’ operations and practices driven by their crop system

crop systems
Crop systems approach enables BASF to support farmers in selected crops and geographies

Key challenges for farmers
- Profitability and income volatility
- Pests, weeds, diseases resistant to existing technologies
- Differentiated traits in soybean and cotton
- New active ingredients in crop protection
- Best agronomic data-based digital recommendations
- Secure farm profitability and efficient farm operations
- R&D pipeline in crop protection and wheat traits
- Launch hybrid wheat
- Digital tools to address farmer needs
- Higher quality standards from food value chain and consumers, e.g., low residues
- Customer-consumer approach for food value chain orientation in seeds
- Superior digital tools addressing farmer and food value chain requirements
- Farm modernization and automation due to labor shortage or higher costs
- Educate farmers about BASF’s offerings
- Use sustainability to promote new, innovative crop protection technologies
Agenda

1. Market environment
2. Agricultural Solutions – focus area of BASF
3. The new BASF in agriculture in 2019
4. Target markets
5. Differentiators
6. Key measures
7. Targets
BASF will differentiate versus peers with four strategic levers:

- Innovation
- Digital
- Sustainability
- Customer experience
BASF will differentiate versus peers with four strategic levers

Innovation  Digital  Sustainability  Customer experience
Strong global R&D platform with locations in all key markets

>30 projects in seeds & traits, crop protection and digital solutions

~€900 million annual Research & Development expenses

>3,000 people in Research & Development

4 Research & Development hubs

26 Research & Development sites in all key markets

>200 regional seed production and breeding facilities
A comprehensive set of capabilities enables market-leading R&D platform

<table>
<thead>
<tr>
<th>Crop protection</th>
<th>Traits</th>
<th>Seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herbicides</td>
<td>Nematode resistance</td>
<td>Germplasm</td>
</tr>
<tr>
<td>Fungicides</td>
<td>Insect resistance</td>
<td>Non-GM traits</td>
</tr>
<tr>
<td>Seed treatment</td>
<td>Yield and quality</td>
<td>Breeding platform</td>
</tr>
<tr>
<td>Insecticides</td>
<td>Herbicide tolerance</td>
<td>Fungal resistance</td>
</tr>
</tbody>
</table>

Digital capabilities

- Leading crop protection platform
- Leading trait platform
- Strong seeds entry position

- BASF legacy portfolio
- Acquired businesses and assets
BASF has one of the strongest and most innovative traits portfolios

Our strong traits pipeline complements our leading crop protection portfolio providing farmers with systems solutions for weed, pest and disease management.

Our trait portfolio is positioned to deliver innovative solutions for each crop system.

Differentiated and proprietary traits create value in own seed products and open up licensing opportunities.
BASF fosters an open innovation system with research institutes and partners from industry

Technologies and know-how

- More than 100 collaborations with academia and industry globally

- Canola – Omega-3 together with Cargill
  Sustainable plant-based source of omega-3 fatty acids in canola

- Corn & Soy – Yield & Stress together with Bayer
  Short Stature Corn for plants with improved stability, greater flexibility of in-season crop inputs and nutrient use

Market access
### Strong pipeline with peak sales potential of >€6 billion\(^1\) (1/2)

<table>
<thead>
<tr>
<th>Crops</th>
<th>In launch</th>
<th>Development (2020 – 2025)</th>
<th>Advanced research (launch after 2025)</th>
<th>Early research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybean</td>
<td>Engenia®</td>
<td>Tirexor®</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Revysol®</td>
<td>Pavecto®</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inscalis®</td>
<td>Broflanilide</td>
<td>Two in development</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pavecto® seed treatment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Teraxxa™</td>
<td></td>
</tr>
<tr>
<td>Cotton</td>
<td>LibertyLink®GT27™</td>
<td>Herbicide tolerance trait</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td>xarvio™ SCOUTING</td>
<td>xarvio™ SCOUTING</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>xarvio™ FIELD MANAGER</td>
<td>xarvio™ FIELD MANAGER</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>xarvio™ HEALTHY FIELDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>Provisia™ herbicide</td>
<td>Luximo®</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Revysol®</td>
<td>One in development</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inscalis®</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provisia™ rice trait system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>xarvio™ SCOUTING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>xarvio™ FIELD MANAGER</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) The innovation pipeline comprises products with a launch date between 2018 and 2028. Projects in “early research” and “life cycle management” are not included.
## Strong pipeline with peak sales potential of >€6 billion\(^1\) (2/2)

