A Combined Management Report

of the Bayer Group and Bayer AG as of December 31, 2021

1. Fundamental Information About the Group

1.1 Corporate Profile and Structure

Our goal: Promote health and safeguard the food supply

Economic growth and sustainability go hand in hand

1.1.1 Corporate Profile

We are a life science company and a global leader in healthcare and nutrition. Our innovative products support efforts to overcome the major challenges presented by a growing and aging global population. We help prevent, alleviate and treat diseases. We also aim to ensure the world has a reliable supply of high-quality food, feed and plant-based raw materials. As part of this endeavor, the responsible use of natural resources is always a top priority. In line with our vision "Health for all, hunger for none", we aim to put an end to hunger and help everyone lead a healthy life, while at the same time protecting ecosystems. That is what we aspire to achieve, guided by our purpose "Science for a better life."

We aim to continuously enhance our company's earning power and create value for customers, patients, shareholders, employees and society. Innovation, growth and sustainability are integral parts of our strategy, while our corporate values of **L**eadership, **I**ntegrity, **F**lexibility and **E**fficiency, or LIFE for short, lay the foundation for the way we operate. These values shape our culture and ensure a common identity throughout the Bayer Group.

1.1.2 Corporate Structure

Corporate structure as of December 31, 2021

As the parent company of the Bayer Group, Bayer AG – represented by its Board of Management – performs the principal management functions for the entire enterprise. This mainly comprises the Group's strategic alignment, resource allocation, and the management of financial affairs and managerial staff, along with the management of the Group-wide operational business of the Crop Science, Pharmaceuticals and Consumer Health divisions. The enabling functions support the operational business.

The following structural changes occurred within our organization in 2021:

In January 2021, the Supervisory Board of Bayer AG announced the appointment of Sarena Lin as a member of the Board of Management. Effective February 1, 2021, she became Chief Transformation and Talent Officer, assuming responsibility for Human Resources, Strategy and Business Consulting. Lin also took on the role of Labor Director on the same date.

Liam Condon stepped down from the Board of Management on December 31, 2021. He was succeeded by Rodrigo Santos, who was appointed to the Board of Management effective January 1, 2022, and became head of the Crop Science Division.

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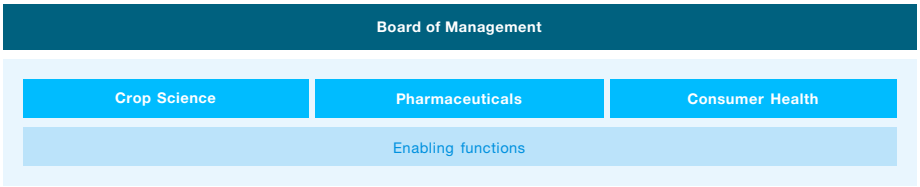
Bayer Group Structure in 2021



Our divisions are active in the following areas:

Crop Science is the world's leading agriculture enterprise, with businesses in crop protection, seeds and traits, and digital farming. We offer a broad portfolio of high-value seeds, improved plant traits, innovative chemical and biological crop protection products, digital solutions and extensive customer service for sustainable agriculture. We market these products primarily via wholesalers and retailers or directly to farmers. In addition, we market pest and weed control products and services to professional users outside the agriculture industry. Most of our crop protection products are manufactured at the division's own production sites. Numerous decentralized formulation and filling sites enable the company to respond quickly to the needs of local markets. The breeding, propagation, production and / or processing of seeds, including seed dressing, take place at locations close to our customers, either at our own facilities or under contract.

Pharmaceuticals concentrates on prescription products, especially for cardiology and women's healthcare, and on specialty therapeutics focused on the areas of oncology, hematology, ophthalmology and, in the medium term, cell and gene therapy. We have established a strategic unit for cell and gene therapy spanning the entire value creation chain – from research and development to marketing and patients. The division also comprises the radiology business, which markets diagnostic imaging equipment and digital solutions together with the necessary contrast agents. Our portfolio includes a range of key products that are among the world's leading pharmaceuticals for their indications. The prescription products of our Pharmaceuticals Division are primarily distributed through wholesalers, pharmacies and hospitals.

Consumer Health is a leading supplier of nonprescription (OTC = over-the-counter) medicines, nutritional supplements, medicated skincare products and other self-care solutions in the categories of pain, cardiovascular risk prevention, dermatology, digestive health, allergy, and cough & cold. The products are generally sold by pharmacies and pharmacy chains, supermarkets, online retailers and other large and small retailers.

The **enabling functions**, such as Group Finance, Information Technology and Human Resources, serve as Group-wide competence centers and bundle business support processes and services. Our Leaps by Bayer unit, which invests in disruptive innovations, also forms part of the enabling functions.

More information on the divisions' products and activities is contained in the following table:

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Products and Activities of the Divisions

Indication/application/business	Core activities and markets	Main products and brands[1]
Crop Science		
Herbicides	Chemical crop protection products to control weeds	Roundup™, Adengo™, Alion™, Corvus™, Atlantis™, XtendiMax™
Corn Seed & Traits	Seeds and traits for corn	Dekalb™, SmartStax™ RIB Complete, VT Double™ PRO, VT Triple™ PRO, VTPRO4™, Vitala™
Soybean Seed & Traits	Seeds and traits for soybeans	Asgrow™, Intacta RR2PRO™, Intacta 2 Xtend™, Roundup Ready 2 Xtend™, Roundup Ready 2 Yield™, XtendFlex™
Fungicides	Biological and chemical products to protect crop plants from fungal diseases	Fox™, Luna™, Nativo™, Serenade™, Xpro™, Delaro Complete™, Prosaro™
Insecticides	Biological and chemical products to protect crop plants from harmful insects and their larvae	BioAct™, Confidor™, Movento™, Sivanto™, Vayego™, Velum/Verango™, Vynyty Citrus™
Environmental Science	Products for professional pest control, vector control, forestry, golf courses and parks, railway tracks, products for consumer lawn and garden use	Ficam™, Maxforce™, Esplanade™, K-Othrine™, Fludora™ Fusion
Vegetable Seeds	Vegetable seeds	Seminis™, DeRuiter™
Digital Agriculture	Digital applications for agriculture	Climate FieldView™
Other	Seeds and traits for cotton, oilseed rape/canola, rice and wheat as well as biological and chemical seed treatment products to protect against fungal diseases and pests	Gaucho™, Bollgard™ 3 XtendFlex™, Deltapine™, TruFlex™
Pharmaceuticals		
Cardiology	Hypertension, pulmonary hypertension, heart attack and stroke, thrombosis, coronary artery disease (CAD), peripheral artery disease (PAD), symptomatic chronic heart failure, chronic kidney disease and type 2 diabetes	Xarelto™, Adalat™, Aspirin™ Cardio, Adempas™, Verquvo™, Kerendia™
Oncology	Liver cancer, renal cell carcinoma, thyroid carcinoma, prostate cancer, colorectal cancer, gastrointestinal stromal tumors (GIST), follicular lymphoma, solid tumors with NTRK gene fusions	Nexavar™, Nubeqa™, Xofigo™, Stivarga™, Aliqopa™, Vitrakvi™
Ophthalmology	Visual impairment due to age-related macular degeneration (AMD), diabetic macular edema (DME) or retinal vein occlusion (RVO)	Eylea™
Hematology	Hemophilia A	Kogenate™/Kovaltry™/Jivi™
Women's health	Contraception, gynecological therapy	Mirena™ product family, YAZ™ product family, Visanne™
Infectious diseases	Bacterial infections	Avalox™/Avelox™, Cipro™, Ciprobay™
Radiology	Contrast agents; diagnostic imaging equipment for use with contrast agents	Gadovist™, Ultravist™, Medrad Spectris Solaris™, Medrad Stellant™
Neurology	Multiple sclerosis	Betaferon™/Betaseron™
Consumer Health		
Dermatology	Wound care, skin care, skin and intimate health	Bepanthen™, Canesten™
Nutritionals	Multivitamin products, dietary supplements	One A Day™, Elevit™, Berocca™, Supradyn™, Redoxon™
Pain and Cardio	General pain relief and cardiovascular risk prevention	Aspirin™, Aleve™
Digestive Health	Digestive health complaints	Alka-Seltzer™, MiraLAX™, Rennie™, Iberogast™
Allergy, Cough & Cold	Allergies, cough and cold	Claritin™, Aspirin™, Alka-Seltzer™, Afrin™

[1] The order of the products listed is no indication of their importance.

Our company has a global footprint. As of December 31, 2021, the Bayer Group comprised 374 consolidated companies in 83 countries.

A 1.1.2/3

Selected Bayer Sites in 2021

Europe / Middle East / Africa

Belgium
Antwerp — CS

Germany
Bergkamen — PH
Berlin — PH
Bitterfeld-Wolfen — CH
Darmstadt — CH
Dormagen — CS
Frankfurt am Main — CS
Grenzach — CH
Hürth-Knapsack — CS
Cologne — PH
Leverkusen — | PH
Monheim am Rhein — CS
Weimar — PH
Wuppertal — PH

Finland
Turku — PH

France
Gaillard — CH
Lyon — CS
Sophia Antipolis — CS
Villefranche — CS

Italy
Garbagnate — PH

Netherlands
Bergschenhoek — CS

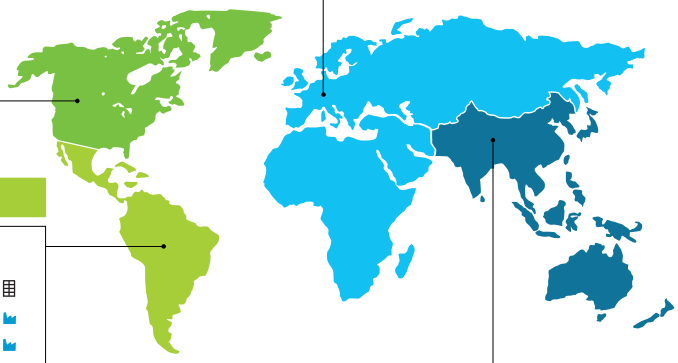
Norway
Oslo — PH

Switzerland
Basel — PH | CH
Muttenz — CS

Spain
Alcalá — CH

North America

United States
Berkeley — PH
Boston/Cambridge — PH
Kansas City — CS
Luling — CS
Morristown — CH
Muscatine — CS
Myerstown — CH
Saxonburg — PH
Soda Springs — CS
St. Louis — | CS
Whippany — | CH | PH
Woodland — CS



Latin America

Argentina
Buenos Aires
Pilar — CH
Zárate — CS

Brazil
Belford Roxo — CS
Camaçari — CS
Petrolina — CS
São José dos Campos — CS
São Paulo — | CS

Mexico
Lerma — CH
Mexico City

Asia / Pacific

China
Beijing — | PH
Qidong — CH

India
Thane
Vapi — CS

Indonesia
Cimanggis — CH

Japan
Koka — PH
Osaka — PH
Tokyo — PH

CS: Crop Science
PH: Pharmaceuticals
CH: Consumer Health
Significant research and development location
Significant production location
Significant administrative site

1.2 Strategy and Management

Sustainable, profitable growth in focus

Innovative business activities support “Health for all, hunger for none” vision

Ambitious sustainability targets for the entire Group

1.2.1 Strategy and Targets

Group strategy

A growing and aging world population and the increasing strain on nature’s ecosystems are among the major challenges facing humanity. As a global leader in health and nutrition, we are able to play a key role in devising solutions to tackle these challenges.

Guided by our purpose “Science for a better life,” we deliver breakthrough innovations in healthcare and agriculture. We contribute to a world in which diseases are not only treated but effectively prevented or cured, in which people can take better care of their own health needs, and in which enough agriculture products are produced while respecting our planet’s natural resources. That's because at Bayer, growth and sustainability go hand in hand. In short, we are working to make our vision “Health for all, hunger for none” a reality. Our strategy operationalizes our vision, as we look to achieve long-term profitable growth and make a positive contribution to society and the environment.

We focus on four strategic levers:

// We develop **innovative products and solutions** and leverage cutting-edge research to address unmet societal challenges. We are also continuing to drive the digitalization of our entire value chain.

// We drive the **operational performance** of our business by optimizing our resource allocation and cost base.

// **Sustainability** is an integral part of our business strategy, operations and compensation system. Through our businesses, we contribute significantly to the United Nations’ Sustainable Development Goals (SDGs). We also pursue resolute, science-based climate action along our entire value chain.

// As a **global leader** in health and nutrition, we continue to develop our business. We create value with strategy-based resource allocation focused on profitable growth. We are active in regulated and highly profitable businesses that are driven by innovation and in which we have the objective to grow ahead of the competition.

These four strategic levers underpin the strategies of our divisions.

Strategies of the divisions

Crop Science

The landscape is changing in agriculture: Increased pressures due to climate change combined with a growing population have created a pivotal moment in how our customers provide food, fuel and fiber for a world that needs to learn to live within planetary boundaries. These challenges have spurred rapid, disruptive changes in the industry, intensifying competition across the value chain, creating new players and opening up new sales opportunities.

In this dynamic environment, the differentiators are clear: the speed and scale of innovation and a focus on sustainable results for our customers. With a leading innovation pipeline, a deep digital ecosystem informing our growers and our research and development (R&D) capabilities, and a multitude of partnerships that accelerate the availability of new technologies, we are currently the market leader and are also very well positioned moving forward.

Our mission is to transform agriculture and drive a more sustainable food system through a farmer-centric, outcomes-based and digitally enabled approach. Our overall goal is to grow faster than the market and deliver superior returns than our competitors. In addition, we aim to achieve digitally enabled sales by the end of the decade.

In the near term, we are leveraging the positive market momentum driven by favorable commodity prices and further accelerating our strong performance across regions. We continue to invest in the backbone of our business: customer-focused innovation in seeds, traits, crop protection and digital solutions.

Our on-farm connectivity continues to create faster innovation, drive more customized solutions for farmers, automate processes and increase the productivity of our R&D pipeline. We are digitally connecting farms, optimizing input use and creating an industrywide ecosystem aimed at unlocking new income streams for our customers and our own business by pioneering new business models with sustainability at their core.

As part of these endeavors, we pursue ambitious sustainability targets: reducing the environmental impact of Bayer's crop protection by 30% globally, decreasing field greenhouse gas emissions by 30% in the most emitting cropping systems that we serve, and improving the livelihoods of 100 million smallholders.

Supported by our digital application FieldView™, the Bayer Carbon Initiative rewards farmers for adopting climate-smart practices, sequestering carbon at scale and creating new on-farm revenue streams. Since its launch in July 2020, the initiative has been scaled in the United States, and pilots have also been initiated and further developed in Brazil, the EU, India and Australia.

Smallholder farmers are both a fast-growing market that we are committed to serving and a critical lever for global poverty reduction. That's why we continue to expand the Better Life Farming program, with around 1,600 centers open for small farmers in India, Bangladesh and Indonesia.

Pharmaceuticals

Throughout the world, an aging population is leading to a growing number of chronic diseases and the increased occurrence of multiple conditions. The convergence of biology and data science will be a key element for innovation in Pharmaceuticals. Digital technologies can transform the way healthcare is delivered, while cell and gene therapy has the potential to cure severe diseases.

We are helping to drive medical progress through our focus on researching, developing and marketing innovative medicines. Our near-term growth is driven by key products, such as Xarelto™ and Eylea™, while our near- and mid-term growth will be further fueled by launch products, such as Nubeqa™, Verquvo™ and Kerendia™, and late-stage R&D pipeline candidates, such as elinzanetant. To safeguard long-term growth, we continue to invest in R&D in therapeutic areas with a substantial need for innovation.

We are continuously strengthening our technology platforms. Building on our acquisitions of the U.S. companies BlueRock Therapeutics LP, and Asklepios BioPharmaceutical, Inc. (AskBio), we are further expanding our cell and gene therapy activities. In addition, the recent acquisition of Vividion Therapeutics, Inc., United States, strengthens our drug discovery capabilities with a chemoproteomics platform. Vividion's approach identifies previously unknown binding pockets in undruggable targets to generate novel compounds. We are also enhancing our technological capabilities through the targeted expansion of our digital R&D infrastructure. Moreover, we are expanding our efforts to access external innovation through research collaborations and in-licensing, capturing continued growth opportunities in biologics and novel technologies.

In Oncology, we are continuing to build our integrated Research & Early Development organization.

In addition, we are investing in the One Drop digital platform and in developing digital solutions, such as our Radiology Calantic™ platform that will embed artificial intelligence solutions in radiology.

We also pursue ambitious sustainability targets. Our sustainability agenda includes improving access to medicines. We are therefore applying tiered pricing principles globally, in order to set price levels according to a country's ability to pay. Another key focus is on improving women's health and strengthening their role in society by helping to promote gender equality and women's economic participation. As part of this endeavor, we are leveraging our leading position in women's health and are aiming to provide 100 million women in low- and middle-income countries with access to modern contraception by 2030. In addition, we remain committed to combating neglected tropical diseases and noncommunicable diseases.

Consumer Health

Rising healthcare costs, changing demographics and increasing health awareness of consumers continue to make self-care more relevant, and are expected to continue to fuel attractive long-term growth of the consumer healthcare market. The pandemic has further raised awareness about the importance of self-care, driven increased consumption in categories like nutritional supplements, and accelerated channel shifts toward e-commerce.

We provide consumers with products, services and information that empower them to improve their everyday health. Our strategy focuses on our core categories, as well as the transition of prescription medicines to nonprescription status. Our profitable growth is driven by world-class, science-based innovation with our trusted, consumer-preferred brands as well as new product launches. We are also continuously driving cost and cash productivity across the entire value chain.

We continue to digitalize all areas of our operations, in marketing, sales, supply chain and R&D to engage better with consumers, customers and healthcare professionals while driving productivity, flexibility and resilience. We leverage an agile innovation model and collaborate with external partners to provide consumers with innovative solutions that best address their everyday health needs. Through acquisitions and partnerships, we have gained access to new business models and capabilities to provide personalized diagnostics and treatment solutions.

We pursue ambitious sustainability targets. By 2030, we aim to expand access to self-care for 100 million people in underserved[1] communities. We are executing this ambition by fully embedding sustainability across our operations to offer solutions that best serve consumers, in particular those for whom self-care is the primary form of care, while reducing our CO_2 emissions and overall environmental footprint.

[1] Economically or medically

Climate action and decarbonization

We have a far-reaching decarbonization program in place across the company, contributing in this way to meeting the target of limiting global warming to 1.5°C. The targets and measures we pursue as part of our decarbonization program have been confirmed by the Science Based Targets initiative. To support this transformation, we launched a pilot project in 2020 and implemented an internal CO_2 price of €100 per metric ton when calculating our capital expenditure projects. To reduce emissions by more than 42% by the end of 2029 compared with the 2019 baseline, we are implementing energy efficiency measures at our sites, and are aiming to purchase 100% of our electricity from renewable sources. We have committed to becoming carbon-neutral in our own operations by 2030 by offsetting all other emissions through the purchase of certificates from certified climate protection projects that satisfy externally recognized quality standards. One step toward that goal is our joining of the LEAF (Lowering Emissions by Accelerating Forest finance) Coalition, one of the largest public-private partnerships for protecting tropical forests. We are also cooperating with our suppliers and customers to reduce our greenhouse gas emissions along the upstream and downstream value chain by at least 12.3% by 2029 compared with the 2019 baseline. The aforementioned in-field decarbonization efforts of our Crop Science Division and its innovations to enhance climate resilience supplement these commitments and should make significant contributions in the value chains of the agricultural industry.

We will continue to forge ahead with decarbonization after 2030, too. As a signatory to the Business Ambition for 1.5°C, we have committed to reaching net zero emissions in our entire value chain by 2050.

We advocate a scientifically sound climate policy in line with our ambitious climate goals. To ensure immediate transparency, we publish the Industry Association Climate Review. The report shows the positions of our industrial associations on climate policy toward our own climate goals. We make it clear where positions coincide and where they differ from one another, allowing us to take measures to close these gaps.

Targets and key performance indicators

To advance and measure the implementation of our strategy, we have set ambitious Group targets.

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Financial Group Targets

Target (based on closing rates as of Sept. 30, 2021)	Target attainment in 2021	Target for 2022 (currency-adjusted)	Target for 2022 (at closing rates)
Group sales (Fx & p adj. change); Revised 2021 outlook: increase by approx. 7% (Fx & p adj.) to approx. €43 billion	€44.1 billion +8.9%	approx. €46 billion Fx & p adj.: approx. +5%	approx. €47 billion Fx & p adj.: approx. +5%
EBITDA margin before special items; Revised 2021 outlook: approx. 25.5%	25.4%	approx. 26%	approx. 26%
Core earnings per share; Revised 2021 outlook: approx. €6.10 to €6.30	€6.51	approx. €7.00	approx. €7.10
Free cash flow; Revised 2021 outlook: approx. minus €0.5 billion to minus €1.5 billion	€1.4 billion	approx. €2.0 to 2.5 billion	approx. €2.0 to 2.5 billion

Fx & p adj. = currency- and portfolio-adjusted

See A 2.1.1 “Economic Position and Target Attainment” for further information on the attainment of our Group financial targets, and A 3.1.2 “Corporate Outlook” for our financial targets for 2022.

A 1.2.1/2

Nonfinancial Group Targets Through 2030

Target[1]	Base year 2019	2020	2021	Target for 2030
Number of smallholder farmers in low- and middle-income countries (LMICs) supported by products, services and partnerships	42 million	45 million	49 million	100 million
Number of women in low- and middle-income countries (LMICs) who have their need for modern contraception satisfied due to interventions supported by Bayer	38 million	40 million	41 million	100 million
Number of people in underserved[2] communities whose self-care is supported by interventions from Bayer	41 million	43 million	46 million	100 million
Scope 1 and 2 greenhouse gas emissions[3] (million metric tons of CO_2 equivalents)	3.76	3.58	3.17	42% decrease [4, 6]
Scope 3 greenhouse gas emissions from relevant[7, 8] categories (million metric tons of CO_2 equivalents)	8.82	8.22	8.16	12.3% decrease [5, 6]
Off-setting of remaining Scope 1 and 2 greenhouse gas emissions (million metric tons of CO_2 equivalents)	0	0.20	0.30	100%

[1] A more detailed description of the calculation methodologies is published on our website www.bayer.com/en/sustainability
[2] Economically or medically
[3] Covering Scope 1 and 2 emissions (market-based) of sites that have an energy consumption in excess of 1.5 terajoules
[4] Corresponding to the sustainability target of limiting global temperature rise to 1.5°C above pre-industrial level
[5] Corresponding to the sustainability target of limiting global temperature rise below 2°C above pre-industrial level
[6] By the end of 2029
[7] In accordance with the criteria set out by the Science Based Targets initiative, the Scope 3 categories relevant for our goal include emissions in the following categories: (1) purchased goods and services, (2) capital goods, (3) fuel- and energy-related activities, (4) (upstream) transportation and distribution, and (6) business travel
[8] The figures for 2019 and 2020 had to be corrected as new information came to light in the categories 3.1, 3.2 and 3.4. This encompassed the integration of price and currency effects and the correction of transportation data.

In our **Crop Science** Division, we support smallholder farmers by supplying high-quality seeds and crop protection products, technologies and services. In 2021, together with the Bill & Melinda Gates Foundation, the Bayer Foundation began supporting Mercy Corps AgriFin's Digital Farmer II program, which is aimed at providing smallholder farmers in Africa with access to digital offerings, such as information and financial products and services, through 2025. In 2021, we supported 49 million smallholder farmers[2] (2020: 45 million smallholder farmers) in low- and middle-income countries.

In our **Pharmaceuticals** Division, our local sales activities for modern contraception are primarily supplemented by global aid programs (such as the United Nations' Population Fund, UNFPA), for which we offer our products on favorable terms. Alongside product sales, we are also engaged in partnerships with the Bill & Melinda Gates Institute at Johns Hopkins University as part of "The Challenge Initiative" and in a national UNFPA project in Egypt. The partnership programs we support help numerous women in Asia and Africa to gain access to modern contraception, irrespective of the method or manufacturer. In 2021, we were able to increase the number of women reached to 41 million (2020: 40 million).

In our **Consumer Health** Division, we are also making our products accessible to low-income consumers, with a focus on availability and affordability. At the same time, we are also enhancing our product portfolio for these consumer groups in a targeted manner. As part of this endeavor, we aim to provide products that address unmet medical need. We supplement our local business activities by collaborating with strategic partners, donating products and promoting health education. We also advocate for access to basic healthcare worldwide, by leveraging our scientific expertise and our global network. Our partnership with Vitamin Angels, which began in 2021, improved access to micronutrients for underserved pregnant women and their unborn babies in 13 countries.

[2] The calculation method for vegetable seeds was simplified, but this had no impact on global reach.

Through these efforts, we were able to reach 46 million people[3] in 2021 (2020: 43 million). We augmented our commercial reach on a like-for-like basis, but this increase was canceled out by a change in consumer behavior. These figures are relevant for Board of Management compensation in 2024. In addition, we successfully integrated our consumer business in India, which had previously been run via a third party, into our own organization as part of our growth strategy. In India, we were already able to reach an additional 13 million people in 2021, pushing the overall total up to 59 million. The figures for India are presented separately.

As part of our **climate strategy**, we reduced Scope 1 and 2 greenhouse gas emissions by 0.41 million metric tons of CO_2 equivalents (–11.5%) year on year in 2021, mainly due to a greater share of electricity being purchased from renewable energy sources. We also offset 0.30 million metric tons of CO_2 equivalents through external projects. In the Scope 3 Science Based Targets (SBT) categories that are relevant for our company, we reduced emissions by 0.05 million metric tons of CO_2 equivalents (–0.6%) compared with the prior year. The slight decline in these Scope 3 emissions was largely due to our operational procurement activities.

EU taxonomy

Our sustainability targets (Chapter 1.2.1) help us to realize our vision of "Health for all, hunger for none." In addition, we also report on other nonfinancial aspects. In accordance with Article 8 of Regulation (EU) 2020/852 of the European Parliament and of the Council of June 18, 2020, on the establishment of a framework to facilitate sustainable investment, in conjunction with the delegated acts of June 4, 2021, and of July 6, 2021, we are required for the first time to report on the nature and scale of sustainable economic activities in accordance with the EU taxonomy classification system.

Under Article 8 of Taxonomy Regulation (EU) 2020/852 and Article 10 of the supplementary delegated act of July 6, 2021, simplified reporting requirements were in effect for 2021, with companies required to disclose the proportion of their business activities that is EU taxonomy-eligible in three defined indicators: turnover (sales), capital expenditure (CapEx), and operating expenditure (OpEx).

Under Article 1, No. 5 of the delegated act of July 6 supplementing Regulation (EU) 2020/852, economic activities can only qualify as taxonomy-eligible if they have been defined in Annexes I and II to the delegated act of June 4, 2021, and comply with the technical screening criteria defined for the two climate-related environmental objectives (climate change mitigation and climate change adaptation) to determine conformity with the EU taxonomy. Activities that are not defined in these two Annexes or economic activities that are not aligned with the description of activities are deemed taxonomy non-eligible. This means that, while our own sustainability targets can be regarded as an additional contribution to sustainability, they do not fall under the EU taxonomy.

We compared our business activities against the activities defined in Annexes I and II of the delegated act of June 4 across our businesses, including our Crop Science, Pharmaceuticals, and Consumer Health divisions. Although we have not classified any of our core business activities as taxonomy-eligible, we have identified relevant cross-cutting activities. Where these cross-cutting activities are aligned with the activity description, we have recorded them as taxonomy-eligible.