<table>
<thead>
<tr>
<th>Crops</th>
<th>In launch</th>
<th>Development (2020 – 2025)</th>
<th>Advanced research (launch after 2025)</th>
<th>Early research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>Revysol(^\circledR)</td>
<td>Luximo(^\circledR), Tirexor(^\circledR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canola</td>
<td>Relenya(^TM)</td>
<td>Pavecto(^\circledR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunflower</td>
<td>InVigor(^\circledR) podshatter reduction</td>
<td>Broflanilide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>InVigor(^\circledR) clubroot</td>
<td>One in development</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>xarvio(^\circledR) SCOUTING</td>
<td>Pavecto(^\circledR) seed treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>xarvio(^\circledR) FIELD MANAGER</td>
<td>Teraxxa(^TM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hybrid wheat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LibertyLink(^\circledR) yellow canola</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PUFA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>xarvio(^\circledR) SCOUTING</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>xarvio(^\circledR) FIELD MANAGER</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>xarvio(^\circledR) HEALTHY FIELDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit and vegetables</td>
<td>Revysol(^\circledR)</td>
<td>Tirexor(^\circledR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inscalis(^\circledR)</td>
<td>Pavecto(^\circledR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Broflanilide; one in development</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pavecto(^\circledR) seed treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teraxxa(^TM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vegetable seeds innovations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>xarvio(^\circledR) SCOUTING</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>xarvio(^\circledR) FIELD MANAGER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herbicide</td>
<td>Fungicide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insecticide</td>
<td>Seed treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seeds &amp; traits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 The innovation pipeline comprises products with a launch date between 2018 and 2028. Projects in "early research" and "life cycle management" are not included.
Leveraging the BASF know-how Verbund gives a competitive advantage in Agricultural Solutions

**Agricultural Solutions R&D**

**BASF know-how Verbund capabilities**

- **Chemistry**
  - Chemical synthesis
  - Formulation
  - Process development

- **Biosciences**
  - Fermentation
  - Protein technologies
  - DNA technologies
  - Toxicological methods

- **Digitalization**
  - Imaging
  - Machine learning and AI
  - Data science

- **Crop protection**
  - Trait research
  - Precision breeding
Crop protection innovations with societal and regulatory requirements in focus are powered by the BASF Verbund

Revyso® fungicide designed to meet the highest level of regulatory standards

The BASF Verbund advantage:
- De-risking through interdisciplinary approach of chemical, toxicological and regulatory sciences
- Proven expertise in computational modelling and machine learning to reduce off-target effects
- Parallel optimization of activity and minimization of unwanted secondary effects

> €1 billion estimated peak sales potential

Inscalis® insecticide derived from fermentation with favorable environmental profile

The BASF Verbund advantage:
- Derived from a biotechnological approach through smart fermentation process development
- Innovative formulation technology drives efficacy
- Low use rates with minimal impact on beneficial arthropods and pollinators

Low triple digit million euro estimated peak sales potential
Blockbuster technologies give soybean growers new options

**Weed management: new herbicides and herbicide tolerance**
Multiple new resistance-breaking herbicides linked with herbicide tolerance traits

- Tirexor®
- Revysol®

**Disease management: fungicides and fungal resistance**
New fungicide solutions paired with novel, robust multiple mode of action fungal resistance trait technology

- Asian soybean rust trait

**Pest management: nematicide seed treatment and nematode resistance**
Leading nematicide seed treatments with new, broadest, most reliable nematode control trait technology

- Soybean cyst nematode resistance trait
Hybrid wheat is an attractive blue ocean opportunity that benefits farmers and society

Wheat market demand requires game changing innovation
- Hybridization in wheat to follow the success stories of other hybridized crops
- BASF holds a strong position with hybrid wheat varieties
- We are in for the “long-play” with significant future value from breeding first, followed by traits for improved performance

Profitability
- Increase yield performance
- Higher return of investment

Risk management
- Yield stability and consistency
- Durable resistance by pest and disease control traits

Sustainability
- Increasing efficiency (water and nitrogen use)
- Drought and stress tolerance (climate change)
- Environmental benefits (less land use)
BASF will differentiate versus peers with four strategic levers

- Innovation
- Digital
- Sustainability
- Customer experience
Investments into digital products support growth in crop protection and seeds, new income streams will be established.

**Smartening crop protection and seeds**
- Digitally enabled product launches
- Stewardship (e.g., Engenia® tool)
- Digitally enabled sales force

**Enhanced digital market access**
- Establish data relationships with growers and channel partners
- 1.2 million users today in >100 countries

**New digital business models**
- xarvio™ SCOUTING
- xarvio™ FIELD MANAGER
- xarvio™ HEALTHY FIELDS (launch 2020)
Combination of unique agronomic system with high-resolution plant protection allows for disruptive business models

Disruptive outcome-based business models for farmers to be launched in 2020

1 Thresholds to be defined, e.g., for biodiversity
Building on channel partnerships to reach more farmers faster with xarvio™

BASF collaborates with Nutrien Ag Solutions™ to provide their customers with xarvio™ products

AgroStar – a leading Asian e-commerce provider for agricultural inputs – uses xarvio™ products to help small-holders understand what is happening on their fields
BASF will differentiate versus peers with four strategic levers

Innovation  Digital  Sustainability  Customer experience
Sustainable Solution Steering: Accelerator product examples in Agricultural Solutions

Best foundation for farmer income and optimized farm management
- Satisfies the highest approval standards
- Essential tool for resistance management
- Outstanding biological performance

Biological seed treatment system
- Improves root nodulation for more nitrogen-fixation potential
- Improved root architecture and nutrient uptake
- Greater plant rigor and optimized yield

Burndown herbicide in key row crops
- Lower use rates
- Very effectively controlling resistant weeds
- Increased yield and resource efficiency

Revystar®
Revysol®-based fungicide

Vault® HP

Sharpen®
Smart Stewardship: Digital farming technologies will contribute to sustainability in agriculture

- Use of digital technologies for targeted applications
- Ensure good agricultural practices
- Consider current environmental conditions
- Online documentation and transparency of application

Example: Buffer zone tool
- Automatic mapping and consideration of no-spray buffer zones to sensitive areas (e.g., water bodies)
- Automated control of spraying equipment (e.g., avoiding vulnerable areas)
- Responsible application of crop protection products
BASF will differentiate versus peers with four strategic levers

- Innovation
- Digital
- Sustainability
- Customer experience
Customer feedback: BASF is a reliable, approachable and consistent partner for farmers

- Strong credibility as an innovator
- Reliable, honest, trustworthy
- High-quality people, willing to listen
- Vision, experience, expertise for new products that work
- R&D, technical expertise for high-quality products

*Source: Kynetec 2017 Global Measurement Qualitative – BASF in Agriculture. Focus groups with 137 farmers and 58 farming advisors*
We want to strengthen customers’ experience even further based on listening, dialog, respect and mutual trust.
Crop system example: Why Western Canadian canola and wheat farmers choose BASF

**High yields**
- Top yielding seeds
- Competitiveness in the global grains market
- Quality and strict grading standards

**Seasonal challenges**
- Safeguard yield
- Risk management
- Establish strong, healthy crop
- Control difficult/resistant diseases, weeds and pests
- Maintain crop quality

**BASF’s connected offer to keep market leadership…**
- InVigor® hybrid canola
- Hybrid wheat (in future)
- xarvio™ FIELD MANAGER
- xarvio™ SCOUTING

**Wide range growing conditions**
- Agronomic decision support
- Application optimization

**Shifting the way of farming**
- Greater harvest flexibility, manage workload during busy harvest season
- Tighter rotations
- High-performing production practices
- Sustainability and environmental protection

... integrated into the farmers’ operations and practices driven by their crop system
Agenda

1. Market environment
2. Agricultural Solutions – focus area of BASF
3. The new BASF in agriculture in 2019
4. Target markets
5. Differentiators
6. Key measures
7. Targets
Achievement of defined milestones will drive strong performance during the next decade