[3] The calculation method was modified due to updated information in 2021 that primarily pertained to the financial vulnerability of the lower middle class due to COVID-19. The income threshold was increased from up to US$10 per day to US$15 per day in low- to middle-income countries, while the income threshold in high-income countries was changed to US$20 per day. In addition, new information about the purchasing behavior of people with low incomes resulted in a change in the relevant products selected. Neither of the modifications to the methodology resulted in a significant change in the overall figure in 2021 or the prior years.

In addition, our analysis concluded that none of our sales-generating activities currently fall within the EU taxonomy.

We were also unable to identify any significant taxonomy-eligible operating expenditure (OpEx). Our operating expenditure with respect to research and development expenses and maintenance work amounted to €6,757 million in 2021.

Our 2021 capital expenditure (CapEx) according to the substantive requirements for this indicator based on the EU Taxonomy Regulation is outlined below. Following detailed analysis, we classified the noncapitalizable costs within the capital expenditure projects as immaterial.

Reporting on capital expenditure

Capital expenditure in the reporting year comprised investments in tangible and intangible assets before depreciation, amortization, impairments, and remeasurements. Also included were investments in tangible and intangible assets due to business combinations. For further details, see Notes [14] and [15].

The data was collected via project controlling and the corresponding project structures, based on the total capital expenditure amount. All major projects relating to tangible and intangible assets were reviewed to ascertain their taxonomy eligibility and classified in accordance with the activities of EU taxonomy. The detailed analyses were conducted by the departments of the respective business units to ensure correct allocation. The total capital expenditure identified as being taxonomy-eligible within the meaning of EU taxonomy is shown in the following table:

A 1.2.1/3

Taxonomy Capex Reporting

Economic activities € million	Absolute CapEx	Proportion of CapEx
Taxonomy-eligible economic activities		
Installation and operation of electric heat pumps	2.8	0.1%
Construction, extension and operation of wastewater collection and treatment	6.4	0.2%
Renewal of wastewater collection and treatment	6.0	0.2%
Transport by motorbikes, passenger cars and light commercial vehicles	5.7	0.2%
Renovation of existing buildings	109.3	3.5%
Installation, maintenance and repair of energy efficiency equipment	90.0	2.9%
Installation, maintenance and repair of instruments and devices for measuring, regulation and controlling energy performance of buildings	0.2	0.0%
Acquisition and ownership of buildings	55.7	1.8%
CapEx taxonomy-eligible economic activities (total)	**276.1**	**8.8%**
Taxonomy non-eligible economic activities	**2,849.9**	**91.2%**
Total	**3,126.0**	

We incurred EU taxonomy-eligible capital expenditure (CapEx) of €276.1 million in 2021. Taxonomy non-eligible capital expenditure amounted to €2,849.9 million. The proportion of taxonomy-eligible capital expenditure therefore amounted to 8.8%. The taxonomy-eligible capital expenditure primarily included three taxonomy activities. Under "**Renovation of existing buildings"**, capital expenditure of €109.3 million was incurred. This was mainly attributable to our Pharmaceuticals Division, and pertained to our IUS facility in Turku, Finland, for example. Under "**Installation, maintenance, and repair of energy efficient equipment"**, capital expenditure of €90.0 million was incurred. This was largely attributable to our Pharmaceuticals Division, and primarily related to the installation of new heating, ventilation and air-conditioning systems. Furthermore, under "**Acquisition and ownership of buildings"**, capital expenditure of €55.7 million was incurred, for example for the Leadership in Energy and Environmental Design certified office building at our Pharmaceuticals site in Cambridge, United States. In addition, there were smaller capital expenditure measures in electric heat pumps, wastewater systems, means of transport and energy-efficient equipment totaling €21.1 million.

1.2.2 Sustainability Management

Sustainability is one of our strategic levers. That means that our business activities are systematically geared toward generating a positive impact for people and the planet. Effective sustainability management throughout the organization is ensured by clearly defined roles and responsibilities. The Chairman of the Board of Management in his capacity as Chief Sustainability Officer (CSO) and the entire Board of Management hold first-level responsibility for this strategy. An external Sustainability Council advises the Board of Management on all matters relating to sustainability and offers a critical-constructive perspective. They are supported by the Public Affairs, Science and Sustainability (PASS) organization, which identifies risks and opportunities, develops strategies, and defines sustainability management targets and guidelines. It also provides governance for all sustainability topics. Sustainability management is integrated into the existing management and governance structures and the core processes of the entire organization.

See Sustainability Report for more detailed information

Our commitment to the U.N. Global Compact and the Responsible Care™ initiative of the chemical industry and our involvement in the World Business Council for Sustainable Development (WBCSD) underline our mission as a company that acts sustainably.

Materiality analysis and stakeholder dialogue

We ascertain the expectations and requirements of our various stakeholders using a materiality analysis, which surveys external stakeholders and managerial employees from various areas of the company throughout the world. The results of this reveal the latest developments along with sustainability-related opportunities and risks. Areas of activity with very high relevance from an internal and external perspective are accounted for in our strategic lever of sustainability and reflected in our nonfinancial Group targets. The current materiality analysis covers the following key areas of activity:

www.bayer.com/materiality

// Innovation
// Access to healthcare
// Sustainable food supply
// Product stewardship
// Climate and environmental protection
// Business ethics

As part of our stakeholder engagement process, which is underpinned by a dedicated guideline, we approach key social and political players and seek dialogue from the outset in strategic decision-making processes regarding new projects such as investment projects and launches of new products.

Respect for human rights

Observing human rights is fundamental to the way we operate. We fully respect and promote human rights and have documented our stance in a globally binding corporate policy entitled the Bayer Human Rights Policy. We further developed our human rights strategy in 2021 and are in the process of updating our human rights policy. A draft version of this policy is currently being checked against the requirements arising from the German Supply Chain Due Diligence Act, which serves as our basis in this respect. Once we have completed this review, both the human rights strategy and updated policy will come into effect in 2022.

www.bayer.com/en/sustainability/human-rights

We take steps to ensure human rights are respected both within our own company and along our entire value chain. Corporate policies, processes, and management and monitoring systems are in place to govern the implementation of human rights standards.

We offer special training programs to enhance employees' awareness of the importance of human rights in their day-to-day activities, and in 2021 also launched a specific human rights training program. Around 86% of our employees received training in aspects of our Human Rights Policy in 2021. We also demand that our business partners, particularly our suppliers, fully observe human rights.

We are a founding member of the U.N. Global Compact and respect the Universal Declaration of Human Rights, the U.N. International Covenants on Civil and Political Rights and on Economic, Social and Cultural Rights, the U.N. Guiding Principles on Business and Human Rights, and a range of globally recognized declarations applicable to multinational corporations, including the OECD Guidelines for Multinational Enterprises, the Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy, and the core labor standards of the International Labour Organization (ILO).

Within the context of our risk management process, we conduct a risk analysis of the potentially adverse consequences of our operating activities for human rights. See the Opportunity and Risk Report for the risk status identified for this area in 2021. We did not identify any potentially negative effects that were reportable under the CSR Directive Implementation Act.

Charitable giving and foundations

Together with our network of leading partners, such as the Bayer foundations and other non-profits, we support social impact projects in the areas of health, nutrition, science and environment, and community engagement. Responding to disasters by providing humanitarian aid also plays a crucial role in our social commitment. Through our disaster relief programs, we support communities affected by natural disasters and public health crises.

In 2021, we provided around €42 million in charitable donations and social impact programs worldwide. In addition to the financial contributions, products costing around €17 million were donated to organizations in countries and communities in need. 63% of our contributions (cash and products) went to low- and middle-income countries. In 2021, we conducted more than 400 social projects worldwide with partner organizations, including the Bayer foundations (Bayer Cares Foundation, Bayer Science & Education Foundation, Bayer Fund (US) and Bayer Foundation India), which generate an important impact for society in line with our vision and corporate purpose.

In countries where we are present, the contributions we make to support social causes – in the form of monetary, product or other in-kind donations – are governed by our global "Corporate Charitable Giving Procedure," which was revised in late 2020. It establishes clear criteria for recipient eligibility and project selection, and also sets forth the strategy we follow to generate long-term impact for society in line with our purpose, vision and sustainability goals. Our charitable donations are recorded and approved centrally, which provides a transparent overview of our contributions to support social causes around the world.

1.2.3 Management Systems

Planning and steering

Economic planning and steering are conducted in line with the frameworks that are set for the Group and the divisions by the Board of Management in the course of the strategic planning process and are translated into specific targets during operational planning. The planning and steering process is complemented by the continuous monitoring of business developments, with key management and performance indicators being updated regularly. In addition, the Board of Management uses predominantly nonfinancial targets and performance indicators to steer the company's sustainable alignment.

The following financial indicators are employed to plan, steer and monitor the development of our business:

Operational management indicators

The main parameters in performance management at the operational level are sales, earnings and cash flow data, which also form the basis of short-term variable compensation (STI). Growth is measured in terms of the change in sales after adjusting for currency and portfolio effects (Fx & portfolio adj.) in order to reflect the operational business development of the Group and the divisions. A key measure of profitability is the EBITDA margin before special items, which is the ratio of EBITDA before special items to sales. Another important profitability indicator for the Bayer Group is core earnings per share, which is the core net income divided by the weighted average number of shares. The free cash flow – an absolute indicator – shows the generation of freely available financial resources and also reflects the company's financial strength and earning power.

See also A 2.3

Strategic value management indicator: ROCE

Return on capital employed (ROCE) is used as a strategic metric to measure the company's operating profit after taxes in relation to the average capital employed. Comparing ROCE against the weighted average cost of capital (WACC) on an annual basis illustrates the level of value creation. It also forms part of our long-term stock-based cash compensation (LTI).

Total shareholder return

We aim to create shareholder value and thus deliver attractive returns for our stockholders. Total shareholder return, which is determined based on the change in the share price over the measurement period plus any dividends paid in the interim, also forms part of our long-term stock-based cash compensation (LTI).

Integrated management system

We maintain a Group-wide integrated management system (IMS), which is detailed in a corporate policy. The IMS provides a framework for all management systems at Bayer, ensuring compliance with the law and with internal and external requirements while also ensuring efficient ways of working. This is achieved through internal regulations and applicable processes involving clear roles and responsibilities. The IMS therefore plays a key role in safeguarding our company's license to operate.

1.3 Focus on Innovation

Our new solutions generate added value for our customers and society. Our activities focus on innovative products based on our research and development (R&D) competencies supplemented with new approaches in our process, service and business models. We also focus on social innovation to improve living conditions for people in developing countries and disadvantaged individuals in our society.

The results of our research and development help us contribute to solving global challenges in medical care and agriculture. In addition to the strong innovative capabilities of our employees throughout the company, our efforts are driven by excellence in R&D, a broad open innovation network, and the use of new, groundbreaking technologies with a particular focus on data science insights.

Partnerships are integral to our innovation strategy, ensuring access to complementary technologies and expertise. We enter into strategic alliances with various partners such as universities, governmental agencies, start-ups, suppliers and industry partners.

We maintain a global network of R&D locations, which employ roughly 15,300 Bayer employees. In 2021, our research and development spend before special items amounted to €5,326 million (2020: €4,884 million).

Excellence in research and development

The activities we pursue are aligned with the innovation strategies of our divisions and are aimed at improving human and plant health and safeguarding stable harvests in agriculture in step with our vision “Health for all, hunger for none.”

We are increasingly employing data science methods in the R&D projects of our three divisions, strategically coordinated by the cross-divisional Digital Transformation Board (DTB) established in 2020.

In 2021, we continued to invest in R&D and pursued targeted programs to further strengthen our innovation capabilities on the basis of a number of strategic decisions. Notable examples in view of their far-reaching importance include the further expansion of cell and gene therapy in the Pharmaceuticals Division and the sustainable agriculture program in the Crop Science Division. The development portfolio for Bayer’s cell and gene therapies already comprises seven candidates at different stages of advanced clinical development. They cover various therapeutic areas with a high unmet need such as neurodegenerative, neuromuscular and cardiovascular indications, and include leading programs for Pompe disease and Parkinson’s disease, hemophilia A and systolic heart failure.

The decarbonization program launched by the Crop Science Division in 2021 is in line with the political objectives of the EU Green Deal and our sustainability commitments. The main goal is to fight climate change by establishing more climate-friendly cultivation methods. Bayer will work together with farmers and experts from the food value chain in a virtual carbon farming laboratory to jointly test innovative methods and gain insights.

2021 also saw the launch of a new cross-divisional initiative, the Bayer Science Collaboration Explorer, to strengthen public trust in our innovations, scientific processes and R&D organization. This initiative is aimed at creating more transparency over Bayer’s scientific collaborations.

Leaps by Bayer

Through Leaps by Bayer, we invest in disruptive innovations in the areas of health and nutrition. The research activities of Leaps by Bayer are focused on applying and further developing new technologies with the potential to solve some of humankind’s most pressing problems and thus also make an important contribution to the Sustainable Development Goals of the United Nations. The framework established for the adoption of new activities is defined by the ten “leaps”:

https://leaps.bayer.com/approach#10leaps

// Cure genetic diseases
// Provide sustainable organ and tissue replacement
// Reverse autoimmune diseases and chronic inflammation
// Replace destroyed tissue
// Prevent and cure cancer
// Reduce the burden of agriculture on the environment
// Use the microbiome to heal
// Develop sustainable protein supply
// Stop disease transmission by insects
// Develop revolutionary digital concepts

The Leaps by Bayer portfolio comprised investments in more than 50 biotech start-ups in 2021.

Examples of the activities of Leaps by Bayer in the area of healthcare in 2021 included the development of innovative therapeutic approaches to treat cancer and autoimmune diseases by modulating T-cells and T-cell receptors, and the development of methods to diagnose and treat chronic inflammatory diseases. These measures led to the addition of Edifice Health, Inc., United States, to the Leaps by Bayer portfolio.

The development of an artificial intelligence (AI)-based care navigation platform is geared toward analyzing disease symptoms faster and better and enabling personalized treatment. To this end, we are collaborating with Ada Health GmbH, Germany, to further advance that company's proven health analysis technologies for symptom analysis. Together, we aim to combine medical knowledge with powerful artificial intelligence to create new possibilities for personalized healthcare. Ada's technology can help shorten time to diagnosis, thus addressing one of the biggest challenges in guiding consumers and patients to appropriate care.

In the agricultural sector, our activities focused on precision agriculture through digital farming, for example in collaborations with Guardian Agriculture, United States, and EarthOptics, United States; and on innovative plant breeding through the use of gene editing in collaboration with Amfora, Inc., United States. Joyn Bio, our joint venture with the start-up company Ginkgo, United States, is working on leveraging the soil microbiome for optimum plant growth and protein content in crops. Further collaborations involving utilization of the soil microbiome were also initiated with Sound Agriculture Co., United States, and Andes Ag. Inc., United States, in 2021.

Sound Agriculture Co. is concentrating on two novel technology platforms that leverage plant and soil biology to significantly improve food production. The first is an on-demand breeding platform that enables plant traits to be developed 10 times faster than current technologies. The second is a nutrient efficiency platform poised to replace 30% of global nitrogen fertilizer use through patented technology that allows crops to access more nutrients. Andes has developed a novel seed treatment technology for seamlessly integrating seeds with a select library of microbes that colonize the seed's root structure. This kick-starts a process known as biological nitrogen fixation. We are helping Andes to expand its current product range and explore the possibilities offered by revolutionary technologies such as soil-based carbon capture.

Patents protect Bayer's intellectual property

Reliable global protection of intellectual property rights is particularly important for an innovation company like Bayer. In most cases, it would be impossible to cover the high costs and risks incurred in the research and development of innovative products without this protection. We are therefore committed worldwide to protecting both the international patent system and our own intellectual property. Depending on the legal framework, we endeavor to obtain patent protection for our products and technologies in major markets. When we successfully market patent-protected products, we are able to invest the profits sustainably in research and development.

The term of a patent is normally 20 years from the date the application is filed. Since it takes an average of 11 to 13 years to develop a new medicine or crop protection active ingredient, only seven to nine years of patent protection remain following the product's approval. The same applies to the development of new transgenic traits. To nevertheless provide an adequate incentive to make the necessary major investments in research and development, the European Union member states, the United States, Japan and some other countries extend patent terms or issue supplementary protection certificates to compensate for the shortening of the effective protection period for pharmaceutical and crop protection patents, but not for transgenic traits.

Crop Science

Working with digital applications and teams of experts, we develop a broad spectrum of tailored solutions that enable farmers to achieve higher productivity in a sustainable manner. Our R&D organization comprises approximately 7,300 employees (2020: 7,100)[4] operating in more than 60 countries around the world. We also enter into collaborations with a large number of external partners under our Open Innovation model to strengthen our innovation power.

Research and development capacities

Our R&D is focused on developing products for farmers and customers across multiple indications, through multiple technology platforms, in order to sustainably increase agricultural productivity while better protecting natural resources. Using a targeted approach, we focus on bringing together our expertise across the following disciplines to deliver innovation faster.

Our **breeding** innovations are aimed at improving crop yields, boosting resiliency against pests, disease and a changing climate, and raising quality. We combine genomic, phenotypic and environmental data with the use of advanced breeding methods and artificial intelligence (AI) to develop novel seed products. In this context, we opened our product design center in Petrolina, Brazil, in 2021 to accelerate the development of corn and soybean products for the country's domestic market.

Biotechnology and **genome editing** tools allow us to develop solutions that strengthen plants' resistance to insect pests, disease, weeds and other environmental stresses, such as drought or high winds, in a targeted manner. Biotechnology makes possible sustainable farming with reduced pesticide use and conservative tillage practices that are designed to preserve topsoil and decrease CO_2 emissions.

In **chemical crop protection**, we discover, optimize and develop new, safe and sustainable products with herbicidal, insecticidal and fungicidal activity. Our tailored solutions help farmers achieve better harvests by managing threats in a more targeted manner. We are constantly working on improving our current offerings and developing new molecules. Discovering new modes of action (MOAs) is one of our main priorities, as this contributes to finding improved solutions for our customer's needs and achieving our sustainability targets.

Our approach in **biologicals** encompasses a focus on microbial organisms and materials derived from them. We are continuing to realign our activities in this field by partnering with innovation leaders. In addition to microbes, we are also developing a broad range of biological solutions, including plant extracts. Biologicals often enable us to reduce the use of synthetic chemicals, decreasing residue levels and supporting resistance management strategies. By introducing microbials or other biological product types into programs with traditional chemistry, we are building a more holistic application system.

Digital solutions and data science, and in particular artificial intelligence, are transforming the world of agriculture. The performance of seed and crop protection products depends heavily on the environmental conditions and management practices under which they are used. With FieldView™, our digital farming platform, we have insight into field-specific information that enables us to use novel modeling to make custom product recommendations tailored to each individual plot. With these insights we are able to maximize the value of our seed and chemistry portfolio for farmers, as well as lead Bayer toward digitally enabled business models and new opportunities for growth.

[4] Including permanent and temporary employees

Research and development pipeline

Our product pipeline contains numerous new small molecule products, seed varieties, digital products and biologicals that promote sustainable agriculture and help improve farmer productivity. The following table shows new products in late development phases[5] that are scheduled to be launched by 2024.

A 1.3/1

Product Innovation Pipeline[1]

Crop/digital application	First launch	Product group	Indication	Product/trait/number of hybrids or varieties
Corn	2022	Biotechnology trait	Pest management	SmartStax PRO
	2023	Breeding/native trait	Crop efficiency/yield	Short Stature Corn
	Annual	Breeding/native trait	Crop efficiency	> 150 new corn seed hybrids
Soybeans	Annual	Breeding/native trait	Crop efficiency	> 150 new soybean seed varieties
Cotton	2023	Biotechnology trait	Pest management	ThryvOn Technology
	Annual	Breeding/native trait	Crop efficiency	> 10 new cotton seed varieties
Crop Protection	2022	Crop protection	Disease management	Xivana (fluoxapiprolin)
	2022	Crop protection	Disease management	Fox Supra (indiflin)[2]
	2024	Crop protection	Pest management	Plenexos (spidoxamat)
	Annual	Biological/small molecule LCM	Crop efficiency, disease, pest and weed management	~ 7 new formulations of crop protection products between 2022 – 2024
Vegetables	Annual	Breeding/native trait	Crop efficiency, disease management	> 90 new seed varieties launched
Digital applications	2022	Digital	Crop efficiency	Seed Advisor tool within FieldView™ enabling seed placement and density recommendations for North American corn growers
	2023	Digital	Disease management	Fungicide timing recommendations for European wheat growers
	2024	Digital	Disease management	Early season fungicide recommendations for North American corn and soy growers

As of December 2021
[1] Planned market launch of selected new products, subject to regulatory approval
[2] Co-development with Sumitomo

In 2021, we launched confirmatory technical proof-of-concept field studies for three new small-molecule or biological active ingredients and plant traits[6]. For 2022, we aim to launch confirmatory technical proof-of-concept field studies for two to three new small-molecule or biological active ingredients and plant traits.

New products and registrations in 2021 (examples)

The next generation of herbicide tolerance in soybeans was launched in 2021 with XtendFlex™ soybeans. The trait offers tolerance to glyphosate, dicamba and glufosinate herbicides. The Roundup Ready™ Xtend Crop System provides soybean growers with industry-leading yield and very good weed management options.

Serenade™ Soil Activ, our new biological option, has been available since the beginning of 2021. This new product offers farmers ease of use with lower application rates and is designed to extend our business in growth markets. It was launched in the United States in 2021, and other countries are set to follow in the years ahead.

[5] Products in late development phases have proven proof of concepts validated by field studies and are ready for hand-off to the regulatory team for regulatory approvals.
[6] A new plant trait is a specific characteristic that has not yet been available or offered at Bayer for the crop plant in question.

Intacta 2 Xtend™ soy, which has gained all regulatory approvals, was successfully introduced in Brazil for the 2020/2021 growing season. This enhancement of the Intacta™ franchise will support farmers in South America with multiple modes of action for insect control.

VTPro4™ corn was launched for the 2021/22 growing season in Brazil and Argentina having received all necessary regulatory approvals. This new stacked offering includes an additional mode of above- and below-ground insect control to combat evolving resistance.

Patents

We regularly apply for patent protection for our innovations in both chemical crop protection and seed / biotechnology. However, the link between patents and products is relatively complex, since products often combine multiple technologies that are patented differently in different areas of the world, with patents often granted only late in the product lifecycle.

Although the patents have already expired for some of our crop protection active ingredients, such as glyphosate, trifloxystrobin, prothioconazole[7] or imidacloprid, we have a portfolio of patents on formulations, mixtures and/or manufacturing processes for these active ingredients. In addition, some of our younger active ingredients such as fluopyram and bixafen are still patent-protected in the United States, Germany, France, the United Kingdom, Brazil, Canada and other countries until at least 2023. Fluopyram is patent-protected until 2024 in the United States and 2025 in Brazil.[8] Tetraniliprole has patent protection until 2029 in Germany, France, the United Kingdom, Brazil, Canada and other countries, and in the United States its patent protection extends until 2030. While our patent coverage on the first-generation Roundup Ready™ trait for soybeans has expired, some varieties – for example in the United States – are still protected by variety patents. The patent coverage on our second-generation Roundup Ready 2 Yield™ trait for soybeans runs until at least the mid-2020s.

Our Intacta RR2 PRO™ soybean also has patent coverage until at least the mid-2020s. Patents on our herbicide trait that confers dicamba tolerance run until at least the mid-2020s. In corn seed and traits, most farmers have already upgraded to next-generation branded corn traits with patent coverage running until at least the mid-2020s.

Collaborations

We are part of a global network of partners from diverse segments of the agricultural industry and work together with numerous public-private bodies, NGOs, universities and other institutions. In 2021, we entered into many new research partnerships, including those detailed below.

In April, we partnered with RAGT Semences, France, to jointly develop hybrid wheat varieties to meet the evolving needs of farmers in Europe. This partnership combines Europe's leading soft wheat genetics with access to the latest breeding methodologies, seed production systems and advanced digital solutions.

[7] The last supplementary protection certificates for prothioconazole in some CIS countries expired in 2020.
[8] Patent protection does not take into account patent term extensions or supplementary protection certificates.

In October, we expanded our collaboration with AbacusBio Limited, New Zealand, in the area of predictive plant breeding to include row crops across broader geographies and, for the first time, various vegetable crops. Through computational integration of economic, grower preference and socio-economic data, AbacusBio's technology can help improve predictions of how products will meet market needs.

In November, we entered into a collaboration with Sound Agriculture Co., United States, to advance a novel technology platform that leverages plant biology to improve food production. Sound's on-demand breeding platform offers a paradigm shift in breeding.

In November, we announced a partnership with Microsoft Corp., United States, to build a new cloud-based set of digital tools and data science solutions for use in agriculture and adjacent industries. The partnership is expected to bring new infrastructure and foundational capabilities to accelerate innovation, boost efficiency and support sustainability across value chains for food, feedstuffs, fuels and textile fibers.

The following table provides an overview of important collaborations that are currently ongoing.

A 1.3/2

Important Collaborations at Crop Science

Partner	Collaboration objective
AbacusBio Limited	Accelerate Bayer's Global Crop Breeding program by utilizing AbacusBio's expertise in trait prioritization and valuation to advance products that anticipate grower and market needs
Andes Ag, Inc.	Andes' process integrates microbes that colonize a seed's root structure, starting biological nitrogen fixation, and enabling the crop to draw down nitrogen from the air. This will contribute to the reduction of additional field inputs and ag-associated greenhouse gas production.
Arvinas Inc.	Oerth Bio LLC (joint venture of Bayer & Arvinas, Inc.) to utilize Arvinas' targeted protein degradation technology PROTAC® to develop innovative new agricultural products to improve crop yields
BASF SE	Co-funded collaboration agreement to develop transgenic products with increased yield stability in corn and soybeans
Berkeley Lights Inc.	Accelerate and expand the discovery of novel traits by developing and performing high-throughput functional screening workflows.
Brazilian Agricultural Research Corporation – Embrapa	R&D cooperation to address specific agricultural challenges in Brazil, e.g., Asian soybean rust and soil carbon dynamics
2Blades Foundation	Collaboration research program to identify Asian soybean rust resistance genes in legumes and other genes to control this important fungal disease in soybeans
Citrus Research Development Foundation, Inc.	Search for solutions to citrus greening disease, which currently threatens the global citrus production and juice industry
Elemental Enzymes Ag and Turf, LLC	Use of soil microbes to improve plant health and crop efficiency thereby increasing crop productivity
Grains Research and Development Corporation (GRDC)	Partnership for the discovery and development of innovative weed management solutions (herbicides)

A 1.3/2 (continued)

Important Collaborations at Crop Science

Partner	Collaboration objective
Ginkgo Bioworks, Inc.	The Joyn Bio joint venture investigates technologies to enhance plant-associated microorganisms
KWS SAAT SE	Joint collaboration and commercial agreement for herbicide-tolerant sugar beet
Microsoft Corp.	Strategic partnership to develop a new cloud-based set of tools and data science solutions for use in agriculture and adjacent industries.
Oxitec Ltd.	Development of a Friendly™ genetically modified fall armyworm exploring a new approach to support integrated pest management in a sustainable way with initial focus on Brazil
Pairwise Plants LLC	Research alliance to develop genome editing tools and products in corn, soybeans, cotton, oilseed rape/canola, and wheat
RAGT SEMENCES S.A.S.	Bayer has entered an exclusive collaboration with RAGT to jointly develop state-of-the-art hybrid wheat varieties to meet the evolving needs of farmers in Europe.
Rantizo, Inc.	Precision aerial pesticide applications while reducing soil compaction. Focusing the application of the right amount to the right plant allows an overall reduction in pesticide applications and of carbon emission compared to traditional sprayers.
Sentera, Inc.	Enables farmers to visualize and order imagery through FieldView™
Sound Agriculture Co.	Sound's technology platform uses biochemical approaches to tap into the natural capabilities of the plant to increase the speed and efficiency of agriculture
Targenomix GmbH	Development and application of systems biology approaches to achieve a better understanding of metabolic processes in plants and develop new herbicides and safeners
Temasek Lmt.	Unfold (joint venture between Bayer and Temasek) has set itself the goal of developing innovative vegetable seeds and raising vertical farming to the next level in terms of quality, efficiency and sustainability

Pharmaceuticals

Research and development activities in our Pharmaceuticals Division are focused on indications with high medical need in the areas of cardiovascular disease, oncology and women's healthcare. We are also engaged in indications outside these fields, such as in the areas of ophthalmology and rare genetic diseases. Our work in radiology focuses on the development of digital solutions, contrast agents and injection systems. Approximately 7,400 (2020: 7,400) employees work in our research and development (R&D) departments at a number of locations around the world, mainly in Germany, the United States, Japan, China, Finland and Norway.

Our research and development activities are focused on the patient. We combine profound knowledge about disease biology with numerous therapy forms and focus on the resolute implementation of digital technologies and the deployment of data sciences to increase the speed, reliability and effectiveness of our R&D processes. We are also strengthening our existing competencies, for example in the area of small-molecule substances, and expanding our expertise in new modalities. Our aim is to employ precision and personalization to offer patients effective solutions that prevent, diagnose, treat or even cure diseases.

Significant advances in 2021 comprised the supplementation of our development portfolio through targeted investment in external growth, including our acquisition of Vividion Therapeutics, Inc., United States, in the area of oncology and immunology. Vividion's leading-edge chemoproteomics technology enables us to develop novel active substances that address previously undruggable proteins. Existing therapies address only a small portion of all disease-associated proteins. Furthermore, the acquisition of Noria Therapeutics, Inc., United States, and its subsidiary PSMA Therapeutics, Inc., added to our oncology pipeline a differentiated, targeted alpha radionuclide therapy based on actinium-225 to treat patients with prostate cancer.

Promising new molecular entities from our early research pipeline are transferred to preclinical development. We define a new molecular entity (NME) as a chemical or biological substance that is not yet approved for use in humans. In preclinical development, these substances are examined further in various models with respect to their suitability for clinical trials and the associated "first-in-humans" studies.

Clinical trials are an essential tool for determining the efficacy and safety of new drugs before they can be used to diagnose or treat diseases. The benefits and risks of new medicinal products must always be scientifically proven and well documented. All our clinical trials comply with strict international guidelines and quality standards, as well as the respective applicable national laws and standards.

Bayer also publishes information about clinical trials in line with the applicable national laws and according to the principles of the European (EFPIA) and U.S. (PhRMA) pharmaceutical industry associations, these principles being defined in position papers.

Information about our own clinical trials can be found in the publicly accessible register www.ClinicalTrials.gov and our own Trial Finder database. Further information on our globally uniform standards, the monitoring of studies and the role of the ethics committees can be found on our homepage.

www.pharma.bayer.com/ethics-clinical-trials

Cell and gene therapy

Cell and gene therapies are one of the next steps in the evolution of drug development. They address the root cause of disease and are geared toward preventing, treating and potentially even curing illnesses. That applies not only to rare genetic diseases but also to more common diseases such as certain immune disorders, cancer and degenerative diseases.

We aim to further broaden our long-term innovation strategy and development portfolio by investing in this area. Our strategy goes well beyond single investments or individual assets – instead, we invest comprehensively in entire fields of technology, so-called technology platforms. This enables a better understanding, more flexible optimization and promising development of new therapies, and will also speed up the development of individual products, giving Bayer a competitive edge. We are therefore focused on establishing four technology platforms: induced pluripotent stem cell (iPSC) therapy, adeno-associated virus (AAV) gene therapy, oncological cell therapies and gene editing.

Our development portfolio already comprises eight projects in various stages of clinical development that cover several therapeutic areas with a high unmet medical need – with leading programs in Parkinson's disease, Pompe disease, hemophilia A and congestive heart failure.

A 1.3/3

Cell and Gene Therapy Projects in Clinical Development

Project	Indication (modality, clinical phase)
AAV2_GDNF_PD	Parkinson's disease (gene therapy, Phase I)
ACTUS-101	Pompe disease (gene therapy, Phase I/II)
NAN-101	Congestive heart failure (gene therapy, Phase I)
AAV2_GDNF_MSA[1]	Multiple system atrophy (gene therapy, Phase I)
DA-01	Parkinson's disease (cell therapy, Phase I)
ATA-2271[2]	Mesothelioma (cell therapy, Phase I)
Peboctocogene camaparvovec (BAY2599023, Factor VIII gene therapy)[3]	Hemophilia A (gene therapy, Phase I/II)
LION-101	Limb-girdle muscular dystrophy type 2I/R9 (gene therapy, start of Phase I scheduled for the first half of 2022)

As of December 7, 2021
[1] Registration number NCT04680065, recruiting has not yet started
[2] In collaboration with Atara Biotherapeutics, Inc., United States
[3] In collaboration with Ultragenyx Pharmaceutical, Inc., United States

We also achieved the following milestones in 2021:

// In June, a Phase I study was initiated by BlueRock for the treatment of Parkinson's disease patients using pluripotent stem cell-derived dopaminergic neurons. In July, the U.S. Food and Drug Administration (FDA) granted Fast Track designation for this therapy. That status enables an accelerated development and subsequent marketing authorization process for therapies of significant medical interest.
// In June, the FDA also granted Fast Track designation for AskBio's AAV-based gene therapy to treat limb-girdle muscular dystrophy type 2I/R9. The Phase I clinical trial is scheduled to begin in the first half of 2022.
// Also in June, we strengthened the contract development and manufacturing organization of our subsidiary Viralgen Vector Core SL with the inauguration of a new AAV-based gene therapy production facility in San Sebastián, Spain.
// In October, we began construction of a modular production unit for cell therapies in Berkeley, United States, to create flexible and high-quality manufacturing capacities for future therapies.
// In December, we entered into a strategic partnership with Mammoth Biosciences, Inc., United States, to develop next-generation CRISPR products. Under the terms of the agreement, the collaboration will concentrate initially on the development of in vivo gene editing therapies with target structures in the liver. The two companies will also work together on ex vivo gene editing projects on a nonexclusive basis.

Phase II and III clinical testing projects

The following table shows our most important drug candidates currently in Phase II of clinical testing:

A 1.3/4

Research and Development Projects (Phase II)

Project	Indication
Adrenomedullin Pegol (PEG-ADM inhale)	Acute respiratory syndrom
Asundexian (FXIa inhibitor)	Prevention of stroke in atrial fibrillation patients
Asundexian (FXIa inhibitor)	Secondary prevention of stroke
Asundexian (FXIa inhibitor)	Prevention of major adverse cardiac events (MACE)
BAY 1747846 (high relaxivity contrast agent)	Magnetic resonance imaging
BAY 2395840 (BDKRB1 antagonist)	Neuropathic pain
BAY 2586116 (task channel blocker)	Obstructive sleep apnea
Fesomersen (BAY 2976217, FXI LICA, IONIS-FXI-L_{RX})[1]	Prevention of thrombosis in end-stage renal disease (ESRD)
Osocimab (anti-FXIa antibody)	Prevention of thrombosis in end-stage renal disease (ESRD)
Pecavaptan (dual vasopressin receptor antagonist)	Congestive heart failure
Regorafenib + nivolumab combination[2]	Recurrent or metastatic solid tumors
Regorafenib + pembrolizumab combination	Second-line therapy of unresectable hepatocellular carcinoma
Runcaciguat (sGC activator)	Chronic kidney disease
Runcaciguat (sGC aktivator)	Non-proliferative diabetic retinopathy

As of February 10, 2022
[1] In collaboration with Ionis Pharmaceuticals, Inc., United States
[2] In collaboration with Bristol-Myers Squibb Company Co., United States, und Ono Pharmaceutical Co., Ltd., Japan

The following table shows our most important drug candidates currently in Phase III of clinical testing:

A 1.3/5

Research and Development Projects (Phase III)

Project	Indication
High-dose aflibercept (VEGF inhibitor)[1]	Diabetic macular edema (DME)
High-dose aflibercept (VEGF inhibitor)[1]	Neovascular age-related macular degeneration (nAMD)
Copanlisib (PI3K inhibitor) + chemotherapy combination	Second-line therapy of indolent non-Hodgkin lymphoma (iNHL)
Darolutamide (ODM-201, AR antagonist)	Hormone-sensitive metastatic prostate cancer
Darolutamide (ODM-201, AR antagonist)	Adjuvant treatment for localized prostate cancer with very high risk of recurrence
Elinzanetant (Neurokinin-1,3 receptor antagonist)	Vasomotor symptoms
Finerenone (MR antagonist)	Heart failure with mid-range or preserved ejection fraction
Finerenone (MR antagonist)	Non-diabetic chronic kidney disease
Regorafenib (multikinase inhibitor)	Newly diagnosed or recurrent glioblastoma
Vericiguat (sGC activator)	Stable heart failure with reduced ejection fraction (HFrEF)

As of January 3, 2022
[1] In collaboration with Regeneron Pharmaceuticals, Inc., United States
The nature of drug discovery and development is such that not all compounds can be expected to meet the predefined project goals. It is possible that any or all of the projects listed above may have to be discontinued due to scientific and/or commercial reasons and will not result in commercialized products. It is also possible that the requisite U.S. Food and Drug Administration (FDA), European Medicines Agency (EMA) or other regulatory approvals will not be granted for these compounds. Moreover, we regularly review our research and development pipeline so that we can give priority to advancing the most promising pharmaceutical projects.

The following material developments occurred in 2021:

Finerenone

// In August, we published results from the Phase III FIGARO-DKD trial evaluating the efficacy and safety of the investigational drug finerenone versus placebo when added to standard of care in patients with chronic kidney disease and type 2 diabetes. The results of the trial, which met its primary endpoint, show that finerenone significantly reduced the combined risk of time to first occurrence of cardiovascular death or nonfatal cardiovascular events (nonfatal myocardial infarction, nonfatal stroke or heart failure hospitalization).
// In September, we announced the initiation of the FIND-CKD Phase III study, which primarily aims to demonstrate the superiority of finerenone compared to placebo in delaying the progression of kidney disease in patients with nondiabetic chronic kidney disease who are additionally receiving guideline-directed therapy.

Darolutamide

// In February, we began enrolling patients in the Phase III ARANOTE trial evaluating the efficacy and safety of darolutamide plus androgen deprivation therapy (ADT) in comparison to placebo plus ADT in patients with metastatic hormone-sensitive prostate cancer.
// In December, we reported that our Phase III ARASENS trial had met its primary endpoint. In the ARASENS trial, darolutamide in combination with docetaxel and androgen deprivation therapy significantly increased overall survival in patients with metastatic hormone-sensitive prostate cancer compared to docetaxel and ADT.

Rogaratinib

// In February 2022, Bayer decided to not pursue further development activities for rogaratinib, a pan-FGFR inhibitor, for the treatment of different types of cancer.

Regorafenib and nivolumab combination

// Upon review of the Phase II data, Bayer and its collaboration partner BMS/Ono Pharmaceuticals have decided to not pursue the development activities for the combination of regorafenib and nivolumab in metastatic colorectal cancer.

Elinzanetant

// In August, we initiated the Phase III clinical development program OASIS, which aims to evaluate the efficacy and safety of elinzanetant in the treatment of vasomotor symptoms during menopause. Elinzanetant is a first-in-class, nonhormonal, once-daily, oral, dual neurokinin-1,3 receptor antagonist that is currently under development. The design and dosing of the Phase III clinical development program is based on the positive data from two Phase II studies (RELENT-1 and SWITCH-1) demonstrating good efficacy for elinzanetant with a favorable safety profile.

Combi IUS LNG/IND

// In April, we decided to discontinue the further development of the Combi IUS LNG/IND program. Combi IUS was a new intrauterine system (IUS) that combined levonorgestrel (LNG) and indomethacin (IND) for five-year contraception and had completed Phase II development.

Fulacimstat CKD

// In March, we decided to halt the development of the chymase inhibitor fulacimstat in the indication chronic kidney disease as the criteria in the Phase II proof-of-concept trial had not been met.

Eliapixant

// In February 2022, we decided to discontinue the development program for eliapixant in all indications following a re-evaluation of the compound's risk/benefit profile.

Filings and approvals

The most important drug candidates currently in the approval process or approved in 2021 are:

A 1.3/6

Main Products Submitted for Approval

Project	Region	Indication
Aflibercept (VEGF inhibitor)[1]	EU, Japan	Retinopathy of prematurity
Finerenone (MR antagonist)	EU, Japan, China	Chronic kidney disease in patients with type 2 diabetes
Larotrectinib (LOXO-101, TRK fusion inhibitor)	China	Solid tumors with NTRK gene fusions
Rivaroxaban (FXa Inhibitor)	China	VTE treatment in children
	Japan, China	Peripheral artery disease (PAD)
Vericiguat (sGC stimulator)[2]	China	Heart failure with reduced ejection fraction (HFrEF)

As of January 3, 2022

[1] In collaboration with Regeneron Pharmaceuticals, Inc., United States

[2] Co-development with Merck & Co., Inc., United States

Finerenone

// In July, the U.S. Food and Drug Administration approved finerenone under the brand name Kerendia™ to reduce the risk of sustained estimated glomerular filtration rate decline, end-stage kidney disease, cardiovascular death, nonfatal myocardial infarction and heart failure hospitalization in adult patients with chronic kidney disease and type 2 diabetes.

// In December, the Committee for Medicinal Products for Human Use (CHMP) of the European Medicines Agency recommended that finerenone be granted regulatory approval as a new therapeutic option for the treatment of adult patients with chronic kidney disease and type 2 diabetes.

Rivaroxaban (FXa inhibitor)

// In January, the Japanese Ministry of Health, Labour and Welfare (MHLW) granted regulatory approval for the oral Factor Xa inhibitor rivaroxaban (Xarelto™) in the treatment of venous thromboembolism (VTE) including catheter-related thrombosis and cerebral venous sinus thrombosis and for the prevention of recurrent VTE in pediatric patients. The suspension for oral administration was likewise approved. This means that rivaroxaban, which is already routinely used in adult patients with VTE, is now the first oral Factor Xa inhibitor to be licensed for the treatment and prevention of recurrent VTE in children.

Vericiguat

// In June, the Japanese Ministry of Health, Labour, and Welfare approved the soluble guanylate cyclase (sGC) stimulator vericiguat under the brand name Verquvo™ for the treatment of patients with chronic heart failure who are receiving standard treatment for chronic heart failure.

// In July, the European Commission granted marketing authorization for vericiguat under the brand name Verquvo™ in the European Union for the treatment of symptomatic chronic heart failure in adult patients with reduced ejection fraction who are stabilized after a recent decompensation event requiring intravenous therapy.

Xofigo

// RADIANT is a large Phase IV, randomized study of radium-223 dichloride vs. novel anti-hormonal therapy (NAH) in patients with bone-dominant metastatic castration-resistant prostate cancer (mCRPC) progressing on/after one line of NAH. Sequencing of NAH like abiraterone or enzalutamide is still frequently used in clinical practice underscoring the paucity of life-prolonging treatment options in these patients. Therefore, the proposed trial will address a clinically very relevant question in a patient population with high unmet medical need. The RADIANT trial has been designed to meet the European Commission's request for a Phase IV randomized study to further characterize the efficacy and safety of radium-223 dichloride.

Larotrectinib

// In March, the Japanese Ministry of Health, Labor and Welfare granted marketing authorization for the precision oncology drug Vitrakvi™ (active ingredient: larotrectinib) for the treatment of neurotrophic tyrosine receptor kinase (NTRK) fusion-positive advanced or recurrent solid tumors. Larotrectinib is a highly selective TRK inhibitor exclusively designed to treat tumors that have developed an NTRK gene fusion.

Copanlisib

// In December, Bayer withdrew its application for marketing authorization of the combination of copanlisib and rituximab on the basis of the Phase III CHRONOS-3 trial in order to collate additional data and conduct further analyses. Bayer intends to reassess the possibility of resubmitting the compound for marketing authorization on completion of these additional analyses. The approved indication of copanlisib (Aliqopa™) as a monotherapy for the third-line treatment of follicular lymphoma (FL) in the United States, Taiwan and Israel is not affected by these measures.

Molidustat

// In January 2021, the Japanese health authorities granted us regulatory approval for molidustat, a new therapeutic option for renal anemia.

Patents

The following table shows the expiration dates for our most significant Pharmaceuticals patents:

A 1.3/7

Pharmaceuticals Patent Expiration Dates

Products											Market
	Germany	**France**	**Italy**	**Switzer-land**	**Spain**	**U.K.**	**China**	**Japan**	**Brazil**	**Canada**	**U.S.A.**
Adempas™											
Active ingredient	2028	2028	2028	2028	2028	2028	2023	2027–2028[d]	2023[c]	2023	2026
Eylea™											
Active ingredient	2025	2025	2025	2025	2025	2025	–	2021–2025[e,d]	2020[c]	–	–
Jivi™											
Active ingredient	2025[a,g]	2030[e,g]	2031[e,h]	2030[e,g]	2031[e,h]	2025[a]	2025	2027[e]	2025[c]	2027	2025[a]
Kerendia™											
Active ingredient	2028[f]	2028[f]	2028[f]	2028[f]	2028[f]	2028[f]	2028[f]	2028[f]	2028	2028[f]	2028[a]
Nexavar™											
Active ingredient	2021	2021	2021	2021	2021	2021	–	2021-2025[d]	2020[c]	–	–
Nubeqa™											
Active ingredient	2030[a]	2030[a]	2035[e]	2030[a]	2035[e]	2030[a]	2030	2035[e]	2030	2032	2030[a]
Stivarga™											
Active ingredient	2028	2028	2028	2028	2028	2028	2024	2026[d]	2024[c]	2024	2031
Verquvo™											
Active ingredient	2031[a]	2031[a]	2036[e]	2031[f]	2031[a]	2031[a]	2031[f]	2031[a]	2031[b]	2031[f]	2031[a]
Vitrakvi™											
Active ingredient	2029[a]	2034[e]	2034	2034[e]	2034	2029[a]	2029	2029[a]	2029[c]	2031[e]	2029[a]
Xarelto™											
Active ingredient	2024[h]	2023[g]	2024[h]	2024[h]	2024[h]	2024[h]	–	2022–2025[d]	2020[c]	–	2025[i]
Xofigo™											
Use	2024	2024	2024	2024	2024	2024	–	2022[e]	–	–	2022

[a] Current expiration date; patent term extension applied for
[b] Patent application pending
[c] Patent term revised
[d] Application-specific patent term extension(s)
[e] Patent term extension granted
[f] Current expiration date; patent term extension will be applied for punctually
[g] Pediatric SPC extension applied for
[h] Pediatric SPC extension granted
[i] Including 6-month period of pediatric exclusivity granted by the regulatory authority following patent expiration in 2024

In addition to the information in the table, it should be noted that in Europe our Xarelto 10, 15 and 20 mg tablets are protected by a patent granted by the European Patent Office for once-daily dosing until 2026. This patent has been successfully defended at European level but could be attacked again at national level. We are confident that we will be able to ward off such attacks, should they occur. In the case of such secondary patents, there is also the risk of an attempt to circumvent them. However, we will take vigorous action against any infringement of this patent.

In the United States, our Xarelto 10, 15 and 20 mg tablets are also protected by a patent for once-daily dosing beyond 2025. There have already been patent law disputes that have been settled through settlements, including with Unichem, Inc. and Unichem Pharmaceuticals (USA), Inc. (collectively “Unichem”). According to the settlement with Unichem, Unichem will be licensed under the relevant patents to market a generic version of Xarelto 10, 15 and 20 mg tablets from 2027 or earlier in certain circumstances, which we do not expect at this time. In the United States, as in Europe, there is a risk of attempts to circumvent and attacks on this patent by previously uninvolved competitors from 2025 onwards.

External innovation

We achieved significant progress in the area of external innovation – a strategic cornerstone of our R&D strategy – in 2021. This also includes acquisitions of companies that are engaged in research in our core therapeutic areas.

// In June, we concluded an agreement to acquire Noria Therapeutics, Inc., United States, and its subsidiary PSMA Therapeutics, Inc., to strengthen our oncology portfolio. This acquisition gives us exclusive rights to a differentiated alpha radionuclide therapy based on actinium-225 and a small molecule targeting the prostate-specific membrane antigen (PSMA), and broadens our existing oncology portfolio of targeted alpha therapies.

// In August, we announced an agreement to acquire the U.S.-based biopharmaceutical company Vividion Therapeutics, Inc., and thus gain access to a cutting-edge chemoproteomics platform that identifies previously unknown binding pockets in undruggable targets. The acquisition will strengthen our drug discovery capabilities and enable us to develop novel compounds in indications of high unmet medical need. Vividion's technology has already proven its applicability preclinically in oncology and immune-related diseases, with potential to expand into additional therapeutic areas.

The following developments also took place in our collaboration projects:

// In September, Huma Therapeutics Ltd., United Kingdom, announced a collaboration with us. The joint research project is aimed at simplifying the analysis of computed tomography (CT) images with the help of machine learning. The jointly developed technology is geared toward enabling a distinction to be made on CT images between various types of non-small-cell bronchial carcinoma, thus improving the accuracy and speed of diagnosis.

// In October, our U.S. partner Informed Data Systems Inc. (One Drop) announced the introduction of a One Drop module for cardiovascular disease prevention. The first product jointly developed with us utilizes artificial intelligence to offer a personalized health program and combine clinical guidelines with ultra-modern technology and prognostic analysis. The ultimate objective is to reduce the risk of developing cardiovascular disease.

// In connection with our relief efforts to address the pandemic, we announced plans at the beginning of 2021 to support the biopharmaceutical company CureVac N.V. in developing its first-generation vaccine candidates. In October, CureVac announced it was withdrawing its first-generation COVID-19 vaccine candidate from the ongoing registration procedure of the European Medicines Agency (EMA) in order to focus on the development of a second-generation COVID-19 vaccine candidate. This obviates the need for further development, manufacturing and logistical support, and we have therefore discontinued the related activities in coordination with CureVac.

The following table provides an overview of additional significant ongoing partnerships and collaborations newly formed in 2021:

A 1.3/8

Main Collaborations

Partner	Collaboration objective
Arvinas, Inc.	Research collaboration in the field of life sciences using novel PROTAC™ (proteolysis-targeting chimeras) technology from Arvinas to develop new pharmaceuticals to treat cardiovascular, oncological and gynecological diseases
Atara Biotherapeutics, Inc.	Strategic partnership for next-generation, mesothelin-directed CAR-T cell therapies for the treatment of solid tumors
Blackford Analysis Ltd.	Development and licensing agreement aimed at establishing a digital AI platform for radiology
Brigham and Women's Hospital and Massachusetts Hospital	Joint laboratory for research into new drug candidates to treat chronic lung diseases
Bristol-Myers Squibb Co. and Ono Pharmaceutical Co., Ltd.	Clinical collaboration to evaluate new combination possibilities for Stivarga™ (regorafenib) with immuno-oncologics
Broad Institute	Strategic partnership to research and develop new therapeutic options in the fields of cardiovascular medicine and oncology and establishment of a joint research laboratory
Compugen Ltd.	Research and development of new immunotherapy approaches in oncology
Curadev Pvt. Ltd.	Research collaboration to identify and develop new drug candidates for the treatment of lung, cardiovascular and other inflammatory diseases, and a licensing agreement for Curadev's STING (Stimulator of Interferon Genes) antagonists program
Daré Bioscience, Inc.	License agreement for U.S. commercial rights to hormone-free contraceptive Ovaprene™ in the future
German Cancer Research Center (DKFZ)	Strategic partnership to research and develop new therapeutic options in oncology, especially in immunotherapy, and establishment of a joint research laboratory
Dewpoint Therapeutics, Inc.	Option, research and license agreement for the development of new treatments for cardiovascular and gynecological diseases, with the partnership leveraging Dewpoint's proprietary platform for biomolecular condensates and Bayer's compound library
Evotec AG	Collaboration to identify development candidates for the treatment of endometriosis and kidney diseases and to develop multiple clincial candidates for the treatment of polycystic ovary syndrome (PCOS)
Exscientia Ltd.	Collaboration in early research projects to treat cardiovascular and oncological diseases
Foundation Medicine, Inc.	Collaboration for the development and global commercialization of therapy-accompanying diagnostic tests, also known as companion diagnostics (CDx), based on next-generation sequencing for new cancer drugs developed by Bayer
Huma Therapeutics Ltd.	Collaboration to develop machine learning technologies that will simplify the diagnosis of certain types of lung cancer
Informed Data Systems Inc. (One Drop)	Collaboration for co-development of digital healthcare products in a variety of therapeutic areas
Invitae Corporation	Collaboration for global development and marketing of companion diagnostics (CDx) tests for Vitrakvi™ (larotrectinib) on the basis of next-generation sequencing
Ionis Pharmaceuticals, Inc.	Development of the antisense drug IONIS-FXIRx for thrombosis prevention and development of IONIS-FXI-LRx in the preclinical phase
Janssen Research & Development, LLC of Johnson & Johnson	Development and marketing of Xarelto™ (rivaroxaban) for the treatment of coagulation disorders
Kyoto University	Research alliance to identify new therapeutic approaches for pulmonary diseases
Mammoth Biosciences, Inc.	Strategic partnership in the field of gene editing, focusing on the development of in vivo therapies with target structures in the liver, and non-exclusive collaboration in the field of ex vivo gene editing
MD Anderson Cancer Center	Development collaboration in oncology
Merck & Co., Inc.	Development and marketing collaboration in the field of soluble guanylate cyclase (sGC) modulation
Orion Corporation	Development and marketing of darolutamide (previously ODM-201) for the treatment of patients with prostate cancer
Peking University	Research collaboration and establishment of a research center for joint projects
Regeneron Pharmaceuticals	Cooperation and license agreement for the brand Eylea™
Recursion Pharmaceuticals Inc.	Strategic partnership to conduct research into new treatments for fibrotic diseases of the lungs, kidneys, heart and other organs
Schrödinger, Inc.	Development of an artificial-intelligence-based platform for chemical compound design
Tsinghua University	Research collaboration and establishment of a research center for joint projects
Ultragenyx Pharmaceuticals Inc.	Research and development of a novel gene therapy for the treatment of hemophilia A
University of Oxford	Strategic research partnership to develop novel gynecological therapies
Vanderbilt University Medical Center	Strategic research alliance to identify and develop new potential active ingredients for the treatment of kidney diseases

Consumer Health

At Consumer Health, we concentrate on developing new nonprescription (OTC) products and solutions that improve consumer health and well-being. We maintain a global network of research and development facilities, with major sites in the United States, France, Spain, Germany and China at which approximately 600 employees (2020: 600 employees) work. We are active in the areas of pain, cardiovascular risk prevention, dermatology, nutritional supplements, digestive health, allergy and cough & cold.

Our focus lies on product developments that are insight-driven and aligned to the unmet needs of consumers. Our innovations range from new product formulations, devices and packaging to new consumer and healthcare professional claims and communications. In addition, we developed around 60 new consumer-validated product innovations in 2021. We are strengthening Consumer Health's innovation pipeline with around 150 active projects that we are developing across all our categories. These include core and adjacent innovations as well as transformational innovations that could significantly advance self-care products for consumers worldwide.[9]

A further important part of our innovation strategy is transitioning current prescription medicines that are suitable for self-care to over-the-counter status (Rx-to-OTC switches).