Key measures

- Implement crop systems approach
- Launch eight crop protection active ingredients
- Launch new soybean trait platform
- Launch hybrid wheat (by mid 2020s)
- Enable existing business with digital tools
- Establish data relationships with customers
- Introduce and grow outcome-based digital business models
- Introduce Revysol®-based products with excellent sustainability profile
- Connect digital tools and crop protection to improve sustainability
- Meet evolving customer needs based on continuous dialogue
- Provide winning offers based on results of systematic use of CRM and customer feedback tools
- Mid triple-digit million euro sales synergies to be realized by 2025
- Efficiency program started in 2019, to contribute ~€200 million by 2022
Major investments include R&D, production assets for new active ingredients, resources for digital offerings and acquisitions

<table>
<thead>
<tr>
<th>Section</th>
<th>Annual expense (estimate)</th>
<th>Future</th>
<th>Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D</td>
<td>€900 million</td>
<td>Slight increase, depending on market conditions</td>
<td>Innovation in crop protection, Innovation in seeds &amp; traits</td>
</tr>
<tr>
<td>Capital expenditures</td>
<td>€260 million</td>
<td>Increase, depending on market conditions</td>
<td>In-house production of key active ingredients and intermediates</td>
</tr>
<tr>
<td>Customer-facing digital offerings</td>
<td>€70 million</td>
<td>Considerable increase (to ~2% of sales over time)</td>
<td>New digital business models, Digitalization and automation, Digital tools to enable crop protection and seeds</td>
</tr>
<tr>
<td>M&amp;A relevance</td>
<td></td>
<td>Medium to high</td>
<td>Seeds, Digital technologies, Individual active ingredients</td>
</tr>
</tbody>
</table>
BASF Agricultural Solutions is an attractive partner and will leverage its position to accelerate growth and strengthen profitability

**Portfolio**
- Enhance soybean seeds portfolio, germplasm and traits
  - Example Pavecto®
    - Joint development framework with Sumitomo
    - Development of novel fungicide

**Market access**
- Improve customer access and market footprint
  - Increase footprint with selected partners in Asia
- Example sunflower seeds
  - Distribution agreement with Euralis Semences

**New business models**
- Expand ecosystem to increase value capture
  - Example xarvio™
    - HEALTHY FIELDS

**Digital**
- Enhance technologies and features
- Strengthen customer and data access
- Example xarvio™
  - Scouting application as part of Nutrien Ag Solutions™ digital platform
Agricultural Solutions contributes strongly to achieving BASF Group’s targets

**BASF targets**

- Grow sales volumes faster than global chemical production every year
- Increase EBITDA before special items by 3% to 5% per year
- Achieve a return on capital employed (ROCE) considerably above the cost of capital percentage every year
- Achieve €22 billion in Accelerator sales by 2025
- Grow CO₂-neutrally until 2030

**Contribution of Agricultural Solutions**

- Grow one percentage point above market to increase market share
- Increase sales by 50% by 2030
- Grow EBITDA before special items by on average 5% per year
- Restore EBITDA before special items margin level of ~23% within next years with high R&D intensity
- ROCE currently impacted by asset step up after acquisition
- Restore ROCE above the cost of capital percentage
- R&D pipeline with peak sales potential of >€6 billion
- CO₂-optimized production processes
- Offer solutions to reduce CO₂-emissions in agricultural production
- Accelerators account for approximately half of the R&D pipeline

1 The innovation pipeline comprises products with a launch date between 2018 and 2028.
BASF Agricultural Solutions – Success for farmers, agriculture and future generations

Unique customer experience based on crop systems approach

Best-in-class R&D pipeline

Sustainability as a key differentiator

Major contributor to BASF Group’s profitable growth
BASF
We create chemistry
Appendix
# Overview crop system soybean – cotton – corn