In the United States, China, Germany and other core markets, we continue to make progress in e-commerce by increasing sales and market share on key e-commerce platforms. In addition, we developed a new strategy called 'Innovation with Partners' to discover new sources of growth.

We also introduced a number of product line extensions for existing brands in various countries in 2021, for example:

Bepanthen™ Derma, a daily skin range for dry skin comprising body and face products, including wash gels, was launched in nine countries globally, including Brazil, France and Germany.

In the United States, we expanded our product portfolio with a line extension of our Aleve™ brand. The newly-launched AleveX™ is a range of topical products for the treatment of pain.

In the Europe/Middle East/Africa region, we extended the LAIF™ product line in Germany with the launch of CalmaLAIF™. The formula is a unique combination of four natural ingredients to help reduce stress complaints, promoting both a sense of calm and restorative sleep.

In the Asia/Pacific region, we expanded our range of Redoxon™ supplements in our Nutritionals category with the launch of single vitamin C in chewable and film-coated tablet formats for adults and kids.

We also received approval from the Food and Drug Administration (FDA) in the United States to switch the in-licensed product Astepro™ Allergy from Rx to OTC status. Astepro™ Allergy relieves nasal congestion, runny nose, sneezing and itchy nose due to hay fever or other upper respiratory allergies. This switch means that Astepro™ Allergy is the first and only steroid-free, antihistamine nasal spray for allergies to be available as an OTC in the United States for adults and children 6 years of age and older, with the product set to be launched over the course of 2022.

[9] Core innovation means optimizing existing products for existing customers. Adjacent innovation refers to the extension of existing brands to new market segments. Transformational innovation refers to achieving breakthroughs and creating new markets that do not yet exist.

1.4 Commitment to Employees

Bayer's business success is essentially built on the knowledge and commitment of our workforce. As an employer, we offer our employees attractive conditions and wide-ranging individual development opportunities. Alongside professional training, we focus on promoting a dialogue- and feedback-oriented culture based on trust, intentional inclusion, and respect for diversity and equality of opportunity, which is also summarized in our corporate policy entitled "Fairness and Respect at Work." Our employees worldwide are trained to comply with these guidelines. We measure the engagement and satisfaction of our employees by means of systematic feedback discussions and regular employee surveys. Responsibility for the human resources strategy of the Bayer Group lies with the Board of Management, supported by Bayer's Human Resources enabling function. The strategy is globally implemented within the scope of binding policies.

For more than 10 years, Bayer's LIFE values (Leadership, Integrity, Flexibility and Efficiency) have guided us in our activities. These stand for our values and leadership principles. Attributes define each value's practical meaning and behaviors, serving as the sole reference for how employees work at Bayer.

An overview of the attributes for each value can be found at www.bayer.com/en/commitments/our-values

Employees at all Bayer sites around the world have the right to elect their own representatives. In 2021, the working conditions for around 54% (2020: 55%) of our employees worldwide were governed by collective or company agreements.

Employee data

On December 31, 2021, we employed 99,637 people (2020: 99,538) worldwide. In Germany, we had 23,116 (2020: 23,398) employees, representing 23.2% of the total Group workforce (2020: 23.5%).

In 2021, the Bayer Group hired 11,819 new employees (accounting for 11.7% of our workforce). On the reporting date, our employees had worked for the Bayer Group for an average of 11.2 years (2020: 11.3). Our workforce includes only a small number of employees on temporary contracts (3.7%).

Restructuring measures

We act with social responsibility when changes and restructuring measures are necessary. In all countries, we aim to minimize the impact on employees and find mutually agreeable solutions in cases where job reductions are necessary. This is also the case in Germany, where agreements are in place with employee representatives that fundamentally rule out dismissals for operational reasons in the intercompany personnel network of Bayer AG in the country until the end of 2025.

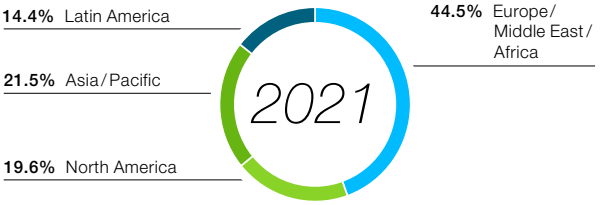
We made further progress with the planned Group-wide measures first announced in 2018 and are at different stages of development with regard to the acceleration of our transformation announced in 2020. We anticipate that all of the major transformation measures will be implemented by the end of 2024. Flexible models with attractive conditions have been offered to employees of various age groups since February 2019.

A 1.4/1

Employee Data

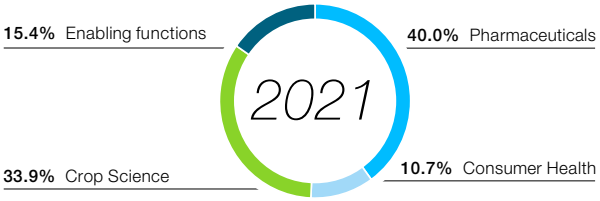
	2020	2021	Change %
Total	**99,538**	**99,637**	**+ 0.1%**

by Region



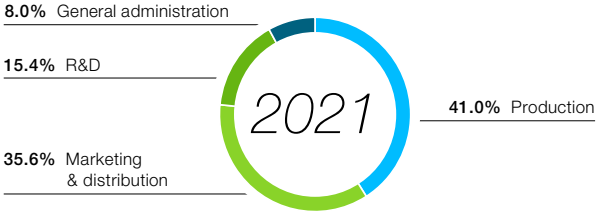
	2020	2021	Change %
Europe/Middle East/Africa	45,146	44,309	– 1.9%
North America	19,111	19,515	+ 2.1%
Asia/Pacific	21,310	21,448	+ 0.6%
Latin America	13,971	14,365	+ 2.8%

by Division



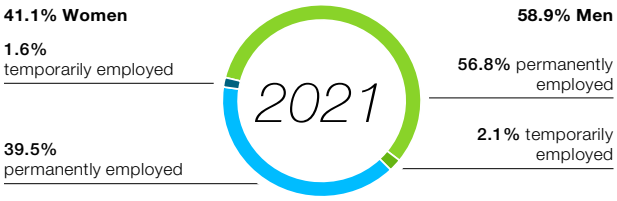
	2020	2021	Change %
Crop Science	33,064	33,738	+ 2.0%
Pharmaceuticals	39,206	39,931	+ 1.8%
Consumer Health	10,570	10,647	+ 0.7%
Enabling functions	16,698	15,321	– 8.2%

by Function



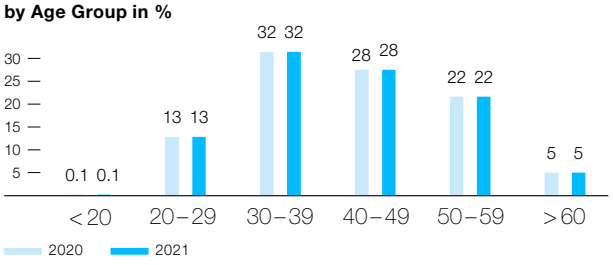
	2020	2021	Change %
Production	40,696	40,838	+ 0.3%
Marketing & distribution	35,424	35,496	+ 0.2%
R&D	15,065	15,310	+ 1.6%
General administration	8,353	7,993	– 4.3%

by Gender



	Women		Men	
	2020	2021	2020	2021
Europe/Middle East/Africa	19,971	19,530	25,174	24,779
North America	7,232	7,482	11,879	12,033
Asia/Pacific	8,174	8,447	13,136	13,001
Latin America	5,325	5,465	8,647	8,900
Total	40,702	40,924	58,836	58,713

by Age Group in %



Fluctuation in %

	Voluntary		Total	
%	2020	2021	2020	2021
Women	5.1	6.7	12.3	12.6
Men	4.7	5.9	12.2	11.8
Total	4.9	6.2	12.3	12.1

Number of employees in full-time equivalents (FTE)

Employee compensation and variable pay

Our compensation system combines a basic salary reflecting performance and responsibility with elements based on the company's success, such as variable one-time payments, plus additional benefits that include stock participation programs. Members of upper management throughout the Bayer Group are invited to participate in Aspire, a uniform long-term compensation program based on the development of the share price. Adjustments based on continuous benchmarking make our compensation internationally competitive.

Besides providing attractive compensation for their work, Bayer contributes to the financial security of its present and former employees after their retirement. Retirement benefit plans are available to 76% (2020: 71%) of Bayer employees worldwide to complement national pension systems.

Starting in 2021, we adjusted the calculation logic of the short-term and long-term variable incentive programs for eligible employees to include the Group's sustainability, return on investment and free cash flow targets. These additional parameters align with those that are already relevant for the compensation of the Board of Management, thereby standardizing the performance parameters for variable compensation throughout the Group.

A 1.4/2

Personnel Expenses and Pension Obligations

€ million	2020	2021
Personnel expenses	9,769	11,798
of which pension expenses	976	904
Pension obligations[1]	26,595	25,734
Pension benefits paid[2]	1,139	1,502

[1] Present value of defined benefit obligations for pensions and other post-employment benefits as of December 31
[2] Including Animal Health and Currenta (until their deconsolidation)

The increase in personnel expenses is largely due to additions to provisions for variable compensation. In 2021, provisions of around €1,570 million (2020: around €500 million) were established for variable one-time payments to employees under the Group-wide short-term incentive (STI) program and similar programs. In addition, a budget of approximately €100 million (2020: €72 million) was made available in 2021 for individual Top Performance Awards. Furthermore, there were also additional allocations to provisions in connection with the drive to accelerate the company's transformation.

Our compensation principles comprise providing fair compensation to all and informing all our employees transparently about the overall structure of their compensation. As standard practice, Bayer pays at least a "living wage," which is annually reviewed and defined worldwide by the non-profit organization Business for Social Responsibility, and compensates employees on both permanent and temporary employment contracts in excess of the statutory minimum wage in many of the countries in which we operate.

Vocational and ongoing training

To meet the need for skilled employees, Bayer hires apprentices in Germany in more than 34 different occupations. In total, we have around 1,300 apprentices. Bayer also offers trainee programs in various areas for those embarking on a career and internships for students around the world.

A wide range of ongoing training opportunities is available to our employees in the form of both e-learning and face-to-face training. Each employee engaged in an average of around 26 hours of ongoing training in 2021.

Work-life integration

We support employees in balancing their work and private lives. We provide various programs to support employees, including flexible working arrangements (how, when and where employees work) and support for childcare and care of close relatives within the scope of local social and legal guidelines. In many countries, our commitment in this area goes beyond the statutory requirements.

In 2021, part-time employees accounted for around 6.2% of our workforce (of which 53.6% were women and 46.4% men), primarily in Europe.

Partly in response to the COVID-19 pandemic, we are developing an approach for when, where and how employees will work in the next normal. Ensuring employee safety and driving work-life integration remain important enablers of our people.

Health promotion

Almost 97% (2020: 97%) of our employees worldwide either have statutory health insurance or can obtain health insurance through the company.

We maintain a global framework concept to promote employee health and quality of life called BeWell@Bayer. BeWell@Bayer expands the core aspect of health into a comprehensive approach, targets further health improvements in the daily work environment and is intended to help employees balance their professional and private lives. Health check-ups are an integral part of our global health promotion initiatives.

Inclusion and diversity

Mutual understanding and a company culture that leverages talented employees of various backgrounds and perspectives is an important success factor for the Bayer Group. We aim to create an inclusive workplace where all employees feel welcome and contribute at their best. We will continue to seek out and promote the best talent and drive for a workforce that both reflects the highest quality of skills and qualifications, and our strong focus on inclusion and diversity. We attach great importance to equal pay for men and women. We developed a consistent methodology for gender pay parity equity analysis in 2020 and have started applying the methodology. We employ people from around 154 nations.

Our Inclusion & Diversity strategy focuses on the integrative behavior and decision-making of all employees within the Group. To support this, we have established inclusion and diversity committees at various management levels. Each of our Business Resource Groups (BRGs) has a sponsor at Board of Management level and is intensively supported in promoting an inclusive workspace. In addition, we are integrating inclusion and diversity into core people processes such as talent attraction and talent management.

The proportion of women in the workforce remained almost constant at 41.1% (2020: 40.9%). We are specifically targeting a greater gender balance in management. Based on 41,520 employees in management, the proportion of women in 2021 was 41.9% (2020: 41.0%), and among skilled workers 40.5% (2020: 40.8%). The proportion of women in top management, which encompasses the highest management level below the Board of Management, increased again compared to previous years. At the end of 2021, it was made up of 26.5% women (2010: 6.5%[10]) and 73.5% men (2010: 93.5%).

[10] Figure as last reported

Our top management currently comprises 37 nationalities (2020: 35), with around 65% (2020: 64.8%) of its members working in their native country. Information on diversity in our Board of Management and our Supervisory Board can be found in our Corporate Governance Report.

The average age of our employees is 42 (2020: 42). There were no significant changes to the age structure in 2021 compared to 2020.

People with disabilities are an integral part of our workforce. Based on voluntary statements by employees, we employ some 2,150 people with disabilities, 45% of whom are women and 55% men. That represents around 2.1% of our total workforce.

In 2021, we released our goals for gender balance across the Bayer Group. We aim to increase female representation to 33% across our entire top management by 2025, and to 50% across all other management levels by the same year. We then aim to increase the share of women in top management to 50% as well by 2030. We have also defined aspirations for other diversity elements, including generation, nationality, experience, LGBTQ+, and people with disabilities for 2025 and 2030. Regionally tracked aspects such as ethnic origin are integrated into targets in our country organizations.

1.5 Procurement and Supplier Management

We have an impact on society and the environment through our procurement activities and supplier relationships. Not only economic but also ethical, social and ecological principles are therefore anchored in our Procurement Policy, which is binding for all employees worldwide.

As a cross-divisional enabling function, Procurement leverages synergies by bundling know-how and procurement spend. In 2021, we had a total of 93,844 (2020: 97,362) suppliers. Our procurement spend was €18.9 billion (2020: € 17.7 billion).

Our main direct procurement materials include active ingredients, raw materials, intermediates, finished products and seeds. Technical goods and services, research and development (R&D) resources, and marketing and IT services are important components of our indirect procurement portfolio.

Procurement operates according to established procurement and supplier management processes. Long-term contracts and active supplier management for strategically important goods and services are key elements here. They serve to minimize procurement-specific risks such as supply disruptions or significant price fluctuations, as well as to safeguard our company's competitiveness and ensure smooth production processes.

During the continuing COVID-19 pandemic, our supply chain has proven to be stable and resilient, due in part to our involvement in the Together for Sustainability (TfS) initiative and the Pharmaceutical Supply Chain Initiative (PSCI). We have worked together with our suppliers for many years to jointly develop sustainable solutions to avoid risks.

To meet our climate protection targets, Procurement takes and supports measures to reduce greenhouse gas (GHG) emissions in our supply chain (Scope 3). We advanced our activities from 2020 and initiated new ones in 2021. We continue to lead a dedicated workstream "GHG Scope 3 Emissions" in the TfS initiative and have also been working with the World Business Council for Sustainable Development and CDP Supply Chain.

Regarding sustainable palm oil, Procurement decided in 2021 to switch from the Roundtable on Sustainable Palm Oil (RSPO) Book & Claim model (credits) to the RSPO Mass Balance model. The transition to the new process will take place in early 2022, from which point we will source RSPO Mass Balanced-certified material.

In 2021, we focused our efforts on raising awareness for human rights in the supply chain among our procurement employees and suppliers as well as on incorporating the German Supply Chain Due Diligence Act into our business operations.

Sustainability in the supply chain

Clear sustainability criteria and standards are in place for our supply chain on both a global and regional level. With the goal of improving sustainable practices in our supply chain, we operate a Group-wide four-step management process that comprises the following elements: raising awareness, supplier selection, supplier evaluation and supplier development. We select suppliers to be evaluated on sustainability performance based on a risk classification matrix that considers country as well as category sustainability risks. This allows for a more targeted analysis according to individual risk criteria (e.g., human rights violations), thus increasing transparency in our supply chain.

Our sustainability requirements are established in the Bayer Supplier Code of Conduct, which is based on our Bayer Human Rights Policy and the principles of the U.N. Global Compact. The code serves as the basis for selecting and evaluating our suppliers and is integrated into electronic ordering systems throughout the Bayer Group. Furthermore, our standard supply contracts contain a clause that authorizes us to verify suppliers' compliance with our sustainability requirements. For all ongoing contracts, we will integrate the standard clause successively from 2022 onward.

We verify suppliers' observance of the code requirements with the aid of online assessments[11] or on-site audits. We evaluate our strategically important suppliers – together comprising around 20% of our total procurement spend – and suppliers with a high sustainability risk, which factors in both country and category risks. Our process also includes supplier evaluations performed within the scope of the two sustainability industry initiatives we are a part of. In total, our service provider EcoVadis assessed 802 (2020: 670) suppliers on our behalf in 2021. In 2021, we arranged for 67 (2020: 26) of our suppliers to be audited on site by external, independent auditors. In addition, 10 suppliers were audited virtually due to the COVID-19 pandemic. In 2021, 200 (2020: 83) suppliers were evaluated through an HSE audit, with the focus on health, safety and environmental protection.

If critical results are recorded in the event of a serious violation or several major findings being identified in a supplier's sustainability performance, specific improvement measures are then jointly defined. In 2021, critical results were determined for 22 suppliers (3% of all assessed and audited suppliers; 2020: 13 suppliers (2%)). In these cases, we request that the suppliers remedy the identified weaknesses. We monitor the implementation of these activities through re-assessments or follow-up audits. We reserve the right to terminate a supplier relationship if no improvement is observed during re-evaluations. In 2021, we did not have to end any supplier relationship due solely to sustainability performance, but we took measures to reduce business with suppliers that did not manage to improve their sustainability performance. In 2021, 508 (2020: 357) of the 879 (2020: 701) suppliers assessed and audited improved their sustainability performance.

[11] The online assessments of suppliers that belong to a company group generally take place at parent company level.

1.6 Product Stewardship

For us, product stewardship means that our products satisfy the highest quality standards and are safe for people and the environment when used properly. We respect legal requirements, and our voluntary commitment and internal standards go beyond these in various areas. We have put in place suitable directives and management systems for the implementation of regulatory and voluntary product stewardship requirements that are steered by our Corporate Health, Safety & Environment (HSE) enabling function and the quality functions of the divisions.

Assessment and testing of active ingredients and products

Along the entire value chain, our substances and finished products undergo extensive assessment and testing that we use to derive appropriate measures to mitigate health and environmental risks. Our divisions have quality management systems based on international sector-specific standards. By implementing a binding company-wide quality assurance system, we guarantee high-quality, safe and effective products and services that satisfy all internal and external requirements and meet customer expectations. In this way, we work to prevent customer complaints, product recalls and other problems. For all chemical substances, we compile safety data sheets targeting professional users. End consumer products contain appropriate information in their packaging, with one example being package inserts for pharmaceuticals. We also conduct environmental risk assessments and implement risk management measures subsequent to product registration.

At **Crop Science**, we examine our crop protection products during the development phase in internationally standardized tests stipulated by law and regulations. These examinations cover the products' mode of action, their (eco)toxicological properties and the extent and distribution of potential residues in and on plants and in the environment. Each new crop protection agent, the product and its active ingredients undergo a thorough safety assessment through suitable scientific studies and testing.

We do not market any crop protection products that are classified by the WHO as being highly toxic (WHO Tox Class I). In addition, we market only those crop protection products whose active ingredients are registered in at least one OECD country.

We aim to strengthen all stakeholders' confidence in our products through transparency. In line with this, we are the first company in the agriculture industry to make safety-relevant data on crop protection products and genetically modified crops publicly accessible. Summaries of scientific studies for 32 of our active ingredients submitted to the European Food Safety Authority (EFSA) in the context of registration procedures are available on our website. These reports include information on toxicological and ecotoxicological studies and investigations into the degradability of crop protection products. Also available are summaries of scientific studies on 16 traits of our genetically modified crops that were evaluated by U.S. regulatory authorities. Comprehensive study reports on our registration studies for the approval of our crop protection products and genetically modified crops are available on specific request. In addition, we also publish the internal standards that we use to evaluate the safety of our products and show how we determine that safe use of our products can be guaranteed.

www.cropscience.bayer.com/transparency-crop-science

Through extensive programs, we train farmers, seed treatment professionals, dealers and other users in the safe handling and use of our products. In 2021, we managed to increase the number of our training contacts worldwide.

With regard to the sale of and the application instructions for crop protection products and technologies, we observe the International Code of Conduct on Pesticide Management (FAO/WHO 2014). The principles of our product stewardship are established in our Product Stewardship Policy and implemented in the Product Stewardship Program.

In the **Pharmaceuticals** Division, we assess the medical benefit-risk profile of our pharmaceutical and medicinal products throughout their entire product life cycle. The efficacy, safety and tolerability of pharmaceuticals are already investigated in preclinical and Phase I to III clinical development studies. These results and the benefit-risk assessment are submitted to the relevant authorities during the pharmaceutical registration process. We continue to compile safety-relevant information in a dedicated database following market launch of the product. Post-Authorization Safety Studies (PASS) are also conducted after approval. The results are entered into the PASS registry in compliance with EU pharmacovigilance legislation.

After proving the efficacy and safety of a nonprescription (OTC) medicinal product and consumers' ability to make self-selection decisions, **Consumer Health** receives marketing authorization from the relevant authorities. We continuously ensure the favorable benefit-risk profile of these products by conducting post-marketing surveillance and generating scientific evidence throughout the entire product life cycle. In addition to these OTC products, Consumer Health also markets medical devices, cosmetics and nutritional supplements. We conduct ongoing monitoring and measurements to ensure safety, efficacy and compliance with regulatory requirements around the world. We also monitor ingredients across all product categories and act on any concerns that are identified to provide the best-quality products for our patients and consumers.

Animal welfare in active ingredient testing

Animal studies are legally required and essential from a scientific viewpoint for assessing the safety and efficacy of our products. Such studies must comply not only with legal requirements but also with Bayer's principles on animal welfare and animal studies. The latter also apply both to the research institutes we commission and to our suppliers, whose compliance with our animal welfare requirements we monitor regularly. We published a corporate policy outlining these principles in 2020. We aim to minimize the use of study animals and to employ alternative methods whenever possible. In early drug research, Bayer continuously makes use of different in silico-based and in-vitro processes that help reduce the number of animal studies; included in this are our activities with "organ-on-a-chip."

Environmental impact

As part of our business activities, we aim to minimize the impact of our products on the environment.

Biodiversity

We aim to promote the responsible use of natural resources, complying with international and national legislation and respecting biodiversity. Our principles on biodiversity are set forth in a corporate policy and a separate position paper on this issue. In this, we express our commitment to the objectives of the United Nations Convention on Biological Diversity, which includes the fair and equitable sharing of the benefits arising from the use of genetic resources. We also published a supplementary corporate policy that is designed to ensure compliance with international and national legislation on access to genetic resources and the fair utilization of the resulting benefits. Through monetary and nonmonetary contributions for the establishment of new collections that serve to preserve the genetic diversity of crops, we help to facilitate the conservation and sustainable use of plant genetic resources. In addition, we participate in a variety of projects, promote the build-up of capacities to develop expertise and structures, and support other global efforts to preserve biodiversity. Furthermore, we continually deploy plant breeding innovations that help improve the genetic diversity of crops, food security and ecological sustainability.

https://www.bayer.com/en/position-biodiversity.aspx

Modern agriculture in particular benefits significantly from biodiversity, but it also inevitably involves interfering with the balance of nature and can therefore contribute to the loss of biodiversity. To foster nature-positive production, we are therefore investigating and developing cultivation systems that help to achieve a better balance between productivity and the conservation of soil health and habitats. In cooperation projects involving the Bayer ForwardFarms and nature conservation experts, we research what this balance could look like in various countries and regions. We develop and propose to our customers and distribution partners effective biodiversity-inclusive production systems and initiate first steps to support their

implementation, which is realized through specific measures on the part of our customers and distribution partners.

We support the development of integrated pest management (IPM) and pollinator management methods which increase the abundance and diversity of beneficial insects, protect pollinators and reduce the use of pesticides.

Bee safety of crop protection products

We are actively involved in numerous projects and research activities to protect bees and other pollinators.

To minimize risks posed to bees and other nontarget species by our crop protection products, we perform extensive safety testing and risk assessments. We also implement product stewardship measures, including certification for seed treatment facilities, knowledge-sharing and educational training courses for growers to help them understand the benefits that pollinators can bring for crop quality and yield and the need to protect them. In addition, we develop bee-friendly crop protection products and are also involved in the development of application processes that reduce the exposure of bees.

Biotechnology

We apply biotechnological methods in biopharmaceutical production (e.g., Kogenate™, Kovaltry™, Jivi™) and the development of innovative biopharmaceuticals, cell and gene therapies. In addition, we apply biotech-based methods in the area of seeds (e.g., Bollgard II™, XtendFlex™ Cotton and Intacta RR2 Pro™). In plant breeding, we use both conventional breeding methods and genetic engineering.

For us, the safety of people and the environment is always a top priority in the use of biotechnology. In addition to meeting legal and regulatory requirements, we have specified the responsible use of genetic engineering and our strict, globally applicable safety measures for handling biological substances in corresponding corporate policies.

The development and commercialization of genetically improved seeds are also subject to stringent laws and regulations. We have additionally established internal processes to ensure the responsible use of biotechnologically manufactured products throughout their life cycle. Furthermore, our Crop Science Division maintained its membership in the Excellence Through Stewardship (ETS) organization in 2021.

Trace substances in the environment

We are committed to preventing emissions of product residues (e.g., active ingredients and their degradation products) into the environment or, where they are unavoidable, to minimize the risks they harbor. We focus on all stages of the product cycle – from manufacturing to safe use and disposal.

At our production sites worldwide, regulatory authorities and external assessors monitor compliance with wastewater thresholds. Internal experts also perform corresponding audits of the production sites at regular intervals. We take additional action in our production facilities to avoid or reduce emissions from production, such as the release of active ingredients into the environment. Alongside the regulatory standards, this action could also come in the form of our own, more far-reaching internal environmental standards, as they are outlined in our “Health, Safety and Environment Key Requirements” (HSE KR), for instance. We are also working to develop further effective risk minimization measures in various research projects.

With regard to the application of crop protection products, potential environmental impact is investigated in ecotoxicological studies prior to the official product approval process. The responsible authorities receive an extensive environmental risk assessment and can specify risk minimization measures as appropriate.

Environmental risk assessments are also conducted in Europe and the United States for the official approval of human pharmaceuticals.

1.7 Environmental Protection and Safety

We are working on ways to further reduce the environmental impact of our business activities and to develop solutions that relieve the burden on the environment. Responsibility for this lies with the Health, Safety & Environment (HSE) enabling function, which defines framework conditions in the form of corporate policies and other measures. We use management systems to control operational implementation in the divisions.

Energy consumption

Bayer's total energy consumption fell year on year to 34.8 petajoules in 2021 (2020: 35.9 petajoules). This includes both primary energy consumption, which mainly relates to fossil fuels, and secondary energy consumption. This decline was primarily attributable to disruptions to production at the U.S. sites in Soda Springs and Luling in the wake of Hurricane Ida. A reduction in the size of the company car fleet was also a factor.

Energy efficiency reported as the ratio of energy consumed to external sales improved from 241 kWh/€ thousand in 2020 to 220 kWh/€ thousand in 2021.

Greenhouse gas emissions

We consider climate protection and the related reduction of greenhouse gas emissions to be a top priority. We have therefore set ourselves ambitious targets in this area that are explained in more detail in Chapter 1.2.1 Strategy and Targets.

www.bayer.com/
CDP-Climate

The following table provides an overview of the development in 2021:

A 1.7/1

Greenhouse Gas Emissions

Million metric tons of CO_2 equivalents	2020	2021
Scope 1: Direct emissions[1]	2.01	1.93
Scope 2: Indirect emissions[2] according to the market-based method	1.57	1.24
Total greenhouse gas emissions according to the market-based method	**3.58**	**3.17**
Scope 3: Indirect emissions from our upstream and downstream value chains (by materiality)[3, 4, 7]	9.20	8.94
of which indirect emissions from our upstream value chain to attain the SBT[4, 5, 6, 7]	8.22	8.16

[1] Direct emissions result from our own power plants, vehicles, waste incineration plants and production facilities (Scope 1). In line with the GHG Protocol, we also report the direct emissions that arise through the generation of energy that we sell to other companies as a site service. Consequently, the figures for direct emissions of the Bayer Group are higher than the actual emissions resulting from Bayer's business activities alone. In 2021, 98.2% of direct greenhouse gas emissions were carbon dioxide emissions. Other greenhouse gases such as nitrous oxide, partially fluorinated hydrocarbons and methane made a negligible contribution to direct greenhouse gas emissions.

[2] Indirect emissions result from the procurement of electricity, steam and cooling energy (Scope 2).

[3] Scope 3 emissions were subjected to a limited assurance review.

[4] Emissions from eight Scope 3 categories are of material importance to Bayer and together represent our total Scope 3 emissions: (1) purchased goods and services, (2) capital goods, (3) fuel- and energy-related activities, (4) (upstream) transportation and distribution, (5) waste generated in operations, (6) business travel, (7) employee commuting and (12) end-of-life treatment of sold products.

[5] Science Based Target

[6] For our reduction target for Scope 3 emissions in line with the SBTi, we consider the following materially important Scope 3 categories, which accounted for 88% of Scope 3 emissions in 2021: (1) purchased goods and services, (2) capital goods, (3) fuel- and energy-related activities, (4) (upstream) transportation and distribution and (6) business travel.

[7] The figures for 2020 had to be corrected as new information came to light in the categories 3.1, 3.2 and 3.4. This encompassed the integration of price and currency effects and the correction of transportation data.

In 2021, we cut Scope 1 and 2 greenhouse gas emissions by 0.41 million metric tons of CO_2 equivalents. This represents a reduction of 11.5%. The main reason for this decline is the increased share of electricity purchased from renewable sources (Scope 2). In addition, we financed reforestation and forest conservation projects in 2021 by purchasing climate protection certificates in, for example, Brazil, Indonesia, Nicaragua and Uganda, thereby offsetting

300,000 metric tons of greenhouse gas emissions. In the Scope 3 Science Based Targets (SBT) categories relevant for our company, we reduced our emissions by 0.05 million metric tons of CO_2 equivalents, corresponding to a decline of 0.6%. The decrease in Scope 3 emissions in the SBT-relevant Scope 3 categories was mainly due to our operational purchasing activities, while the decline in the non-SBT-relevant categories was attributable to a reduction in the volume of waste from our production activities (category 3.5) and product packaging (category 3.12).

Water

We use water resources as sparingly as possible and are endeavoring to further reduce emissions into water. All sites in water-scarce areas or areas identified as being threatened by water scarcity have a water management system in place.

Total water use in 2021 amounted to 55 million cubic meters (2020: 57 million cubic meters). This 4.1% year-on-year decrease in use is due to infrastructure-related measures at the Orizaba Proquina site in Mexico. Around 35.7% of all water used by Bayer is cooling water that is only heated in the process and does not come into contact with products. It can be returned to the water cycle, in line with the relevant official permits.

www.bayer.com/CDP-Water

At our production facilities, we endeavor to use water several times and to recycle it. The total quantity of industrial and mixed wastewater came in at 25 million cubic meters in 2021 and was thus level with the previous year. All wastewater is subject to thorough checks before it is discharged into the various disposal channels. In 2021, 79.6% of Bayer's industrial and mixed wastewater worldwide was purified in wastewater treatment plants (Bayer or third-party facilities). The remaining volume was categorized as environmentally safe according to official provisions and returned to the natural water cycle.

Waste and recycling

We aim to minimize material consumption and disposal volumes through systematic waste management. In accordance with Bayer's corporate policies, all production sites are required to prevent, reduce and recycle waste and to dispose of it safely and in line with good environmental practices.

The total quantity of waste generated rose slightly to 1,001,000 metric tons in 2021 (2020: 935,000 metric tons). This was mainly due to an increase in seed production at several sites in Latin America, which meant that larger volumes of vegetable by-products were disposed of.

The volume of hazardous waste increased to 316,000 metric tons (2020: 305,000 metric tons) due to building and renovation work at our site in Berlin, Germany. The volume of hazardous waste from production, including hazardous waste from wastewater treatment plants, remained consistent with the 2020 level, at 303,000 metric tons.

Process and plant safety

We aim to design and operate our processes and production facilities in such a way that they do not pose any inappropriate risks to employees, the environment or neighboring communities. We are working to further develop our safety culture and the expertise of employees. Principles of process and plant safety are laid out in our globally applicable corporate policies. Compliance with internal and external safety regulations is verified in internal audits.

www.bayer.com/en/safety.aspx

To prevent substance and energy releases, the causes of process safety incidents (PSIs) are analyzed and relevant findings communicated throughout the Bayer Group. For this purpose, Bayer uses a globally standardized key performance indicator (KPI) – the Process Safety Incident Rate (PSI-R) – that is integrated into the Group-wide reporting system. The PSI-R indicates the number of PSI incidents per 200,000 hours worked. In 2021, the PSI-R was 0.08 (2020: 0.08).

Transportation safety

Transportation and warehouse safety is part of HSE management and is implemented by a network of supply chain experts. In addition to complying with legal regulations, we have implemented supplementary standards and requirements that are defined in corporate policies. We thereby ensure that our materials are handled and transported in accordance with their respective potential hazards and applicable regulations.

There were 32 transport incidents in 2021 (2020: 17[12]), primarily involving road transport accidents. We define transport incidents as accidents that cause personal injury or significant damage to property, environmental impact resulting from the release of substances, or leakage of hazardous goods.

Safe working conditions

We firmly believe that nothing is important enough to justify an accident or any risk to the safety of our employees. We consider safeguarding the occupational health of our employees – and of the employees of contractors on our company premises – to be a top priority.

In 2021, occupational safety and health protection were once again primarily shaped by the development of the COVID-19 pandemic. With the health and safety of our employees being our top priority, the existing regulations and requirements were adapted to reflect changing risk situations, thus minimizing risks to employees at work as far as possible. The protection concepts and measures that we implemented on a global scale took the different activity profiles at the individual sites into consideration.

In 2021, the Recordable Incident Rate (RIR)[13] increased from 0.32 to 0.37 cases per 200,000 hours worked, corresponding to 441 occupational injuries worldwide. The low RIR is due to the long-term impact of effective occupational safety measures and programs as well as short- and medium-term effects in connection with the COVID-19 pandemic resulting from a reduction in general movement due to employees working from home and paying greater attention to their health and safety, for example.

Despite all safety precautions undertaken, it is not possible to completely rule out serious or fatal accidents. Two Bayer employees lost their lives in work-related accidents in 2021. We will not let up in our efforts to further reduce risks and risky behavior.

In 2021, the Intelex accident management platform was introduced to streamline and accelerate existing processes. Employees can now quickly, easily and anonymously report a safety incident, near accident or safety observation. Using this platform as a central source for data and insights enables us to share experiences and knowledge better, and thus reduce the incidence of illnesses and injuries in the future. The new KPI “severity of injury” is also recorded in Intelex to assess the relevance of a reportable incident in terms of injury outcome and enable safety improvements to be made.

[12] Prior-year figure adjusted due to retrospective reports of said incidents
[13] The RIR covers all injuries to employees and directly supervised contractors leading to medical treatment that goes beyond simple first aid.

2. Report on Economic Position

2.1 Overview of Business Performance

2.1.1 Economic Position and Target Attainment

2021 was a successful year, both operationally and strategically. We registered a substantial increase in sales, with growth of 8.9% on a currency- and portfolio-adjusted basis (Fx & portfolio adj.). EBITDA before special items declined by 2.5%, after we were able to largely offset an increases in costs, which was partly due to inflation, and significant currency headwinds. The EBITDA margin before special items came in at 25.4%. At Crop Science, sales advanced by a double-digit percentage after adjusting for currency and portfolio effects, while EBITDA before special items rose by 3.6%. The growth in earnings was driven by the division's strong business performance but was mainly held back by an inflation-related increase in the cost of goods sold. Sales at Pharmaceuticals advanced by 7.4% (Fx & portfolio adj.), as business recovered from the impact of COVID-19 restrictions. Earnings declined against the prior year due to investments in marketing and in research and development, as well as an increase in the cost of goods sold. Consumer Health registered substantial sales growth on a currency- and portfolio-adjusted basis and a corresponding increase in EBITDA before special items, which advanced by 6.8%. Earnings per share (total) were up year on year but were diminished by allocations to provisions in connection with the glyphosate litigation and by further special charges for restructuring programs. Core earnings per share rose by 1.9% to €6.51.

In the Group outlook published in February 2021 in the 2020 Annual Report, we anticipated currency-adjusted sales of approximately €42 billion to €43 billion, corresponding to an increase of about 3% on a currency- and portfolio-adjusted basis. We expected an EBITDA margin before special items of around 27% on a currency-adjusted basis, which, based on the sales forecast, would have corresponded to EBITDA before special items of €11.2 billion to €11.5 billion on a currency-adjusted basis. We also forecast core earnings per share of approximately €6.10 to €6.30 on a currency-adjusted basis, and free cash flow of around minus €3.0 billion to minus €4.0 billion.

After a slight adjustment in August, the forecast was revised again in November due to the very good business performance. As part of this updated guidance, we anticipated an increase in currency-adjusted sales to approximately €44 billion, corresponding to currency- and portfolio-adjusted growth of approximately 7%. The EBITDA margin before special items was expected to come in at 26% on a currency-adjusted basis. In the revised outlook, we anticipated core earnings per share of between €6.50 and €6.70 on a currency-adjusted basis. Free cash flow was forecast to come in at between approximately minus €0.5 billion and minus €1.5 billion.

We exceeded this revised Group outlook.

A 2.1.1/1

Target Attainment in 2021

	Forecast for 2021[1] currency-adjusted	Revised forecast for 2021[2] currency-adjusted	Target attainment in 2021 currency-adjusted	2021 results reported
Group sales	Approx. €42 to €43 billion	Approx. €44 billion	€45.2 billion	€44.1 billion
	Approx. +3% (Fx & p adj.)	Approx. +7% (Fx & p adj.)	+8.9% (Fx & p adj.)	+6.5%
EBITDA before special items	€11.2 to €11.5 billion based on a margin of approx. 27%	€11.2 to €11.5 billion based on a margin of approx. 26%	€11.7 billion and a margin of 25.9%	€11.2 billion and a margin of 25.4%
Core earnings per share	Approx. €6.10 to €6.30	Approx. €6.50 to €6.70	€6.86	€6.51
Free cash flow	Approx. minus €3.0 to minus €4.0 billion	Approx. minus €0.5 to minus €1.5 billion	€1.4 billion	€1.4 billion

Fx & p adj. = currency- and portfolio-adjusted
[1] Issued in February 2021
[2] Issued in November 2021

2.1.2 Key Events

Approval granted for Kerendia™ (finerenone) in the United States and Verquvo™ (vericiguat) in the European Union and Japan

In July, the U.S. Food and Drug Administration (FDA) approved finerenone for the treatment of adult patients with chronic kidney disease and type 2 diabetes under the brand name Kerendia™.

Also in July, the European Commission approved vericiguat in the European Union for the treatment of symptomatic chronic heart failure in adult patients under the brand name Verquvo™. We also obtained approval for Verquvo™ in Japan in June.

Portfolio changes

In February, we announced plans to divest the Environmental Science Professional business. It is a global leader offering solutions to control pests, disease and weeds in nonagricultural areas such as vector control, professional pest management, industrial vegetation management, forestry, and turf and ornamentals.

In June, we concluded an agreement to acquire Noria Therapeutics, Inc. and PSMA Therapeutics Inc. to broaden our oncology platform of targeted alpha therapies. Through this acquisition, we will obtain exclusive rights to a differentiated alpha radionuclide therapy based on actinium-225 and a small molecule targeting the prostate-specific membrane antigen.

In August, we announced that we had entered into an agreement to acquire the U.S. biopharmaceutical company Vividion Therapeutics, Inc. Through the acquisition, we will gain access to a cutting-edge chemoproteomics platform that is able to identify previously unknown binding pockets in undruggable targets to generate first-in-class novel compounds in indications of high unmet medical need. Vividion's technology has already proven its applicability pre-clinically in oncology and immune-related diseases, with potential to expand into additional therapeutic areas.

In December, we entered into a strategic collaboration with U.S. company Mammoth Biosciences, Inc., to develop next-generation CRISPR products. Under the terms of the agreement, we will initially focus on developing in vivo gene-editing therapies with target structures in the liver. Together with Mammoth, we will also jointly explore work on ex vivo projects on a nonexclusive basis. The partnership with Mammoth significantly strengthens our cell and gene therapy platform, and will enhance the potential of our cell and gene therapy strategy by combining Mammoth's novel CRISPR systems with our existing gene augmentation and induced pluripotent stem cell (iPSC) platforms.

Plan to resolve glyphosate litigations

At the end of May, we announced a series of measures to resolve potential future glyphosate litigation, combining both legal and commercial actions. The responsible court had previously denied the motion to approve the class settlement agreement.

In July, we provided an update on the progress made and announced additional details. We have developed two scenarios based on a potential ruling by the Supreme Court of the United States in the Hardeman case.

// If the Supreme Court accepts the petition for review and rules in our favor in this matter, it could effectively end potential future litigation.
// The second scenario assumes that the Supreme Court either refuses to hear the Hardeman case or issues a ruling in favor of the plaintiff, in which case we would activate our own claims administration program. We have implemented corresponding accounting measures for this scenario, resulting in a discounted allocation to provisions for litigations of €3.5 billion in the second quarter of 2021 on top of the existing provisions.

We are confident that this provides an effective path to manage and address any risks from potential future Roundup™ litigation, while simultaneously giving Bayer more control going forward. Both we and the relevant regulatory authorities continue to believe there are no safety concerns in connection with these products. See the "Legal Risks" in Note [30] for further details.

In December, the U.S. Supreme Court requested the views of the Solicitor General in the Hardeman case. We are encouraged by that step and believe there are strong legal arguments to support Supreme Court review and reversal, as our petition and the many amicus briefs filed in support of the petition underscore. The U.S. expert agency, the Environmental Protection Agency, has consistently found that glyphosate-based herbicides can be used safely and are not carcinogenic, and has stated that a cancer warning would be false and misleading and misbrand the product. As previously announced, we had engaged in settlement negotiations only very selectively since the Supreme Court application and have suspended them altogether since the Supreme Court's decision to seek the opinion of the U.S. government and in light of two recent cases won in California.

Further details on the litigation above and other legal risks are given in the “Legal Risks” in Note [30].

Financing activities

In January, we placed bonds comprising four tranches with a total volume of €4 billion. The four tranches have maturities of 4, 8, 10.5 and 15 years. The proceeds were used for general corporate purposes, including the refinancing of existing liabilities.

Supervisory Board and the Board of Management

Sarena Lin was appointed to the Board of Management by the Supervisory Board. Effective February 1, 2021, she became Chief Transformation and Talent Officer, assuming responsibility for Human Resources, Strategy and Business Consulting. Lin also began her role as Labor Director on the same date.

In addition, the Supervisory Board of Bayer AG appointed Rodrigo Santos to the company’s Board of Management and the position of President of the Crop Science division, effective January 1, 2022. Santos succeeded Liam Condon, who informed the Supervisory Board that he wished to bring forward the end date of his contract with the company from December 31, 2023, to December 31, 2021.

2.1.3 Economic Environment

Global economy grows significantly

See also A 2.2.2

After contracting in 2020 due to the pandemic, the world economy registered substantial growth in 2021. This was largely attributable to the increasing number of vaccinations against COVID-19 and the easing of protective measures and contact restrictions. As a result, labor market conditions improved and private consumption picked up again. However, the pace of economic growth slowed over the course of the year, mainly due to additional waves of COVID-19 and the rapid spread of the Omicron variant in particular, which led to restrictions being reintroduced. Furthermore, problems in international supply chains led to shipment delays and rising prices in many areas.

A 2.1.3/1

Economic Environment

	Growth[1] 2020	Growth[1] 2021
World	–3.4%	+5.6%
European Union	–6.0%	+5.2%
of which Germany	–4.9%	+2.7%
United States	–3.4%	+5.7%
Emerging Markets[2]	–1.6%	+6.6%

2020 figures restated

[1] Real GDP growth, source: IHS Markit (as of January 2022)

[2] Including about 50 countries defined by IHS Markit as Emerging Markets in line with the World Bank

Currency development

In 2021, Group sales were impacted by negative currency effects of €1,102 million, while EBITDA before special items was diminished by negative currency effects of €507 million. The effects pertained to the currencies shown in the following table.

A 2.1.3/2

Currency Development Bayer Group

	Average end-of-day exchange rate against the euro for the year				€ million
	2020	2021	Fx effect on sales	Fx effect on clean EBITDA	Of which result of Fx hedging[1]
AUD	1.65	1.57	43	16	(10)
BRL	5.80	6.37	(200)	(181)	(103)
CAD	1.53	1.48	37	10	(9)
CNY	7.87	7.63	95	22	(29)
JPY	121.71	129.82	(132)	(47)	26
MXN	24.35	23.99	13	(5)	(10)
RUB	81.86	87.11	(73)	(56)	(8)
TRY	7.90	10.23	(111)	(72)	0
USD	1.14	1.18	(652)	(141)	18
Other currency areas			(122)	(53)	(11)
All currencies			**(1,102)**	**(507)**	**(136)**

[1] Result of Fx hedging, including hedging costs, for all currencies in 2021 (minus €55 million) and 2020 (€84 million).

2.2 Earnings; Asset and Financial Position of the Bayer Group

2.2.1 Earnings Performance of the Bayer Group

Business Development of the Bayer Group

A 2.2.1/1

			Change (%)				Change (%)	
€ million	Q4 2020	Q4 2021	Reported	Fx. & p adj.	2020	2021	Reported	Fx. & p adj.
Sales	**9,995**	**11,118**	**+11.2**	**+8.0**	**41,400**	**44,081**	**+6.5**	**+8.9**
Change in sales[1]								
Volume	+5.4%	+3.7%			+3.0%	+6.8%		
Price	−2.8%	+4.3%			−2.4%	+2.1%		
Currency	−9.4%	+2.9%			−4.4%	−2.6%		
Portfolio	−0.2%	+0.3%			−1.1%	+0.2%		
Sales by region								
Europe/Middle East/Africa	2,996	3,255	+8.6	+7.4	12,881	13,648	+6.0	+7.4
North America	3,027	3,401	+12.4	+6.4	14,352	14,952	+4.2	+7.5
Asia/Pacific	2,041	2,276	+11.5	+8.7	8,267	8,849	+7.0	+7.7
Latin America	1,931	2,186	+13.2	+10.6	5,900	6,632	+12.4	+17.1
EBITDA[1]	**2,024**	**1,731**	**−14.5**		**(2,910)**	**6,409**	**.**	
Special items[1]	(368)	(664)			(14,371)	(4,770)		
EBITDA before special items[1]	**2,392**	**2,395**	**+0.1**		**11,461**	**11,179**	**−2.5**	
EBITDA margin before special items[1]	23.9%	21.5%			27.7%	25.4%		
EBIT[1]	**1,515**	**2,021**	**+33.4**		**(16,169)**	**3,353**	**.**	
Special items[1]	67	638			(23,264)	(3,942)		
EBIT before special items[1]	**1,448**	**1,383**	**−4.5**		**7,095**	**7,295**	**+2.8**	
Financial result	**(142)**	**(524)**	**.**		**(1,081)**	**(1,307)**	**+20.9**	
Net income (from continuing and discontinued operations)	**308**	**1,161**	**.**		**(10,495)**	**1,000**	**.**	
Earnings per share[1] from continuing and discontinued operations (€)	**0.32**	**1.18**	**.**		**(10.68)**	**1.02**	**.**	
Core earnings per share[1] from continuing operations (€)	**1.32**	**1.26**	**−4.5**		**6.39**	**6.51**	**+1.9**	
Net cash provided by operating activities (from continuing and discontinued operations)	**751**	**3,046**	**.**		**4,903**	**5,089**	**+3.8**	
Free cash flow[1]	**(503)**	**1,535**	**.**		**1,343**	**1,415**	**+5.4**	
Net financial debt (at end of period)	**30,045**	**33,137**	**+10.3**		**30,045**	**33,137**	**+10.3**	
Cash flow-relevant capital expenditures (from continuing and discontinued operations)	**893**	**1,140**	**+27.7**		**2,418**	**2,611**	**+8.0**	
Research and development expenses	**1,291**	**1,012**	**−21.6**		**7,126**	**5,412**	**−24.1**	
Depreciation, amortization and impairment losses/loss reversals	**509**	**(290)**	**.**		**13,259**	**3,056**	**−77.0**	
Number of employees (at end of period)	**99,538**	**99,637**	**+0.1**		**99,538**	**99,637**	**+0.1**	
Personnel expenses (including pension expenses)	**2,279**	**3,016**	**+32.3**		**9,769**	**11,798**	**+20.8**	

Fx & p adj. = currency- and portfolio-adjusted

[1] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”

Group sales up significantly after adjusting for currency and portfolio effects

Sales of the Bayer Group rose to €44,081 million (Fx & portfolio adj. +8.9%; reported +6.5%) in 2021. Germany accounted for €2,545 million of this figure.

Sales at Crop Science increased by 11.1% (Fx & portfolio adj.) to €20,207 million, with business up in all regions. We registered double-digit percentage gains in Latin America and Asia/Pacific, and also delivered very strong performance in North America and Europe/Middle East/Africa. Sales at Pharmaceuticals climbed by 7.4% (Fx & portfolio adj.) to €18,349 million, as business recovered from the impact of the COVID-19 restrictions, especially in the areas of ophthalmology, radiology and women's healthcare. Our opthalmology business was also able to capture market share. Sales at Consumer Health advanced by 6.5% (Fx & portfolio adj.) to €5,293 million. The greater focus on health and prevention in connection with the COVID-19 pandemic led to higher demand, especially in the Nutritionals category. Growth was also driven by the launch of innovative products. In the Reconciliation, sales fell by 11.6% to €232 million.

Earnings

EBITDA before special items of the Bayer Group fell by 2.5% to €11,179 million (2020: €11,461 million). Earnings were diminished by an increase in the cost of goods sold, which was partly due to inflation, and negative currency effects of €507 million, among other factors. At Crop Science, EBITDA before special items increased by 3.6% to €4,698 million (2020: €4,536 million), mainly due to price increases and expanded volumes, as well as contributions from ongoing efficiency programs. Earnings were primarily diminished by an increase in the cost of goods sold. At Pharmaceuticals, EBITDA before special items declined by 3.9% to €5,779 million (2020: €6,016 million). The division's strong business performance was insufficient to offset an increase in marketing costs, which was largely attributable to the launch of Kerendia™, Verquvo™ and Nubeqa™, and a rise in research and development expenses, which was partly related to our cell and gene therapy unit. EBITDA before special items at Consumer Health increased by 6.8% to €1,190 million (2020: €1,114 million), mainly due to the division's strong business performance and continuous cost management efforts. In the Reconciliation, EBITDA before special items came in at minus €488 million (2020: minus €205 million).

See also A 2.3

EBITDA in 2021 came in at €6,409 million (2020: minus €2,910 million). **Depreciation, amortization, impairment losses and impairment loss reversals** led to net expenses of €3,056 million (2020: €13,259 million), with intangible assets accounting for €1,482 million (2020: €11,570 million) and property, plant and equipment for €1,574 million (2020: €1,689 million). Impairment losses and impairment loss reversals led to net gains of €684 million (2020: net expenses of €8,976 million), with intangible assets accounting for a gain of €741 million (2020: expense of €8,948 million).

See also A 2.3

The impairment loss reversals mainly related to the Crop Science Division, and concerned the cash-generating units Corn Seed & Traits (€281 million), Soybean Seed & Traits (€602 million) and glyphosate (€166 million). An impairment loss of €198 million was recorded in the cash-generating unit canola in 2021. The impairment loss reversals were largely attributable to improved business prospects. Changes in the interest rate and currency environment were the primary negative factor.

Net impairment loss reversals of €844 million (2020: net impairment losses of €8,898 million) and accelerated depreciation of €16 million (2020: €1 million) were included in special items.

EBIT before special items rose by 2.8% to €7,295 million (2020: €7,095 million). **EBIT** amounted to €3,353 million (2020: minus €16,169 million) after net special charges of €3,942 million (2020: €23,264 million) that mainly resulted from the allocation to provisions in connection with the Roundup™ litigation as part of the glyphosate litigations. Further special charges were attributable in particular to the established restructuring programs in the Reconciliation and the Pharmaceuticals Division. As outlined above, the impairment loss reversals were primarily attributable to the Crop Science Division.

In 2021, the following special effects were taken into account in calculating EBIT and EBITDA before special items.

A 2.2.1/2

Special Items[1] by Category

€ million	EBIT Q4 2020	EBIT Q4 2021	EBIT 2020	EBIT 2021	EBITDA Q4 2020	EBITDA Q4 2021	EBITDA 2020	EBITDA 2021
Total special items	**67**	**638**	**(23,264)**	**(3,942)**	**(368)**	**(664)**	**(14,371)**	**(4,770)**
Restructuring	(83)	(415)	(757)	(1,322)	(209)	(407)	(884)	(1,304)
of which in the Reconciliation	(132)	(162)	(573)	(570)	(131)	(162)	(571)	(570)
Acquisition/integration	(44)	5	(81)	(19)	(45)	5	(81)	(19)
of which in the Reconciliation	–	(1)	(2)	(1)	(1)	(1)	(2)	(1)
Divestments	(10)	(41)	(52)	5	(10)	(34)	(52)	12
of which in the Reconciliation	(11)	–	(45)	–	(11)	–	(45)	–
Litigations/legal risks	(27)	(99)	(13,163)	(3,310)	(27)	(99)	(13,163)	(3,310)
of which in the Reconciliation	(27)	(80)	(858)	(34)	(27)	(80)	(858)	(34)
Impairment losses/loss reversals[2]	284	1,309	(9,158)	841	(24)	(8)	(138)	(12)
Other	(53)	(121)	(53)	(137)	(53)	(121)	(53)	(137)
of which in the Reconciliation	–	(52)	–	(52)	–	(52)	–	(52)

2020 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."
[2] Where not already included in the other special items categories

Core earnings per share

Core earnings per share were up slightly year on year, at €6.51 (2020: €6.39; +1.9%), driven by the positive earnings contribution from the Crop Science Division and the favorable development of the financial result after special items. These effects were partly offset by lower earnings at Pharmaceuticals.

Earnings per share (total) came in at €1.02 in 2021 (2020: minus €10.68), and were diminished by the allocation to provisions in connection with the glyphosate litigations, as well as by further special charges relating to restructuring programs.