## Key characteristics

<table>
<thead>
<tr>
<th>Market size</th>
<th>~€27 billion&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key regions</td>
<td>North America</td>
</tr>
<tr>
<td></td>
<td>South America</td>
</tr>
<tr>
<td>Expected market growth 2018-2030</td>
<td>CAGR ~2.5%&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Growth drivers</td>
<td>Increasing global demand for meat-based protein diet</td>
</tr>
<tr>
<td></td>
<td>Significant productivity increase with limited agricultural land expansion</td>
</tr>
</tbody>
</table>

## Key challenges for farmers

- Profitability and income volatility
- Pests, weeds, diseases resistant to existing technologies

## BASF ambition

- Strong innovator

## Key measures

- Differentiated traits in soybean and cotton
- New active ingredients in crop protection
- Best agronomic data-based digital recommendations

---

<sup>1</sup> Source: BASF estimates and AgbioInvestor/PMD
R&D pipeline: crop system soybean – cotton – corn

<table>
<thead>
<tr>
<th>Activity</th>
<th>Herbicide</th>
<th>Fungicide</th>
<th>Insecticide</th>
<th>Seed Treatment</th>
<th>Seeds &amp; Traits</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>In launch</td>
<td>Engenia®</td>
<td>Revysof®</td>
<td>Inscalis®</td>
<td>LibertyLink®GT27™</td>
<td></td>
<td>xarvio™ SCOUTING</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>xarvio™ FIELD MANAGER</td>
</tr>
<tr>
<td>Development (2020 – 2025)</td>
<td>Tirexor®</td>
<td>Pavecto®</td>
<td>Broflanilide</td>
<td>Pavecto® seed treatment</td>
<td>Herbicide tolerance trait</td>
<td>xarvio™ SCOUTING</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Two in development</td>
<td>Teraxxa™</td>
<td></td>
<td>xarvio™ FIELD MANAGER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>xarvio™ HEALTHY FIELDS</td>
</tr>
<tr>
<td>Advanced research (launch after 2025)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early research</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Overview crop system wheat – canola/oilseed rape – sunflower

## Key characteristics

<table>
<thead>
<tr>
<th>Key regions</th>
<th>~€12 billion(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>Europe</td>
</tr>
<tr>
<td>North America</td>
<td>CAGR 2.0%(^1)</td>
</tr>
<tr>
<td>Expected market growth 2018-2030</td>
<td>Increasing demand for yield and quality</td>
</tr>
<tr>
<td></td>
<td>Need for innovation driven by regulatory pressure on existing technologies</td>
</tr>
</tbody>
</table>

## Key challenges for farmers

- Secure farm profitability and efficient farm operations
- Address socio-political requirements, e.g., EU greening policy

## BASF ambition

- Market leader

## Key measures

- R&D pipeline in crop protection and wheat traits
- Launch hybrid wheat
- Digital tools to address farmer needs
- Actively shape sustainability in agriculture

---

\(^1\) Source: BASF estimates and AgbioInvestor/PMD
## R&D pipeline: crop system wheat – canola/oilseed rape – sunflower

<table>
<thead>
<tr>
<th>Activity</th>
<th>Herbicide</th>
<th>Fungicide</th>
<th>Insecticide</th>
<th>Seed Treatment</th>
<th>Seeds &amp; Traits</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In launch</strong></td>
<td></td>
<td>Revysol®</td>
<td></td>
<td>Relenya™</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Development</strong></td>
<td>Luximo®</td>
<td>Pavecto®</td>
<td>Broflanilide</td>
<td>Pavecto® seed treatment</td>
<td>Hybrid wheat</td>
<td>xarvio™ SCOUTING</td>
</tr>
<tr>
<td>(2020 – 2025)</td>
<td>Tirexor®</td>
<td></td>
<td>One in development</td>
<td>Teraxxa™</td>
<td>LibertyLink® yellow canola</td>
<td>xarvio™ FIELD MANAGER</td>
</tr>
<tr>
<td><strong>Advanced research</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PUFA</td>
<td>xarvio™ SCOUTING</td>
</tr>
<tr>
<td>(launch after 2025)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>xarvio™ FIELD MANAGER</td>
</tr>
<tr>
<td><strong>Early research</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>xarvio™ HEALTHY FIELDS</td>
</tr>
</tbody>
</table>
# Overview crop system fruit and vegetables