A 2.2.1/3

Core Earnings per Share[1]

€ million	Q4 2020	Q4 2021	2020	2021
EBIT[1] (as per income statements)	**1,515**	**2,021**	**(16,169)**	**3,353**
Amortization and impairment losses/loss reversals on goodwill and other intangible assets	254	(651)	11,570	1,482
Impairment losses/loss reversals on property, plant and equipment, and accelerated depreciation included in special items	(110)	(34)	29	74
Special items (other than accelerated depreciation, amortization and impairment losses/loss reversals)	368	664	14,371	4,770
Core EBIT[1]	**2,027**	**2,000**	**9,801**	**9,679**
Financial result (as per income statements)	(142)	(524)	(1,081)	(1,307)
Special items in the financial result[2]	(197)	137	(469)	95
Income taxes (as per income statements)	(987)	(327)	1,689	(1,024)
Special items in income taxes	–	–	–	–
Tax effects related to amortization, impairment losses/loss reversals and special items	600	(39)	(3,640)	(1,021)
Income after income taxes attributable to noncontrolling interest (as per income statements)	(3)	(9)	(8)	(22)
Above-mentioned adjustments attributable to noncontrolling interest	–	–	(12)	(1)
Core net income from continuing operations	**1,298**	**1,238**	**6,280**	**6,399**
Shares (million)				
Weighted average number of shares	982.42	982.42	982.42	982.42
€				
Core earnings per share from continuing operations[1]	**1.32**	**1.26**	**6.39**	**6.51**

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."
[2] Primarily comprising currency effects in connection with dividend payments in Brazil (2020: changes in the fair value of our interests in Elanco and Covestro)

Bayer Group – Other Earnings Parameters

A 2.2.1/4

Bayer Group Summary Income Statements

€ million	Q4 2020	Q4 2021	Change (%)	2020	2021	Change (%)
Net sales	9,995	11,118	+ 11.2	41,400	44,081	+ 6.5
Cost of goods sold	(3,669)	(3,685)	+ 0.4	(19,138)	(16,816)	– 12.1
Selling expenses	(2,827)	(3,505)	+ 24.0	(13,053)	(12,363)	– 5.3
Research and development expenses	(1,291)	(1,012)	– 21.6	(7,126)	(5,412)	– 24.1
General administration expenses	(664)	(786)	+ 18.4	(2,879)	(2,962)	+ 2.9
Other operating income / (expenses)	(29)	(109)	.	(15,373)	(3,175)	– 79.3
EBIT[1]	**1,515**	**2,021**	**+ 33.4**	**(16,169)**	**3,353**	**.**
Financial result	**(142)**	**(524)**	**.**	**(1,081)**	**(1,307)**	**+ 20.9**
Income before income taxes	**1,373**	**1,497**	**+ 9.0**	**(17,250)**	**2,046**	**.**
Income taxes	(987)	(327)	– 66.9	1,689	(1,024)	.
Income from continuing operations after taxes	386	1,170	.	(15,561)	1,022	.
Income from discontinued operations after taxes	(75)	–		5,074	–	
Income after income taxes (total)	**311**	**1,170**	**.**	**(10,487)**	**1,022**	**.**
of which attributable to noncontrolling interest	3	9	.	8	22	-
of which attributable to Bayer AG stockholders (net income)	**308**	**1,161**	**.**	**(10,495)**	**1,000**	**.**

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Functional costs

In the prior year, functional costs were heavily impacted by special items. The special effects accounted for in EBIT and EBITDA before special items were attributable to the functional costs as shown in the following table.

A 2.2.1/5

Special Items[1] by Functional Cost

€ million	EBIT Q4 2020	EBIT Q4 2021	EBIT 2020	EBIT 2021	EBITDA Q4 2020	EBITDA Q4 2021	EBITDA 2020	EBITDA 2021
Total special items	**67**	**638**	**(23,264)**	**(3,942)**	**(368)**	**(664)**	**(14,371)**	**(4,770)**
Cost of goods sold	90	661	(3,411)	229	(38)	(66)	(233)	(199)
Selling expenses	202	(99)	(1,433)	(89)	(37)	(216)	(100)	(315)
Research and development expenses	(8)	442	(2,242)	(86)	(76)	(16)	(110)	(260)
General administration expenses	(175)	(198)	(709)	(705)	(175)	(198)	(708)	(705)
Other operating income/(expenses)	(42)	(168)	(15,469)	(3,291)	(42)	(168)	(13,220)	(3,291)

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

The cost of goods sold fell by 12.1% to €16,816 million in 2021, mainly due to the significantly lower special charges recorded in the Crop Science Division. The ratio of the cost of goods sold to total sales decreased sharply year on year, falling to 38.1% (2020: 46.2%). After adjusting for special items, the cost of goods sold rose by 8.4%, mainly at Crop Science and Pharmaceuticals, due primarily to inflation.

Selling expenses fell by 5.3% to €12,363 million. There was a significant decline in selling expenses at Crop Science due to the special charges recognized in the previous year in connection with impairments. Selling expenses accounted for 28.0% (2020: 31.5%) of sales. After adjusting for special items, selling expenses increased by 5.6%, mainly at Pharmaceuticals – largely due to the launch of new products – and at Crop Science.

Research and development (R&D) expenses decreased by 24.1% to €5,412 million. The ratio of R&D expenses to sales declined to 12.3% (2020: 17.2%) due to lower special charges at Crop Science compared with the previous year. Adjusted for special items, R&D expenses increased by 9.0%, particularly at Pharmaceuticals.

General administration expenses increased by 2.9% to €2,962 million. This increase was mainly attributable to the addition to provisions for short-term variable compensation. The ratio of general administration expenses to total sales decreased to 6.7% (2020: 7.0%).

The balance of other operating expenses and other operating income came in at minus €3,175 million, representing a significant, 79.3% improvement against the prior year (2020: minus €15,373 million). The 2021 figure mainly reflected the allocations to provisions in connection with the glyphosate litigations.

Financial result and income before income taxes

After a financial result of minus €1,307 million (2020: minus €1,081 million), income before income taxes amounted to €2,046 million (2020: minus €17,250 million). The financial result comprised income from investments in affiliated companies of €23 million (2020: €406 million), net interest expense of €930 million (2020: €1,292 million), a net exchange loss of €385 million (2020: €216 million), interest cost of €71 million (2020: €102 million) for pension and other provisions, and net other financial income of €56 million (2020: €123 million). The financial result included net special charges of €95 million (2020: net special gains of €469 million) that resulted primarily from currency effects related to dividend payments in Brazil.

Income taxes

Income tax expense of €1,024 million was recorded in 2021 (2020: income from income taxes of €1,689 million). The increase in tax expense was largely attributable to the year-on-year decline in special charges.

Income from discontinued operations after income taxes

Income from discontinued operations after income taxes amounted to €0 million (2020: €5,074 million). The prior-year figure contained proceeds from the divestment of the Animal Health business unit.

Net income

After income tax expense, income from discontinued operations after income taxes, and income attributable to noncontrolling interest, net income in 2021 came to €1,000 million (2020: net loss of €10,495 million).

2.2.2 Business Development by Division

Crop Science

Encouraging market environment

The global seed and crop protection market grew strongly in 2021 (Fx adj. +7%; 2020: +4%). Continued strong global demand for corn and soybeans encouraged further acreage growth in Latin America as well as the application of premium crop protection across the globe. Growth was also driven by higher prices for agrochemicals, in particular nonselective herbicides, reflecting high cost inflation and supply bottlenecks.

A 2.2.2/1

Key Data – Crop Science

			Change (%)[1]				Change (%)[1]	
€ million	Q4 2020	Q4 2021	Reported	Fx & p adj.	2020	2021	Reported	Fx & p adj.
Sales	**4,176**	**4,690**	**+12.3**	**+8.8**	**18,840**	**20,207**	**+7.3**	**+11.1**
Change in sales[1]								
Volume	+4.1%	–1.1%			+1.5%	+5.6%		
Price	+0.2%	+9.9%			–0.2%	+5.5%		
Currency	–14.5%	+3.5%			–6.3%	–3.8%		
Portfolio	0.0%	0.0%			0.0%	0.0%		
Sales by region								
Europe/Middle East/Africa	545	573	+5.1	+3.9	4,053	4,205	+3.8	+6.2
North America	1,555	1,695	+9.0	+3.8	8,367	8,721	+4.2	+9.3
Asia/Pacific	499	614	+23.0	+20.2	1,917	2,183	+13.9	+15.2
Latin America	1,577	1,808	+14.6	+12.0	4,503	5,098	+13.2	+17.2
EBITDA[1]	**538**	**715**	**+32.9**		**(6,600)**	**940**	**.**	
Special items[1]	(56)	(46)	–		(11,136)	(3,758)		
EBITDA before special items[1]	**594**	**761**	**+28.1**		**4,536**	**4,698**	**+3.6**	
EBITDA margin before special items[1]	14.2%	16.2%			24.1%	23.2%		
EBIT[1]	**91**	**1,435**	**.**		**(18,629)**	**(495)**	**–97.3**	
Special items[1]	54	1,263			(20,420)	(2,915)		
EBIT before special items[1]	**37**	**172**	**.**		**1,791**	**2,420**	**+35.1**	
Net cash provided by (used in) operating activities	**(577)**	**2,335**	**.**		**99**	**1,272**	**.**	
Cash flow-relevant capital expenditures	404	470	+16.3		1,103	1,019	–7.6	
Research and development expenses[2]	403	138	–65.8		4,138	2,029	–51.0	

Fx & p adj. = currency- and portfolio-adjusted

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

[2] The elevated research and development expenses in 2020 were largely attributable to special charges in connection with impairment charges.

Sales

Sales at Crop Science advanced by a significant 11.1% (Fx & portfolio adj.) in 2021 to €20,207 million, with business up in all regions. We registered double-digit percentage gains in Latin America and Asia/Pacific, and posted significant growth in North America and Europe/Middle East/Africa.

A 2.2.2/2

Sales by Strategic Business Entity

			Change (%)[1]				Change (%)[1]	
€ million	Q4 2020	Q4 2021	Reported	Fx & p adj.	2020	2021	Reported	Fx & p adj.
Crop Science	**4,176**	**4,690**	**+12.3**	**+8.8**	**18,840**	**20,207**	**+7.3**	**+11.1**
Corn Seed & Traits	980	1,042	+6.3	+2.1	4,970	5,162	+3.9	+9.2
Herbicides	1,074	1,302	+21.2	+17.2	4,740	5,328	+12.4	+15.4
Fungicides	669	706	+5.5	+3.8	2,639	2,924	+10.8	+13.8
Soybean Seed & Traits	505	544	+7.7	+4.0	1,956	2,164	+10.6	+14.9
Insecticides	312	373	+19.6	+17.4	1,370	1,417	+3.4	+6.6
Environmental Science	237	259	+9.3	+6.3	1,070	1,103	+3.1	+6.6
Vegetable Seeds	179	171	–4.5	–6.6	640	653	+2.0	+4.3
Other	220	293	+33.2	+27.6	1,455	1,456	+0.1	+4.6

Fx & p adj. = currency- and portfolio-adjusted

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

// Sales at **Corn Seed & Traits** rose in all regions. Our business in Latin America and North America in particular benefited from an increase in acreages that was driven by positive market developments as well as greater market penetration. We also implemented price increases worldwide.
// We recorded encouraging sales gains at **Herbicides**, primarily due to price increases for our glyphosate-based products across all regions as well as higher volumes.
// We also significantly increased sales at **Fungicides**, mainly driven by higher Fox Xpro™ volumes in Latin America. Sales also rose in the Asia/Pacific and Europe/Middle East/Africa regions due to favorable weather conditions, whereas business in North America decreased.
// **Soybean Seed & Traits** recorded double-digit percentage growth in Latin America and North America due to an increase in volumes and prices.
// Sales at **Insecticides** increased year on year due to higher volumes, primarily in Latin America thanks to our Curbix™ product, but also in Asia/Pacific and North America. However, business was down in Europe/Middle East/Africa due to the loss of a registration.
// Sales at **Environmental Science** rose in all regions, with growth in North America driven by higher demand and price increases for Roundup™.
// Sales at **Vegetable Seeds** increased in Latin America, Asia/Pacific and North America due to higher volumes and prices.
// Sales in the reporting unit **"Other"** advanced year on year, largely due to higher acreages in Asia/Pacific in our cotton seed business.

Earnings

EBITDA before special items at Crop Science increased by 3.6% in 2021 to €4,698 million (2020: €4,536 million). The growth in earnings was mainly driven by higher prices and volumes as well as contributions from ongoing efficiency programs. By contrast, earnings were diminished by an increase in costs, particularly in the cost of goods sold, that was mainly due to high inflation, as well as by negative currency effects of €387 million. The EBITDA margin before special items declined by 0.9 percentage points to 23.2% (2020: 24.1%).

EBIT came in at minus €495 million in 2021 (2020: minus €18,629 million) after special charges of €2,915 million (2020: €20,420 million) that primarily related to provisions in connection with the Roundup™ litigation as part of the glyphosate litigations. In addition, impairment loss reversals were recorded in the cash-generating units Corn Seed & Traits, Soybean Seed & Traits, and glyphosate.

A 2.2.2/3

Special Items[1] Crop Science

€ million	EBIT Q4 2020	EBIT Q4 2021	EBIT 2020	EBIT 2021	EBITDA Q4 2020	EBITDA Q4 2021	EBITDA 2020	EBITDA 2021
Restructuring	(27)	(37)	(201)	(211)	(28)	(36)	(190)	(208)
Acquisition/integration	(9)	(8)	(44)	(12)	(9)	(8)	(44)	(12)
Divestments	1	(37)	(7)	(77)	1	(30)	(7)	(70)
Litigations/legal risks	–	6	(10,762)	(3,466)	–	6	(10,762)	(3,466)
Impairment losses/loss reversals	89	1,317	(9,406)	852	(20)	–	(133)	(1)
Other	–	22	–	(1)	–	22	–	(1)
Total special items	**54**	**1,263**	**(20,420)**	**(2,915)**	**(56)**	**(46)**	**(11,136)**	**(3,758)**

2020 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Fourth quarter of 2021

Sales

Sales advanced by 8.8% (Fx & portfolio adj.) to €4,690 million in the fourth quarter. Business was up in all regions, with sales rising by double-digit percentages in Asia/Pacific and Latin America. Sales at **Corn Seed & Traits** increased in Latin America due to higher volumes and prices. At **Herbicides,** sales rose year on year due to an increase in prices across all regions, especially for our glyphosate-based products. The growth in sales at **Fungicides** was mainly driven by higher Fox Xpro™ volumes in Latin America. We increased sales at **Soybean Seed & Traits** thanks to higher prices in Latin America. Sales at **Insecticides** rose significantly, mainly due to shifts in demand. Business at **Environmental Science** was up year on year, largely owing to increased demand for Roundup™ in North America. Sales at **Vegetable Seeds** decreased in all regions, primarily due to shifts in demand into the third quarter. Sales in the reporting unit **"Other"** advanced year on year, largely driven by growth in our cotton seed business in the Asia/Pacific and North America regions.

Earnings

EBITDA before special items rose by 28.1% in the fourth quarter to €761 million (Q4 2020: €594 million). The growth in earnings was attributable to higher prices and contributions from ongoing efficiency programs. By contrast, earnings were diminished by an increase in costs, particularly in the cost of goods sold. In addition, we recorded a positive currency effect of €4 million. The EBITDA margin before special items came in at 16.2%.

EBIT increased to €1,435 million in the fourth quarter (Q4 2020: €91 million). This figure included special gains of €1,263 million (Q4 2020: €54 million) that mainly related to the impairment loss reversals outlined in the full-year commentary above.

Pharmaceuticals

Pharmaceuticals market shows recovery

The pharmaceuticals market grew by 6% (Fx adj.) in 2021 (2020: 3%), driven by a general recovery from the severe restrictions introduced to combat the COVID-19 pandemic. Catch-up effects and a normalization in the number of treatments and diagnostic tests performed resulted in a significant increase in volumes. In addition, COVID-19 vaccines made a substantial contribution to market growth.

A 2.2.2/4

Key Data – Pharmaceuticals

			Change (%)[1]				Change (%)[1]	
€ million	Q4 2020	Q4 2021	Reported	Fx & p adj.	2020	2021	Reported	Fx & p adj.
Sales	**4,476**	**4,951**	**+10.6**	**+7.6**	**17,243**	**18,349**	**+6.4**	**+7.4**
Change in sales[1]								
Volume	+7.9%	+8.3%			+4.8%	+9.3%		
Price	–7.4%	–0.7%			–6.3%	–1.9%		
Currency	–4.9%	+2.4%			–2.5%	–1.4%		
Portfolio	0.0%	+0.6%			0.0%	+0.4%		
Sales by region								
Europe/Middle East/Africa	1,918	2,127	+10.9	+9.5	6,940	7,438	+7.2	+7.9
North America	975	1,133	+16.2	+9.3	3,855	4,155	+7.8	+8.6
Asia/Pacific	1,357	1,460	+7.6	+4.9	5,598	5,834	+4.2	+4.8
Latin America	226	231	+2.2	+0.8	850	922	+8.5	+15.2
EBITDA[1]	**1,422**	**1,208**	**–15.0**		**4,311**	**5,470**	**+26.9**	
Special items[1]	(117)	(298)			(1,705)	(309)		
EBITDA before special items[1]	**1,539**	**1,506**	**–2.1**		**6,016**	**5,779**	**–3.9**	
EBITDA margin before special items[1]	34.4%	30.4%			34.9%	31.5%		
EBIT[1]	**1,308**	**938**	**–28.3**		**3,467**	**4,469**	**+28.9**	
Special items[1]	9	(305)			(1,565)	(324)		
EBIT before special items[1]	**1,299**	**1,243**	**–4.3**		**5,032**	**4,793**	**–4.7**	
Net cash provided by operating activities	**1,258**	**595**	**–52.7**		**4,064**	**3,493**	**–14.1**	
Cash flow-relevant capital expenditures	368	516	+40.2		915	1,178	+28.7	
Research and development expenses	816	792	–2.9		2,743	3,139	+14.4	

2020 figures restated
Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Sales

Sales at Pharmaceuticals rose by 7.4% (Fx & portfolio adj.) to €18,349 million in 2021. Our ophthalmology, radiology and women's healthcare businesses recovered from the impact of the COVID-19 restrictions, with this positive development more than offsetting price-related declines in sales due to tender procedures in China. The ophthalmology business additionally benefited from growth in market share and the launch of Eylea™ prefilled syringes. Our cancer drug Nubeqa™ also performed well, with sales of €219 million, driven mainly by higher volumes in the United States. In addition, we initiated the U.S. market launch of Kerendia™, our product for the treatment of patients with chronic kidney disease and type 2 diabetes, in the third quarter.

A 2.2.2/5

Best-Selling Pharmaceuticals Products

			Change (%)[1]				Change (%)[1]	
€ million	Q4 2020	Q4 2021	Reported	Fx & p adj.	2020	2021	Reported	Fx & p adj.
Xarelto™	1,212	1,247	+2.9	+1.2	4,515	4,735	+4.9	+6.0
Eylea™	669	773	+15.5	+13.7	2,468	2,918	+18.2	+18.7
Mirena™/Kyleena™/Jaydess™	288	282	–2.1	–5.6	1,081	1,170	+8.2	+11.3
Kogenate™/Kovaltry™/Jivi™	201	219	+9.0	+6.1	851	823	–3.3	–1.6
Adalat™	138	207	+50.0	+40.3	613	763	+24.5	+21.3
YAZ™/Yasmin™/Yasminelle™	168	178	+6.0	+3.4	670	740	+10.4	+13.2
Adempas™	261	328	+25.7	+24.0	628	738	+17.5	+19.6
Aspirin™ Cardio	169	170	+0.6	–3.3	639	678	+6.1	+6.0
Stivarga™	109	120	+10.1	+7.4	475	477	+0.4	+2.5
CT Fluid Delivery[2]	106	120	+13.2	+9.7	393	449	+14.2	+17.0
Nexavar™	159	91	–42.8	–41.3	639	435	–31.9	–30.9
Gadovist™ product family	102	112	+9.8	+8.2	385	418	+8.6	+11.1
Ultravist™	80	97	+21.3	+18.3	303	357	+17.8	+18.9
Betaferon™/Betaseron™	86	93	+8.1	+6.1	404	337	–16.6	–14.4
Xofigo™	61	66	+8.2	+4.2	262	261	–0.4	+2.7
Total best-selling products	**3,809**	**4,103**	**+7.7**	**+5.4**	**14,326**	**15,299**	**+6.8**	**+8.0**
Proportion of Pharmaceuticals sales	85%	83%			83%	83%		

Fx & p adj. = currency- and portfolio-adjusted

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

[2] 2020 figures restated; the CT Fluid Delivery product family comprises injection systems marketed primarily under the Stellant™ brand.

// Sales of our oral anticoagulant **Xarelto™** continued to grow. We registered higher volumes in China and Russia, but also experienced price declines that mainly resulted from tender procedures in China. Our license revenues – recognized as sales – in the United States, where Xarelto™ is marketed by a subsidiary of Johnson & Johnson, were up against the previous year.
// Sales of our ophthalmology drug **Eylea™** advanced significantly, as business recovered from the impact of the COVID-19 restrictions, especially in Europe. We also recorded a strong increase in volumes as we expanded market share in a growing market, with the ongoing launch of Eylea™ prefilled syringes also providing an encouraging contribution.
// The considerable growth in sales of our long-term contraceptives in the **Mirena™** product family was largely due to the recovery of business in the United States, Brazil and China.
// Business with **Adalat™**, our product for the treatment of heart disease, benefited from strong volume growth in China.
// Sales of our **YAZ™/Yasmin™/Yasminelle™** oral contraceptives advanced, owing to the expansion of sales activities in China and strong growth in volumes in Japan.
// We posted a significant increase in sales of our pulmonary hypertension treatment **Adempas™**, particularly in the United States. As in the past, sales reflected the proportionate recognition of the upfront and milestone payments resulting from the sGC collaboration with Merck & Co., United States. A further milestone in this collaboration was reached in the fourth quarter of 2021, with full-year sales benefiting as a result.
// Our cancer drug **Nexavar™** experienced a decrease in volumes, particularly in China, where we faced strong competition and modified tender procedures for various classes of active ingredients.
// Our radiology business with the **CT Fluid Delivery, Gadovist™ and Ultravist™** product lines expanded significantly due to a normalization in the number of radiological treatments being carried out following the substantial COVID-19 restrictions in the previous year.
// Sales of our multiple sclerosis treatment **Betaferon™/Betaseron™** declined, especially in the United States, due to continued competitive pressure.

Earnings

EBITDA before special items at Pharmaceuticals declined by 3.9% to €5,779 million in 2021, resulting in a margin of 31.5%. The division's strong business performance was insufficient to fully offset an increase in marketing costs, which was largely attributable to the launch of Kerendia™, Verquvo™ and Nubeqa™, and a rise in research and development expenses, which was partly related to our cell and gene therapy unit. An increase in the cost of goods sold and negative currency effects of €77 million also weighed on earnings.

EBIT at Pharmaceuticals rose by a substantial 28.9% to €4,469 million after net special charges of €324 million (2020: €1,565 million) that primarily related to restructuring and the measurement of a contingent consideration at fair value. By contrast, we registered a special gain from a patent dispute involving our product Jivi™.

A 2.2.2/6

Special Items[1] Pharmaceuticals

€ million	EBIT Q4 2020	EBIT Q4 2021	EBIT 2020	EBIT 2021	EBITDA Q4 2020	EBITDA Q4 2021	EBITDA 2020	EBITDA 2021
Restructuring	101	(191)	71	(495)	(25)	(184)	(69)	(480)
Acquisition/integration	(35)	14	(35)	(6)	(35)	14	(35)	(6)
Divestments	–	(4)	–	82	–	(4)	–	82
Litigations/legal risks	–	(25)	(1,543)	190	–	(25)	(1,543)	190
Impairment losses/loss reversals	(4)	(8)	(5)	(11)	(4)	(8)	(5)	(11)
Other	(53)	(91)	(53)	(84)	(53)	(91)	(53)	(84)
Total special items	**9**	**(305)**	**(1,565)**	**(324)**	**(117)**	**(298)**	**(1,705)**	**(309)**

2020 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Fourth quarter of 2021

Sales

Sales at Pharmaceuticals rose by 7.6% (Fx & portfolio adj.) to €4,951 million in the fourth quarter. Significant sales gains for important products more than offset the negative effects arising from the volume-based procurement policy in China.

We registered an expansion in volumes for **Xarelto™**, particularly in Germany and Russia. However, we also experienced price-related declines, especially in China, which resulted in sales remaining level with the prior-year quarter overall. Sales of **Eylea™** were up considerably year on year in all regions, particularly in Europe. The recovery of our business from the impact of the COVID-19 restrictions, as outlined above, had a positive effect. We were also able to capture market share, due partly to the ongoing launch of Eylea™ prefilled syringes. Our business with **Adalat™** benefited from an encouraging expansion of volumes in China. Fourth-quarter sales of **Adempas™** included the proportionate recognition of the milestone payment under the sGC collaboration with Merck & Co., United States, for the contract term to date. Sales of our cancer drug **Nexavar™** continued to decline sharply due to strong competition, especially in China. Our radiology business with the **CT Fluid Delivery, Gadovist™ and Ultravist™** product lines expanded significantly due to a normalization in the number of radiological treatments being carried out.

Earnings

EBITDA before special items at Pharmaceuticals declined by 2.1% to €1,506 million in the fourth quarter (Q4 2020: €1,539 million), resulting in a margin of 30.4%. The division's strong business performance was insufficient to fully offset an increase in marketing costs, which was largely attributable to the launch of Kerendia™, Verquvo™ and Nubeqa™, and a rise in research and development expenses, which was partly related to our cell and gene therapy unit. An increase in the cost of goods sold also weighed on earnings.

EBIT at Pharmaceuticals declined by a substantial 28.3% to €938 million after special charges of €305 million (Q4 2020: special gains of €9 million) that primarily related to restructuring and the measurement of a contingent consideration at fair value.

Consumer Health

Stable market growth

Growth of the global consumer health market in 2021 was around 4% (2020: 4%). While overall market growth remained stable, we saw an increase in demand for products that help support people's immune systems and healthcare needs, with this trend mainly benefiting the nutritionals category. On the other hand, the ongoing social distancing and hygiene measures led to a decline in the incidence of flu around the world in the first half of the year. Despite recovering in the second half, demand for cough and cold products was subdued for the full year overall.

A 2.2.2/7

Key Data – Consumer Health

			Change (%)[1]				Change (%)[1]	
€ million	Q4 2020	Q4 2021	Reported	Fx & p adj.	2020	2021	Reported	Fx & p adj.
Sales	**1,250**	**1,405**	**+12.4**	**+8.6**	**5,054**	**5,293**	**+4.7**	**+6.5**
Changes in sales[1]								
Volume	+0.7%	+4.6%			+3.3%	+3.4%		
Price	+2.4%	+4.0%			+1.9%	+3.1%		
Currency	−8.4%	+3.2%			−4.4%	−2.7%		
Portfolio	−1.2%	+0.6%			−8.3%	+0.9%		
Sales by region								
Europe/Middle East/Africa	452	486	+7.5	+6.6	1,739	1,779	+2.3	+4.6
North America	492	573	+16.5	+10.1	2,026	2,075	+2.4	+3.3
Asia/Pacific	178	200	+12.4	+7.6	744	829	+11.4	+10.5
Latin America	128	146	+14.1	+11.1	545	610	+11.9	+19.5
EBITDA[1]	**233**	**287**	**+23.2**		**1,060**	**1,144**	**+7.9**	
Special items[1]	(25)	(25)			(54)	(46)		
EBITDA before special items[1]	**258**	**312**	**+20.9**		**1,114**	**1,190**	**+6.8**	
EBITDA margin before special items[1]	20.6%	22.2%			22.0%	22.5%		
EBIT[1]	**352**	**201**	**−42.9**		**992**	**808**	**−18.5**	
Special items[1]	174	(25)			199	(46)		
EBIT before special items[1]	**178**	**226**	**+27.0**		**793**	**854**	**+7.7**	
Net cash provided by operating activities	**276**	**316**	**+14.5**		**987**	**1,030**	**+4.4**	
Cash flow-relevant capital expenditures	75	89	+18.7		159	196	+23.3	
Research and development expenses	53	61	+15.1		195	199	+2.1	

2020 figures restated
Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Sales

Sales at Consumer Health advanced by 6.5% (Fx & portfolio adj.) in 2021 to €5,293 million, as the division once again reported significant gains across all regions against a very strong prior year. The greater focus on health and prevention in connection with the COVID-19 pandemic generated substantial growth in demand in all regions, especially in the Nutritionals category. Growth was also driven by the launch of innovative products across all categories.

A 2.2.2/8

Sales by Category

€ million	Q4 2020	Q4 2021	Change (%)[1] Reported	Change (%)[1] Fx & p adj.	2020	2021	Change (%)[1] Reported	Change (%)[1] Fx & p adj.
Consumer Health	**1,250**	**1,405**	**+12.4**	**+8.6**	**5,054**	**5,293**	**+4.7**	**+6.5**
Nutritionals	331	374	+13.0	+7.4	1,313	1,471	+12.0	+11.7
Allergy & Cold	253	299	+18.2	+13.8	1,080	1,036	–4.1	–2.1
Dermatology	259	284	+9.7	+7.3	1,086	1,122	+3.3	+5.1
Pain & Cardio	207	221	+6.8	+3.9	807	834	+3.3	+8.0
Digestive Health	186	211	+13.4	+10.6	717	771	+7.5	+9.7
Other	14	16	+14.3	+7.5	51	59	+15.7	+17.4

Fx & p adj. = currency- and portfolio-adjusted

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

// In **Europe/Middle East/Africa**, sales rose by 4.6% (Fx & portfolio adj.) to €1,779 million. Growth was mainly driven by high demand in the Dermatology category, which benefited from the Bepanthen™ product innovation for daily treatment of dry skin. We also registered significant growth in Nutritionals due to a continuous increase in demand. Sales in the Digestive Health category also benefited from product innovation. Our business with cough and cold products registered a decline in sales in the first half of the year, driven by the increased protection and hygiene measures.

// Sales in **North America** advanced by 3.3% (Fx & portfolio adj.) to €2,075 million. Business in our Nutritionals category increased significantly against a very strong prior year, driven by our One A Day™ vitamins. We also registered encouraging growth in the Digestive Health and Allergy & Cold categories. Sales of our allergy product Claritin™ increased due to the stronger allergy season, while our cough and cold business benefited from a product line extension. By contrast, the Dermatology category saw a decline in sales.

// Business in the **Asia/Pacific** region expanded by 10.5% (Fx & portfolio adj.) to €829 million. This performance was largely driven by an increase in sales in the Nutritionals category, with Elevit™ in particular posting strong growth. The integration of our Consumer Health business in India as part of our growth strategy also had a positive impact, particularly in the Pain & Cardio category.

// In **Latin America**, sales climbed by a significant 19.5% (Fx & portfolio adj.) to €610 million, with an increase in demand driving substantial growth in the Pain & Cardio and Nutritionals categories in particular. Business in the Dermatology category benefited from our Bepanthen™ product innovation.

Earnings

EBITDA before special items increased by 6.8% to €1,190 million in 2021 (2020: €1,114 million), with the EBITDA margin before special items improving by 0.5 percentage points to 22.5%. Earnings primarily benefited from our strong business performance and continuous price and cost management efforts, which offset an inflation-related increase in costs and enabled us to invest in the launch of innovative products. In addition, earnings were diminished by negative currency effects of €39 million.

EBIT at Consumer Health came in at €808 million (2020: €992 million) after special charges of €46 million (2020: special gains of €199 million) that primarily related to restructuring.

A 2.2.2/9

Special Items[1] Consumer Health

€ million	EBIT Q4 2020	EBIT Q4 2021	EBIT 2020	EBIT 2021	EBITDA Q4 2020	EBITDA Q4 2021	EBITDA 2020	EBITDA 2021
Restructuring	(25)	(25)	(54)	(46)	(25)	(25)	(54)	(46)
Impairment losses/loss reversals	199	–	253	–	–	–	–	–
Total special items	**174**	**(25)**	**199**	**(46)**	**(25)**	**(25)**	**(54)**	**(46)**

2020 figures restated

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Fourth quarter of 2021

Sales

Sales at Consumer Health rose by a significant 8.6% (Fx & portfolio adj.) to €1,405 million in the fourth quarter of 2021, with business up in all categories. Sales of our cough and cold products increased compared with the prior-year period. The encouraging development in the Nutritionals category in the previous quarters continued into the fourth quarter. In addition, the launch of innovative products, especially in the Dermatology and Digestive Health categories, contributed to the positive business performance.

Earnings

EBITDA before special items increased by 20.9% to €312 million in the fourth quarter of 2021 (Q4 2020: €258 million), with the margin rising 1.6 percentage points to 22.2%. The growth in earnings was primarily driven by our strong business performance. This was partially offset by investments associated with the launch of innovative products and by inflation-related increases in costs.

EBIT at Consumer Health came in at €201 million (Q4 2020: €352 million) after special charges of €25 million (Q4 2020: special gains of €174 million) that were mainly attributable to restructuring.

2.2.3 Value-Based Performance

A 2.2.3/1

Value-Based Performance

	Crop Science		Pharmaceuticals		Consumer Health		Group[2]	
€ million	2020	2021	2020	2021	2020	2021	2020	2021
EBIT[1]	(18,629)	(495)	3,467	4,469	992	808	(16,169)	3,353
Income taxes[3]	4,471	119	(832)	(1,073)	(238)	(194)	3,881	(805)
NOPAT[1]	(14,158)	(376)	2,635	3,396	754	614	(12,288)	2,548
Average capital employed[1]	49,502	40,161	16,550	18,275	9,802	9,581	74,675	66,449
ROCE[1]	–28.6%	–0.9%	15.9%	18.6%	7.7%	6.4%	–16.5%	3.8%
WACC[1, 4]	6.8%	6.2%	6.8%	6.2%	6.8%	6.2%	6.8%	6.2%

2020 figures restated; Animal Health recognized as a discontinued operation

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

[2] Including Reconciliation

[3] 24% on EBIT; based on historical average of tax rates.

[4] At the divisional level, ROCE is compared with the WACC of the Bayer Group as we do not report WACC for the individual divisions.

Bayer's ROCE in 2021 amounted to 3.8%. ROCE improved considerably at the Group level compared with the previous year, which was marked by significant special charges within the Crop Science and Pharmaceuticals divisions, but remained 2.4 percentage points below the cost of capital (6.2%). At Crop Science, net operating profit after taxes (NOPAT) benefited from impairment loss reversals but was again adversely impacted by provisions for litigations. As such, ROCE remained below the cost of capital, despite a reduced capital base. At Pharmaceuticals, ROCE rose year on year due to a reduction in special charges, even though its capital base increased as a result of the acquisition of Vividion Therapeutics, Inc. Consumer Health recorded a decline in NOPAT and saw a further reduction in its capital base.

The following overview shows the components of the average capital employed used in calculating ROCE.

A 2.2.3/2

Components of Capital Employed[1]

€ million	Dec. 31, 2020	Dec. 31, 2021
Goodwill	36,418	40,106
Other intangible assets	25,424	26,258
Property, plant and equipment	11,723	12,688
Other financial assets[2]	143	57
Inventories	10,961	11,314
Trade accounts receivable	9,552	10,047
Other receivables[2]	1,843	1,896
Deferred tax assets[2]	2,378	2,444
Claims for income tax refunds	1,233	1,526
Assets held for sale	113	76
Gross capital employed	**99,788**	**106,412**
Other provisions[2]	(13,974)	(15,321)
Trade accounts payable	(5,678)	(6,792)
Other liabilities[2]	(2,938)	(3,406)
Refund liabilities	(4,463)	(4,847)
Contract liabilities	(4,314)	(4,821)
Financial liabilities[2]	(2)	–
Deferred tax liabilities[2]	(1,107)	(814)
Income tax liabilities	(2,537)	(2,288)
Liabilities directly related to assets held for sale	–	–
Capital employed[1]	**64,775**	**68,123**
Average capital employed[1]	**74,675**	**66,449**

2020 figures restated; Animal Health recognized as a discontinued operation

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

[2] Selected items forming part of the line item in the statement of financial position; items that were predominantly non-interest-bearing or nonoperating in nature were eliminated from capital employed.

2.2.4 Asset and Financial Position of the Bayer Group

Financial management of the Bayer Group

The financial management of the Bayer Group is conducted centrally. Capital is a global resource, generally procured centrally and distributed within the Bayer Group. The foremost objectives of our financial management are to help bring about a sustained increase in corporate value and to ensure the Group's liquidity and creditworthiness. This involves optimizing the capital structure and effectively managing risks. The management of currency, interest-rate, commodity-price and default risks helps to reduce the volatility of our earnings.

See also A 1.2.2

The contracted rating agencies assess Bayer as follows:

A 2.2.4/1

Rating

	Long-term rating	Short-term rating	Outlook
S & P Global Ratings	BBB	A-2	stable
Moody's	Baa2	P-2	negative
Fitch Ratings	BBB+	F-2	stable

These investment grade ratings from all three agencies reflect the company's high solvency and ensure access to a broad investor base for financing purposes. Our stated aim is to regain A-category long-term ratings in the future.

As a matter of principle, we pursue a prudent debt management strategy to ensure flexibility, drawing on a balanced financing portfolio. This is fundamentally based on bonds in various currencies, syndicated credit facilities, bilateral loan agreements and a global commercial paper program.

We use financial derivatives to hedge against risks arising from business operations or financial transactions but do not employ contracts in the absence of an underlying transaction. It is our policy to diminish default risks by selecting trading partners with a high credit standing. We closely monitor the execution of all transactions, which are conducted in accordance with Bayer Group policies.

See also A 3.2.2

Liquidity and Capital Expenditures of the Bayer Group

A 2.2.4/2

Bayer Group Summary Statements of Cash Flows

€ million	Q4 2020	Q4 2021	2020	2021
Net cash provided by (used in) operating activities from continuing operations	**697**	**3,046**	**4,569**	**5,089**
Net cash provided by (used in) operating activities from discontinued operations	54	–	334	–
Net cash provided by (used in) operating activities (total)	**751**	**3,046**	**4,903**	**5,089**
Net cash provided by (used in) investing activities (total)	**(194)**	**(988)**	**(4,073)**	**855**
Net cash provided by (used in) financing activities (total)	**(1,354)**	**(1,798)**	**423**	**(5,645)**
Change in cash and cash equivalents due to business activities	**(797)**	**260**	**1,253**	**299**
Cash and cash equivalents at beginning of period	**5,067**	**4,316**	**3,185**	**4,191**
Change due to exchange rate movements and to changes in scope of consolidation	(79)	(12)	(247)	74
Cash and cash equivalents at end of period	**4,191**	**4,564**	**4,191**	**4,564**

Net cash provided by operating activities

The net operating cash flow from continuing operations in 2021 came to €5,089 million (2020: €4,569 million). This figure included net settlement payments of €4,259 million (2020: €3,938 million) to resolve litigations, mainly in connection with the glyphosate and Essure™ litigations.

Net cash provided by investing activities

Investing activities led to a net cash inflow of €855 million (2020: net cash outflow of €4,073 million). Cash outflows for property, plant and equipment and intangible assets rose to €2,611 million (2020: €2,418 million), with the increase mainly attributable to the Pharmaceuticals Division. Net cash outflows for divestments, less transferred cash, amounted to €6 million (2020: proceeds of €4,172 million) and pertained to the final purchase price adjustment from the divestment of the Animal Health business unit as well as small-scale divestments at the Crop Science Division. The high inflows in the prior year were mainly due to sale of the Animal Health business, which closed in the third quarter of 2020. Cash outflows for acquisitions, less acquired cash, amounted to €1,340 million (2020: €2,263 million) and mainly related to the acquisition of U.S. biopharmaceutical company Vividion Therapeutics, Inc. The prior-year figure included payments for the acquisition of Asklepios BioPharmaceutical Inc., United States, and KaNDy Therapeutics Ltd., United Kingdom, among other transactions. The net cash inflow from current financial assets came to €4,265 million (2020: outflow of €4,455 million). These inflows largely arose from the divestment of investments in money market funds and were used to make settlement payments and repay loans, among other things.

Net cash used in financing activities

There was a net cash outflow of €5,645 million for financing activities (2020: inflow of €423 million). This included net loan repayments of €2,452 million (2020: net borrowings of €4,467 million). Net interest payments decreased to €1,200 million (2020: €1,276 million). The Bayer Group paid a dividend of €1,993 million (2020: €2,768 million).

Free cash flow

Free cash flow (total), which is the total operating cash flow less capital expenditures plus interest and dividends received less interest paid, was €1,415 million in 2021 (2020: 1,343 million).

Capital expenditures

A 2.2.4/3

Cash Flow-Relevant Capital Expenditure for Property, Plant and Equipment and for Intangible Assets

€ million	2020	2021
Crop Science	1,103	1,019
Pharmaceuticals	915	1,178
Consumer Health	159	196
Reconciliation	209	218
Group[2]	**2,418**	**2,611**

[1] Group total including continuing and discontinued operations

Crop Science continuously invests in a variety of projects within its global production network for crop protection products and seeds as well as in research, development and digital transformation. The largest capital expenditure projects in 2021 included investments in the sourcing of an important raw material used in the production of glyphosate in the United States (€60 million). We also invested in the expansion of fungicide production in Germany (€16 million). Alongside these projects, the development of digital solutions for our customers was a key investment in 2021 and will remain so in the coming years.

At **Pharmaceuticals**, the largest expenditures for property, plant, and equipment in 2021 were for cell and gene therapy research and production facilities in the United States, Spain, Germany, the United Kingdom and Canada (€131 million); modernization programs for the production network of our product supply organization at the sites in Turku, Finland; Leverkusen, Germany; and Garbagnate, Italy (€118 million); the development of a new production site for medicinal products in Costa Rica (€65 million); and the construction of a new production facility for solid launch products in Leverkusen, Germany (€60 million).

At approximately €21 million, **Consumer Health's** largest investment was the GMP upgrade program across its global production sites.

A 2.2.4/4

Material Capital Expenditures for Property, Plant and Equipment

		2020	2021
Crop Science	Expansion of fungicide production capacities in Dormagen, Germany	ongoing	ongoing
	Expansion of research and development facilities in Monheim, Germany	ongoing	ongoing
	Expansion of insecticide production capacities in Vapi, India	ongoing	completed
	Construction of a corn seed production site in Pochuyki, Ukraine	ongoing	completed
	Expansion of research and development facilities in Petrolina, Brazil	ongoing	ongoing
	IT solutions to support digital transformation	ongoing	ongoing
	Sourcing of a raw material used in the production of glyphosate in Soda Springs, United States	ongoing	ongoing
	Implementation of sustainability measures in Soda Springs, United States	ongoing	ongoing
	Construction of a production site in Russia		initiated
Pharmaceuticals	Expansion of Eylea™ production capacities in Berlin, Germany, and in Shiga, Japan	completed	
	Pilot facility for solids production in Leverkusen, Germany	completed	
	Modernization of production facilities at sites across the production network (Leverkusen, Germany; Garbagnate, Italy; Turku, Finland)	ongoing	ongoing
	Construction of a new research building (preclinical pharmacology) in Wuppertal (Aprath), Germany	ongoing	ongoing
	Modernization of research facilities in Berlin, Germany	ongoing	ongoing
	Expansion of active ingredient production for Xarelto™ in Bergkamen, Germany	completed	
	Construction of modular production center for biologicals in Berkeley, United States	ongoing	ongoing
	Construction of a sterile filling plant for launch products in Berlin, Germany	ongoing	ongoing
	Expansion of Xarelto™ production in Bitterfeld, Germany	completed	
	Expansion of active ingredient production for acarbose in Wuppertal, Germany	ongoing	ongoing
	Expansion of packaging capacities in Beijing, China	initiated	ongoing
	Construction of a new production facility for solid launch products in Leverkusen, Germany	initiated	ongoing
	Construction of a new multi-purpose facility for active ingredient production in Wuppertal, Germany		initiated
	Construction of research and production facilities for cell and gene therapies in the United States, Spain, German, Canada and the United Kingdom	initiated[1]	ongoing
	Construction of a new production site in Costa Rica	initiated[1]	ongoing
Consumer Health	Upgrade of global production site facilities to new GMP standards	ongoing	ongoing

[1] The project volume became material in 2021.

Liquid assets and net financial debt

A 2.2.4/5

Net Financial Debt[1]

€ million	Dec. 31, 2020	Dec. 31, 2021	Change (%)
Bonds and notes	36,745	37,593	+2.3
of which hybrid bonds[2]	4,532	4,537	+0.1
Liabilities to banks[3]	3,669	773	–78.9
Lease liabilities	1,143	1,165	+1.9
Liabilities from derivatives[4]	136	69	–49.3
Other financial liabilities	77	1,272	.
Receivables from derivatives[4]	(141)	(114)	–19.1
Financial debt	**41,629**	**40,758**	**–2.1**
Cash and cash equivalents	(4,191)	(4,564)	+8.9
Current financial assets[5]	(7,393)	(3,057)	–58.7
Net financial debt[1]	**30,045**	**33,137**	**+10.3**

2020 figures restated

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

[2] Classified as debt according to IFRS

[3] Including both financial and nonfinancial liabilities

[4] Including the market values of interest-rate and currency hedges of recorded transactions

[5] Including short-term receivables with maturities between 3 and 12 months outstanding from banks and other companies as well as financial investments in debt and equity instruments that were recorded as current on first-time recognition

The Bayer Group's net financial debt increased by €3.1 billion to €33.1 billion in 2021. Cash inflows from operating activities stood against outflows for dividends and the acquisition of U.S. biopharmaceutical company Vividion Therapeutics, Inc., as well as for settlement payments for the litigations in the United States and negative currency effects.

Financial debt included four subordinated hybrid bonds with a total volume of €4.5 billion, 50% of which is treated as equity by three contracted rating agencies. As such, the hybrid bonds have a positive impact on the Group's rating-specific debt indicators.

In January 2021, Bayer AG placed bonds with a total volume of €4 billion. The four tranches with volumes of between €0.8 and €1.2 billion have maturities of 4 years, 8 years, 10.5 years and 15 years. The coupons on the notes are 0.05%, 0.375%, 0.625% and 1.00% p.a., respectively.

In addition, five bonds with a total volume of US$4.5 billion, one bond with a nominal volume of €750 million and one bond with a nominal volume of JPY10 billion were redeemed at maturity in 2021.

The decrease in liabilities to banks mainly resulted from the repayment of the outstanding amount of US$3.8 billion from the syndicated credit facility drawn in June 2018 as bridge financing for the acquisition of Monsanto.

The other financial liabilities as of December 31, 2021, included €1.2 billion in commercial paper.

The decline in current financial assets mainly related to investments in money market funds.

Asset and Capital Structure of the Bayer Group

A 2.2.4/6

Bayer Group Summary Statements of Financial Position

€ million	Dec. 31, 2020	Dec. 31, 2021	Change (%)
Noncurrent assets	**81,129**	**87,663**	**+8.1**
Assets held for sale	113	76	–32.7
Other current assets	35,562	32,502	–8.6
Current assets	**35,675**	**32,578**	**–8.7**
Total assets	**116,804**	**120,241**	**+2.9**
Equity	**30,675**	**33,168**	**+8.1**
Noncurrent liabilities	**49,361**	**57,670**	**+16.8**
Current liabilities	36,768	29,403	–20.0
Liabilities directly related to assets held for sale	–	–	–
Total current liabilities	**36,768**	**29,403**	**–20.0**
Liabilities	**86,129**	**87,073**	**+1.1**
Total equity and liabilities	**116,804**	**120,241**	**+2.9**

2020 figures restated

Between December 31, 2020, and December 31, 2021, total assets increased by €3.4 billion to €120.2 billion.

// Noncurrent assets increased by €6.5 billion to €87.7 billion. This increase was mainly attributable to the foreign currency measurement of goodwill, which is primarily in the United States. Other contributing factors were the acquisition of Vividion Therapeutics, Inc., United States, and impairment loss reversals on other intangible assets. By contrast, the adjustment of the purchase price allocation for Asklepios BioPharmaceutical, Inc. (AskBio), United States, had a negative effect.
// Total current assets fell by €3.1 billion to €32.6 billion. This decrease was mainly due to a decline in investments in money market funds and bank deposits, which were used to make settlement payments and repay debt.

// Equity rose by €2.5 billion during the year to €33.2 billion. This was primarily attributable to the positive income after income taxes, changes – recognized outside profit or loss – arising from the remeasurement of the net defined benefit liability, and from currency translation of equity items. By contrast, the dividend payment had a negative effect. The equity ratio rose to 27.6% (2020: 26.3%).
// Liabilities rose by €0.9 billion as of December 31, 2021, to €87.1 billion. A key factor here was the significant year-on-year increase in allocations to provisions for variable compensation under the Group-wide short-term incentive (STI) program and similar programs. Additional allocations to provisions were made in connection with restructuring. By contrast, liabilities were diminished by the repayment of bonds and the syndicated credit facility as well as the reduction in provisions for pensions due to an increase in the discount rate and the positive development of plan assets.

2.3 Alternative Performance Measures Used by the Bayer Group

The Combined Management Report and the Consolidated Financial Statements of the Bayer Group are prepared according to the applicable financial reporting standards. In addition to the disclosures and metrics these require, Bayer publishes alternative performance measures (APMs) that are not defined or specified in these standards and for which there are no generally accepted reporting formats. Bayer calculates APMs to enable a comparison of performance indicators over time and against those of other companies in its industry sectors. These APMs are calculated by making certain adjustments to items in the statement of financial position or the income statement prepared according to the applicable financial reporting standards. Such adjustments may result from differences in calculation or measurement methods, nonuniform business activities or special factors affecting the information value of these items. The APMs determined in this way apply to all periods and are used both internally for business management purposes and externally by analysts, investors and rating agencies to assess the company's performance. Bayer determines the following APMs:

See also "About this Report" and Note [2] to B Consolidated Financial Statements

// Change in sales (reported, currency-adjusted, currency- and portfolio-adjusted)
// EBITDA
// EBITDA before special items
// EBITDA margin before special items
// EBIT
// EBIT before special items
// Core earnings per share
// Net financial debt
// Return on capital employed (ROCE)
// Net operating profit after tax (NOPAT)
// Capital employed
// Weighted average cost of capital (WACC)
// Free cash flow
// Forecast key financial data

The **(reported) change in sales** is a relative indicator. It shows the percentage by which sales varied from the previous year.

The **currency-adjusted or currency- and portfolio-adjusted change in sales** shows the percentage change in sales excluding the impact of exchange rate effects and, in the latter case, disregarding material acquisitions and divestments as well. Exchange rate effects are generally calculated on the basis of the functional currency valid in the respective country. An exception existed in Argentina, primarily in our crop protection business, where the currency effect was calculated on the basis of the U.S. dollar instead of the functional currency.

EBITDA (earnings before interest, tax, depreciation and amortization) encompasses earnings before the financial result, taxes, depreciation and impairment losses / loss reversals on property, plant and equipment, impairment losses on goodwill, and amortization and impairment losses / loss reversals on other intangible assets. This performance indicator neutralizes the effects of the financial result along with distortions of operational performance that result from divergent depreciation and amortization methods and the exercise of measurement discretion. EBITDA is EBIT plus the amortization of intangible assets and the depreciation of property, plant and equipment, plus impairment losses and minus impairment loss reversals, recognized in profit or loss during the reporting period.

EBIT (earnings before interest and taxes) serves to present a company's performance while eliminating the effects of differences among local taxation systems and different financing activities.

See B 1 of the Notes to the Consolidated Financial Statements for the reconciliation to EBIT

EBITDA before special items and **EBIT before special items** show the development of the operational business irrespective of the effects of special items, i.e., special effects for the Bayer Group with regard to their nature and magnitude. These may include acquisition costs, divestments, litigations, restructuring, integration costs, impairment losses and impairment loss reversals. In the calculation of EBIT before special items and EBITDA before special items, special charges are added and special gains subtracted.

The **EBITDA margin before special items** is a relative indicator used by Bayer for internal and external comparisons of operational earnings performance. It is the ratio of EBITDA before special items to net sales.

The APM **core earnings per share (core EPS)** from continuing operations is based on the concept of earnings per share (EPS) as defined in IAS 33. Core EPS forms the basis of the Bayer Group's dividend policy.

See A 2.2.1/3 for the calculation of core EPS, and A 2.2.1 for further details

Core EPS is calculated using the following method: Based on EBIT (as per the income statements), the special items, impairment losses on goodwill, amortization / impairment losses / loss reversals on other intangible assets, impairment losses / loss reversals on property, plant and equipment and the accelerated depreciation included in special items are neutralized to determine **core EBIT**. This enables a comparison of performance over time. Core EBIT is reconciled to **core net income from continuing operations**. This is calculated by adding the core financial result to core EBIT. Special items in the financial result include nonrecurring financial expenses or income that are not part of our normal financing activities. These primarily pertain to changes in the fair value of equity instruments that are not held for medium- or long-term strategic purposes, as well as to nonrecurring financial expenses or income arising from acquisitions, divestments and litigations. Income taxes – net of special items – are then deducted from this figure to give core net income. Special items relating to income taxes include material effects from tax reforms, among other things.

Core EPS is then calculated by dividing core net income by the weighted average number of shares.

As core EPS is calculated for each interim reporting period, core EPS for the fiscal year or for each interim reporting period up to the respective closing date may deviate from the cumulated core EPS for the individual interim reporting periods.

Net financial debt is an important financial management indicator for the Bayer Group and is used both internally and externally in assessing its liquidity, capital structure and financial flexibility.

See A 2.2.4/5 for the calculation of net financial debt

The **return on capital employed (ROCE)** measures the capital return over a specified period and is employed as a strategic indicator to evaluate value creation. It is the ratio of **net operating profit after taxes (NOPAT)** to the average **capital employed** in a fiscal year. NOPAT is calculated by subtracting income taxes from EBIT. Income taxes are calculated by multiplying EBIT by a uniform tax rate that is based on a historical average of tax rates.

See A 2.2.3 for the calculation of ROCE

The **capital employed** by Bayer is the total carrying amount of operational noncurrent and current assets, minus liabilities that are largely non-interest-bearing in character and / or would distort the capital base. An average value, calculated from the values at the end of the prior year and of the reporting year, is used to depict the change in capital employed during the reporting year.

See A 2.2.3 for the calculation of capital employed

The ROCE is compared to the **weighted average cost of capital (WACC),** which is the return expected by the providers of equity and debt. If the ROCE exceeds the WACC, return expectations have been exceeded, indicating that value has been created.

The WACC is based on an after-tax approach and calculated at the start of the year as the weighted average of the equity and debt cost factors. The cost of equity is determined using the capital asset pricing model (CAPM), while the debt-capital cost factor is calculated based on the average returns of ten-year Eurobonds issued by industrial companies. Further information on the segment-specific capital cost factors used in impairment testing is provided in Note [4] to B Consolidated Financial Statements.