## Key characteristics

<table>
<thead>
<tr>
<th>Market size</th>
<th>~€16 billion(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key regions</td>
<td>Asia, Europe, North America, South America</td>
</tr>
<tr>
<td>Expected market growth 2018-2030</td>
<td>CAGR 2%(^1)</td>
</tr>
<tr>
<td>Growth drivers</td>
<td>Increasing demand for high-quality fruit and vegetables all year long, Strong professionalization of production</td>
</tr>
</tbody>
</table>

## Key challenges for farmers

| | Higher quality standards from food value chain and consumers, e.g., traceability, low residues |
| | Capture crop value during seasonal price volatility |

## BASF ambition

| | Global number 3 |

## Key measures

| | Customer-consumer approach for food value chain orientation in seeds |
| | Superior digital tools addressing farmer and food value chain requirements, e.g., residue minimization |

\(^1\) Source: BASF estimates and AgbioInvestor/PMD
## R&D pipeline: crop system fruit and vegetables

<table>
<thead>
<tr>
<th>Activity</th>
<th>Herbicide</th>
<th>Fungicide</th>
<th>Insecticide</th>
<th>Seed Treatment</th>
<th>Seeds &amp; Traits</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>In launch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>xarvio™ SCOUTING</td>
</tr>
<tr>
<td>Development (2020 – 2025)</td>
<td>Tirexor®</td>
<td>Pavecto®</td>
<td>Broflanilide</td>
<td>Pavecto® seed treatment</td>
<td>Vegetable seeds innovations</td>
<td>xarvio™ SCOUTING</td>
</tr>
<tr>
<td>Advanced research (launch after 2025)</td>
<td></td>
<td></td>
<td>One in development</td>
<td>Teraxxa™</td>
<td></td>
<td>xarvio™ FIELD MANAGER</td>
</tr>
<tr>
<td>Early research</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Advanced research**
- Tirexor®
- Pavecto®
- Broflanilide
- One in development
- Pavecto® seed treatment
- Teraxxa™

**Early research**
- 
- 
- 
- 
- 
- 

**Digital**
- xarvio™ SCOUTING
- xarvio™ FIELD MANAGER
## Overview crop system rice

### Key characteristics

<table>
<thead>
<tr>
<th>Market size</th>
<th>~€7 billion&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key region</td>
<td>Asia</td>
</tr>
<tr>
<td>Expected market growth 2018-2030</td>
<td>CAGR 3%&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

### Growth drivers

- Increasing demand for yield
- Adoption of modern and sustainable technologies (e.g., drone application)

### Key challenges for farmers

- Farm modernization and automation due to labor shortage or higher costs

### BASF ambition

- Recognized player in Asia

### Key measures

- Educate farmers about BASF’s offerings
- Use sustainability to promote new, innovative crop protection technologies
- Multichannel approach

---

<sup>1</sup> Source: BASF estimates and AgbioInvestor/PMD
## R&D pipeline: crop system rice

<table>
<thead>
<tr>
<th>Activity</th>
<th>Herbicide</th>
<th>Fungicide</th>
<th>Insecticide</th>
<th>Seed Treatment</th>
<th>Seeds &amp; Traits</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>In launch</td>
<td>Provisia™ herbicide</td>
<td>Revysof®</td>
<td>Inscalis®</td>
<td></td>
<td>Provisia™ rice trait system</td>
<td>xarvio™ SCOUTING</td>
</tr>
<tr>
<td>Development (2020 – 2025)</td>
<td>Luximo®</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>xarvio™ SCOUTING</td>
</tr>
<tr>
<td>Advanced research (launch after 2025)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>xarvio™ FIELD MANAGER</td>
</tr>
<tr>
<td>Early research</td>
<td>![Icon1]</td>
<td>![Icon2]</td>
<td>![Icon3]</td>
<td>![Icon4]</td>
<td>![Icon5]</td>
<td></td>
</tr>
</tbody>
</table>
Seasonal patterns are the basis for crop systems

Example: Wheat – canola / wheat – sunflower crop system

- Optimize: deployment and availability of labor and machinery
- Minimize risks: climate, weed/pest pressure, price fluctuations
- Maximize: yields and profits in the combination of all crops