Free cash flow (FCF) is an alternative performance measure that is based on the cash flow from operating activities under IAS 7. FCF illustrates the cash flows available for paying dividends and reducing debt as well as for investing in innovation and acquisitions. It is calculated by subtracting cash outflows for additions to property, plant and equipment and intangible assets from the cash flow from operating activities from continuing and discontinued operations, adding interest and dividends received along with interest received from interest-rate swaps, and deducting interest paid including interest-rate swaps.

The forward-looking key performance indicators published in the **forecast for key financial data** are based on data that is determined in the course of our planning process. The key financial data in the forecast is determined in accordance with the applied accounting policies and with the calculation models for alternative performance measures described in this chapter.

3. Report on Future Perspectives and on Opportunities and Risks

3.1 Future Perspectives

3.1.1 Economic Outlook

A 3.1.1/1

Economic Outlook

	Growth[1] 2021	Growth forecast[1] 2022
World	+5.6%	+4.2%
European Union	+5.2%	+3.7%
of which Germany	+2.7%	+3.8%
United States	+5.7%	+4.1%
Emerging Markets[2]	+6.6%	+4.8%

[1] Real growth of gross domestic product; Source: IHS Markit
[2] Including about 50 countries defined by IHS Markit as Emerging Markets in line with the World Bank
As of January 2022

Global economic recovery set to slow going forward

The global economic recovery from the pandemic-induced slump is set to continue in 2022, though at a slower pace. We expect the Omicron variant's spread around the world to have a dampening impact on economic activity in almost all regions. At the same time, we anticipate that transport bottlenecks and supply-chain problems will continue to lead to delivery delays and rising prices. Labor shortages in some countries, such as in the United States, are also a factor. However, the COVID-19 pandemic's negative impact could dissipate in coming months, thereby alleviating international supply-chain problems and enabling the economy to rebound during the year.

Economic forecasts still entail a high degree of uncertainty – particularly due to the considerable impact of the pandemic on economic activity.

A 3.1.1/2

Economic Outlook for the Divisions

	Growth 2021	Growth forecast 2022
Seeds and crop protection market[1]	+7%	+5%
Pharmaceuticals market[2]	+6%	+5%
Consumer health market[3]	+4%	+4%

2021 data provisional
[1] Bayer's estimate (as of January 2022), plus various local sources; currency-adjusted
[2] Source: IQVIA Market Prognosis (as of September 2021); all rights reserved; currency-adjusted
[3] Bayer's estimate (as of November 2021), taking into account external sources; currency-adjusted

We foresee continued strong market growth for the global **seed and crop protection market** in 2022 (+5%). We expect a major growth contribution from price as seed prices will be higher, reflecting the elevated crop commodity price environment. Agrochemical prices are expected to be significantly higher, reflecting continued inflationary cost pressures in 2022. Latin American corn and soybean acreage will continue to expand.

We expect the **pharmaceuticals market** to expand by 5% in 2022 (2021: 6%). Innovative products will continue to drive growth and more than offset losses due to the expiration of patents.

At around 4%, we anticipate that growth of the **consumer health market** in 2022 will be near the 2021 level (4%). We expect social distancing and economic conditions to continue to put pressure on market growth.

3.1.2 Corporate Outlook

The following forecast is based on the current business development and our internal planning. To enhance the comparability of operational performance, we are presenting this guidance on a currency-adjusted basis, applying the average monthly exchange rates from 2021.

In 2022, we expect to generate currency-adjusted sales of approximately €46 billion, which corresponds to an increase of about 5% on a currency- and portfolio-adjusted basis. We expect the EBITDA margin before special items to come in at around 26% on a currency-adjusted basis. Based on the currency-adjusted sales forecast, this would correspond to EBITDA before special items of around €12 billion on a currency-adjusted basis. We expect to post core earnings per share of approximately €7.00 on a currency-adjusted basis.

Based on the exchange rates as of December 31, 2021, we expect to generate sales of approximately €47 billion in 2022, which corresponds to an increase of about 5% on a currency- and portfolio-adjusted basis. We are targeting an EBITDA margin before special items of approximately 26%. Based on the aforementioned sales figure, this would correspond to EBITDA before special items of around €12 billion. We expect core earnings per share to come in at approximately €7.10. Overall, it should be noted that a 1% appreciation (depreciation) of the euro against all other currencies would decrease (increase) sales by some €350 million and EBITDA before special items by about €110 million on an annual basis.

A 3.1.2/1

Forecast for 2022

	2021 figures		2022 forecast (Fx adj.)		2022 forecast at closing rates on Dec. 31, 2021	
	€ billion	Fx & p adj. change (%)	€ billion	Fx & p adj. change (%)	€ billion	Fx & p adj. change (%)
Sales	**44.1**	**+8.9**	**~46**	**~+5**	**~47**	**~+5**
Crop Science	20.2	+11.1	-	~+7		~+7
Pharmaceuticals	18.3	+7.4	-	~+3 to 4		~+3 to 4
Consumer Health	5.3	+6.5	-	~+4 to 5		~+4 to 5
		Margin (%)		**Margin (%)**		**Margin (%)**
EBITDA before special items[1]	**11.2**	**25.4**	**-**	**~26**		**~26**
Crop Science	4.7	23.2	-	~25 to 26		~25 to 26
Pharmaceuticals	5.8	31.5	-	~32		~32
Consumer Health	1.2	22.5	-	~22 to 23		~22 to 23
Financial result (core)[2]	**–1.2**		**~–1.5**		**~–1.5**	
Tax rate (core)[3]	**24.2%**		**~23%**		**~23%**	
Free cash flow[1]	**1.4**		**~2.0 to 2.5**		**~2.0 to 2.5**	
Net financial debt[1]	**33.1**		**~33 to 34**		**~33 to 34**	
Special items in EBIT	–3.9		~–1.0		~–1.0	
	€		€		€	
Core EPS[1]	**6.51**		**~7.00**		**~7.10**	

Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."
[2] Financial result before special items
[3] (Income taxes + special items in income taxes + tax effects on adjustments) / (core EBIT + financial result + special items in financial result)

We plan to take total special charges of about €1.0 billion (currency-adjusted) in 2022 in connection with restructuring measures.

Potential estimation risks regarding special charges in connection with litigations are referenced in A 3.2 Opportunity and Risk Report.

3.2 Opportunity and Risk Report

3.2.1 Group-wide Opportunity and Risk Management System

As a global life science enterprise, we are exposed to a wide range of internal and external developments and events that could significantly impact the achievement of our financial and nonfinancial objectives. Opportunity and risk management is therefore an integral part of corporate management at Bayer. We regard opportunities as positive deviations, and risks as negative deviations, from projected or target values for potential future developments. We also take into account risks that could occur as a result of our business operations, such as those impacting social and environmental matters.

Opportunity management system

We identify opportunities as part of the annual strategic planning cycle, during which we analyze internal and external factors that may affect our business. These may be factors of a social, economic or environmental nature. The core phase of our strategic planning process takes place in the first half of the year and starts with a comprehensive analysis of the markets. We build on this by analyzing the respective market environments to identify opportunities. These analyses are based on different time periods since trends or developments may impact our business over the short, medium or long term. In addition, we identify and leverage opportunities as part of our regular business operations and through our daily observation of internal processes and markets. Depending on developments, factors affecting our business, such as market risks, may result in either risks or opportunities.

Risk management system

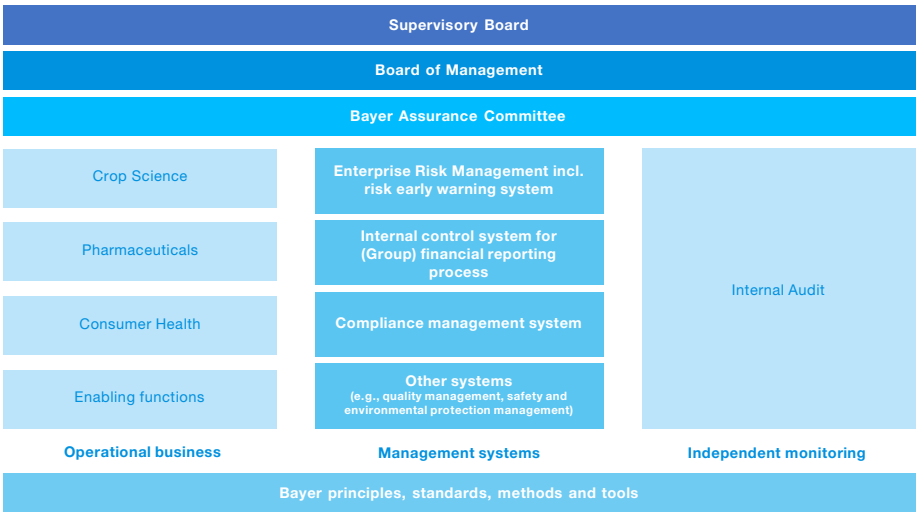
We have implemented a holistic and integrated risk management system designed to ensure the continued existence and future target attainment of the Group through the early identification, assessment and treatment of risks.

Our risk management system is aligned to internationally recognized standards and principles such as the ISO 31000 risk management standard of the International Organization for Standardization.

Structure of Bayer's risk management system

A 3.2.1/1

Structure of the Risk Management System



The **Board of Management** of Bayer AG holds overall responsibility for an effective risk management system. The Audit Committee of the Supervisory Board examines the appropriateness and effectiveness of the risk management system at least once a year and subsequently provides a report to the full Supervisory Board.

The **Bayer Assurance Committee**, which is chaired by the Chief Financial Officer, is a committee of the Board of Management. Besides ensuring that appropriate action is taken to control any substantial risks, the Bayer Assurance Committee regularly discusses and reviews the risk portfolio and the status of the risk control measures.

Responsibility for the identification, assessment, treatment and reporting of risks lies with the **operational business units** in the divisions and enabling functions.

Management systems
Controls and monitoring are performed as part of the respective management systems, focusing on the risks that need to be mitigated. The overarching requirements for all management systems in place at Bayer are defined by the integrated management system (IMS). To enable the Board of Management and the Supervisory Board to monitor material business risks as required by law, we have implemented a risk early warning system pursuant to Section 91, Paragraph 2 of the German Stock Corporation Act (AktG), an internal control system for (Group) accounting and financial reporting processes, and a compliance management system. Responsibility for these systems, along with other cross-divisional management systems, lies with different enabling functions.

The Enterprise Risk Management department steers and coordinates the risk management system. It provides overarching standards, methods and tools, is responsible for the risk early warning system, steers the annual Enterprise Risk Management (ERM) process, and ensures reporting to the Bayer Assurance Committee, the Board of Management and the Supervisory Board.

Risk early warning system
Our ERM system meets the requirement set out in Section 91, Paragraph 2 of the German Stock Corporation Act that a risk early warning system be implemented and used to identify, at an early stage, developments that are material and/or could endanger the company's continued existence. It establishes a consistent framework and uniform standards for the risk early warning system throughout the Bayer Group.

Internal control system for (Group) accounting and financial reporting
(Report pursuant to Section 289, Paragraph 4 and Section 315, Paragraph 4 of the German Commercial Code)

As part of the comprehensive risk management system, Bayer has an internal control system over financial reporting (ICSOFR) in place for the (Group) accounting and financial reporting process. This system comprises suitable structures and workflows that are defined and implemented throughout the organization. The purpose of our ICSOFR is to ensure proper and effective accounting and (Group) financial reporting in accordance with the relevant reporting principles. The ICSOFR is designed to guarantee timely, uniform and accurate accounting for all business transactions based on applicable statutory regulations, accounting and financial reporting standards and the internal Group policies that are binding on all consolidated companies. Risks are identified and assessed, and appropriate countermeasures are taken to mitigate them. Mandatory Group-wide standards such as system-based and manual reconciliation processes and functional separation have been derived from these frameworks and promulgated throughout the Bayer Group. These standards are implemented by the Bayer Group companies. Compliance with these standards is the responsibility of the respective management teams. The Board of Management of Bayer AG has confirmed the effective functioning of the ICSOFR and the relevant criteria for the 2021 fiscal year. However, it should be noted that an internal control system, irrespective of its design, cannot provide absolute assurance that material misstatements in the financial reporting will be avoided or identified.

Compliance management system
Our compliance management system is aimed at ensuring lawful and responsible conduct by our employees. It is designed to identify potential violations in advance and systematically prevent their occurrence. The compliance management system thus contributes significantly to the integration of compliance into our operating units and their processes. Detailed information on compliance management can be found in Chapter A 4.2 "Compliance," which describes in particular the process of identifying risks and taking measures to mitigate them.

Independent monitoring
The Internal Audit department conducts independent, risk-based and objective audit activities, employing a targeted and systematic approach in order to assess and help improve the effectiveness of corporate governance, risk management and monitoring processes. In addition, the external auditor, as an independent external body, assesses the fundamental suitability of the early warning system as part of its audit of the annual financial statements.

Basic elements of the Bayer risk management system

Risk culture and objectives of the risk management system

All levels of the company are included in risk management in order to heighten the awareness and understanding of risks. This lays the foundation for a risk culture with independent, proactive and systematic risk management involving clearly defined roles and responsibilities, principles, standards, methods, tools and training measures. The aims of the risk management system are to achieve risk transparency, which also encompasses the early detection of risks, to support risk-based (treatment) decisions and to ensure compliance with legal requirements.

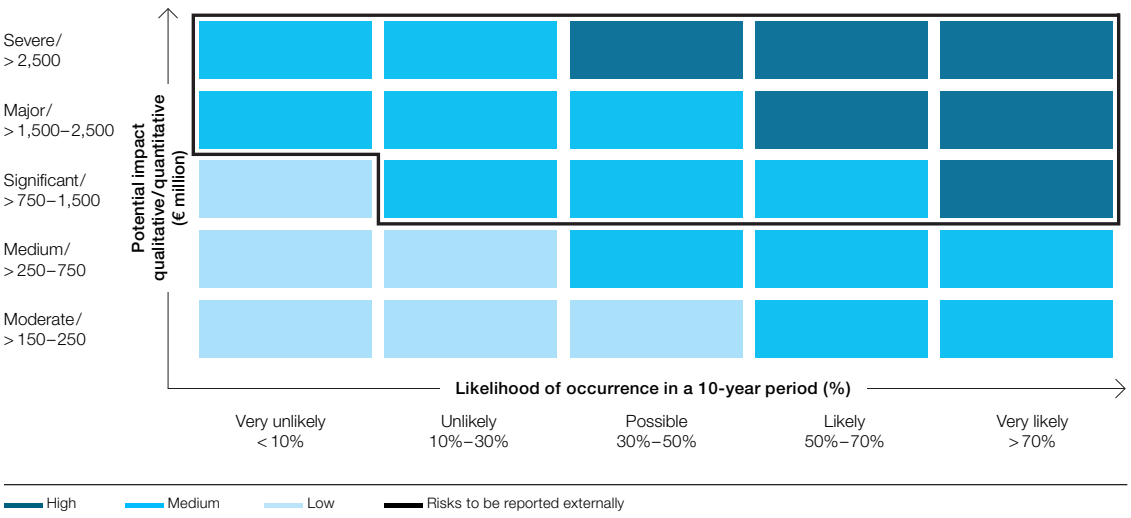
Risk management process

Identification: Risks are identified by risk owners in the divisions and enabling functions. To help ensure we identify risks as comprehensively as possible, we maintain a risk universe that reflects the company's potential risk categories. The Bayer Risk Universe, which is regularly updated, also expressly accounts for risks of a nonfinancial nature that are linked to our business activity or to our business relationships, products and services. Risks pursuant to the Corporate Social Responsibility (CSR) Directive Implementation Act that relate to environmental, employee and social issues, human rights, corruption and bribery (compliance) are included as well. Detailed information on the nonfinancial statement pursuant to the CSR Directive Implementation Act can be found in the "About this Report" section.

Assessment: Where possible, the identified risks are evaluated with regard to their potential impact and likelihood of occurrence using the following matrix. Risks are assessed on a net basis, taking into account the risk control measures in place to mitigate the potential impact and/or likelihood of occurrence.

A 3.2.1/2

Risk Assessment Matrix



Risks are classified as high, medium or low when assessing their materiality within the overall risk portfolio. The extent of the impact is rated in quantitative and/or qualitative terms. The quantitative assessment reflects a potentially negative effect on cash flows. A qualitative assessment of the impact is based on criteria such as the effect on our strategy or reputation, the potential loss of stakeholder confidence, and potential incomplete compliance with sustainability principles (e.g., in the area of safety, environmental protection or human rights). The higher rating – qualitatively or quantitatively – determines the overall assessment. The likelihood of occurrence is calculated based on a maximum period of 10 years. A further aspect we consider is the speed at which the impact will occur if a risk materializes. Risk categories may potentially influence the materialization of risks in other categories, a factor that we take into account when assessing the likelihood of occurrence. For example, developments in the "Social and macroeconomic trends" risk category may have an influence on the "Regulatory changes," "Legal/compliance" and "Product safety and stewardship" categories.

As an additional step in the process, risks with a potential impact of over €5,000 million are examined separately by the Bayer Assurance Committee to determine whether they could endanger the company's continued existence.

We aggregate risks to ensure the early detection of risks that could combine to potentially endanger our company's continued existence. Using methods such as Monte Carlo simulations, we estimate the potential aggregated impact that our main risks could have on our cash flow. We compare the resulting aggregated risk situation with the risk-bearing capacity approved by the Board of Management. The outcome of this comparison is factored into the Board of Management's overall assessment of the company's risk status.

Treatment: The risk owners decide on a targeted risk level based on a cost-benefit analysis and define a risk management strategy as well as risk management measures. These include risk avoidance, risk reduction, risk transfer and risk acceptance.

Reporting: The results are reported to the Bayer Assurance Committee by the Enterprise Risk Management unit within the Internal Audit & Risk Management enabling function. In addition, new risks above a defined threshold are reported to Enterprise Risk Management on an ad-hoc basis and, if relevant, to the Bayer Assurance Committee. A report on the risk portfolio is submitted to the Board of Management and the Audit Committee of the Supervisory Board at least once a year.

Monitoring and improvement

The Enterprise Risk Management unit within the Internal Audit & Risk Management enabling function continuously evaluates whether the principles, standards, methods and tools are appropriate and up to date.

3.2.2 Opportunity and Risk Status

In this section, we report on material, reportable risks pursuant to German Accounting Standard No. 20. These include all financial and nonfinancial risks that have been classified as high or medium and are at least significant in terms of potential impact after taking into account the risk control measures in place (net risk). They encompass risks falling within the black outline in the rating matrix A 3.2.1/2. In addition, we report relevant risks that from a financial point of view may not be sufficiently or meaningfully quantifiable, if at all. We also report on the principal opportunities identified in the course of our opportunity management. Furthermore, we assess the probability that the effects of individual risks could change significantly during the forecast period. Our most recent evaluation did not find this to be case, with the following exception: Legal proceedings generally involve estimation risks, which may be substantial in some cases. Against the background of the proceedings in the glyphosate matter and PCB matters, in particular, outcomes of the mediation process and/or the ongoing litigations may lead to adjustments of the provisions established in connection with this series of litigations. Such adjustments may materially impact the forecast issued with respect to the financial position and cash flows.

See also Note [30] to B Consolidated Financial Statements

Comparable risks existing in different divisions of the company are grouped together where applicable.

According to our understanding, risks relating to the aspects outlined in the CSR Directive Implementation Act that would have to be reported separately would have to have at least a "severe" potential impact under the qualitative criterion "potential incomplete compliance with sustainability principles," and additionally their likelihood of occurrence would have to be classified as "very likely." We did not identify any such risks in 2021.

The section below details the individual risk categories that fall within the "Risks to be reported externally" area outlined in the risk matrix, as well as how they have been classified[14] and the divisions concerned. The order in which the risks are listed does not imply any order of importance. We also describe opportunities and risks of a division-specific nature where relevant. The divisions mentioned are those that have identified material risks. Other divisions may also be affected to a lesser extent. Material risks reported by enabling functions are categorized under "Group," although they may also affect the divisions.

In addition, the year 2021 was likewise marked by the COVID-19 pandemic, the impact of which gives rise to risks such as a prolonged, significant decline in global demand as well as unfavorable geopolitical and macroeconomic effects. Such developments could have consequences for our company, such as a decline in sales, supply chain disruptions and the inability to procure certain materials, an increase in input prices, or longer development times. Our profitability, working capital, cash flow and ability to achieve strategic objectives might continue to be negatively impacted.

Social and macroeconomic trends (High: Group; Medium: Crop Science)
The growing world population, coupled with rising food demand, gives rise to opportunities for our Crop Science Division. In addition, changing consumption patterns and increasing public awareness of the importance of healthy eating and sustainability, paired with new digital technologies, are giving rise to new pools of value in the agriculture market. Therefore, while high-quality seeds and crop protection will remain at our core, we will see opportunities arise to capture additional value by tapping new customer segments, sales platforms and digital capabilities.

Furthermore, the increase in quality of life and life expectancy is leading to a heightened focus on the medical care needs of elderly patients. To take advantage of the opportunities arising from the growing demand for innovative healthcare products to treat age-related diseases, our Pharmaceuticals Division is concentrating its research and development activities on relevant therapeutic areas, among other measures.

Moreover, a negative public perception of Bayer represents a risk. For example, modern agricultural methods, such as the application of certain classes of crop protection products and the use of genetic engineering, are often the subject of intense public debate and can adversely affect our reputation. The risk of an increasingly negative public debate that is not primarily based on science may, for example, lead to legislative and regulatory decisions that are unfavorable to our company, significantly limiting the use of our products or even resulting in voluntary or mandated product withdrawals. We are engaged in constant dialogue with interest groups and regulators to promote scientifically founded, rational and responsible discussions and decision-making processes.

[14] The classification pertains to the risks.

Furthermore, negative developments of a macroeconomic nature, such as crises in important sales markets for our company, could weigh on our business and reduce our earnings. Our seed and crop protection business in particular is cyclical and is shaped by economic developments and factors including fluctuating weather conditions and pest pressure that may adversely impact our Crop Science business. Forecasts concerning climate change indicate that these risks may possibly increase in the long term. We address these influences through our globally diversified business, flexible supply chain, comprehensive monitoring and assessment of market developments, and our ability to adjust production volumes to the level of demand forecast in sales and distribution planning on the basis of an optimized supply chain strategy.

Market developments (Medium: Crop Science)
In the Crop Science Division, we could face increased competition in the seed and crop protection industry. New competitors entering the market and aggressive marketing and pricing strategies – not only for generic products – could negatively impact our profitability. In addition, increasing digitalization in the agriculture sector could lead to the rise of new players and alter the market. To take account of these developments, we are realigning our business models, engaging in scientific and commercial partnerships and utilizing our own R&D capabilities.

New developments such as cell and gene therapies and digitalization are enabling patient needs to be addressed in a more targeted and sustainable way. This provides an opportunity for our Pharmaceuticals Division. Cell and gene therapies can be used to treat or potentially even completely cure numerous as yet untreatable diseases. At the same time, digitalization is leading to improved diagnostic methods, enabling diseases to be diagnosed and treated in a more targeted way.

Regulatory changes (High: Group; Medium: Crop Science, Pharmaceuticals)
Our business activity is subject to extensive regulations that are changing – and may become more stringent, including for reasons of a political nature. For example, further restrictions could be imposed on the sale and use of various crop protection products. In addition, approvals that have already been granted have already been and will probably continue to be challenged in court, especially by NGOs, potentially resulting in temporary or permanent revocation of product registrations or approvals and financial loss from reduced sales of crop protection products as well as associated seed offerings. The issue of conserving biodiversity plays a role in this connection, as does the manufacture and use of certain chemical substances. In addition, the pricing of pharmaceutical products could become more strictly regulated – not only for products already exposed to generic competition, but also for innovative, patent-protected products. Residues of agrochemical products, pharmaceutical compounds or microplastics in the environment could also become subject to more stringent regulation. In addition, regulatory changes could affect agricultural imports from other parts of the world and therefore our business in those regions. Regulatory changes could also cause uncertainty over our products' patent protection, potentially resulting in financial losses that may even include the repayment of license fees. Regulatory changes may also lead to higher product development costs and longer development times or even necessitate adjustments to our product portfolio, which in turn may negatively impact our reputation.

We counter such risks by monitoring changes in regulatory requirements in order to adequately address them within the company. We pursue a global strategy that bundles our strong product portfolio and our sustainability commitments, and leverages our global business presence. We also deploy in-house research and development capacities, make acquisitions and enter into collaborations, while aligning our product portfolio to reflect anticipated changes. We also address these risks by engaging in dialogue with the authorities with the goal of promoting science-based decision-making, and by appropriately participating to defend against challenges to product approvals.

Business strategy (Medium: Pharmaceuticals, Group)
Our business strategy is geared toward innovation, which is inherently associated with risks. In our Pharmaceuticals Division, we see challenges in setting up new therapy platforms, such as for cell and gene therapy, and in further developing established therapeutic areas through innovative solutions. Throughout our company, we need to ensure that the digital transformation we are targeting is accompanied by the corresponding IT support. In addition, we might encounter challenges in our endeavors to implement our voluntary sustainability commitments in a timely manner, which may also be due to external factors.

We counter these risks by aligning our organization and our processes to existing challenges. In the Crop Science Division, for example, our digital farming activities are supplemented by strategic partnerships with leading IT companies where necessary. In the Pharmaceuticals Division, meanwhile, we have established a cell and gene therapy unit, for example.

Research and development (High: Pharmaceuticals)
Across our businesses, we see opportunities both in the continued development of our brands and in the expansion of our research pipeline as a result of our innovation capabilities. In the Pharmaceuticals Division, opportunities result from digitalization and associated new research and development methods that save time and increase development effectiveness. In addition, new, unique screening technologies facilitate the identification of new lead structures to unlock previously undruggable targets, with the potential to develop new and innovative products. We also rely on networking, both within the company and with external partners, to boost our innovation capabilities. This stimulates the development of new products.

Technological advances in pharmaceutical product development may at the same time also represent a risk for our company should we not be in a position to play a role in shaping such advances. Identifying a sufficient number of research candidates and ensuring their appropriate development represents a challenge. Targeting inlicensing and acquisitions as additional ways to strengthen our company involves the risk that we may be unable to identify suitable candidates on financially acceptable terms. Furthermore, we cannot ensure that all of the products we are currently developing or will develop in the future will obtain their planned approval/registration or achieve commercial success. These goals may not be reached if, for example, we are unable to satisfy technical or capacity requirements or meet time constraints in product development, fail to achieve study objectives or do not allocate financial resources optimally. Delays or cost overruns may occur during product registration or launch. We counter this risk through holistic portfolio management, by estimating the probability of success and prioritizing development projects.

Thanks to our innovation capacities and budgets within the Crop Science Division, we anticipate that we will be able to effectively tackle the challenges faced in developing and introducing product solutions in agriculture, including longer and more costly development cycles or stricter regulatory requirements. We plan to further leverage the strengths of our R&D platform to deliver pioneering technologies faster. In addition, we will leverage our existing expertise and strategically invest in new capabilities to unlock and capture new market segments.

Supply of products (procurement, production, logistics) (Medium: Crop Science, Pharmaceuticals)
Despite all precautions, operations at our sites may be disrupted by fires, power outages, process changeovers – including those due to restrictions on the use of certain chemical substances – or plant breakdowns, for example. In addition, some of our production facilities are located in areas that may be affected by natural disasters such as flooding or earthquakes. These risks can lead to production disruptions or stoppages, result in personal injury and damage to our reputation, lead to declines in sales and/or margins, and necessitate the reconstruction of damaged infrastructure. If we are unable to meet product demand, sales may undergo a structural decline because patients then receive alternative treatments and may not switch back to our products. We address this risk for certain products by building up safety stocks and by spreading production across multiple sites, for example. Furthermore, an emergency response system based on a corresponding corporate policy has been implemented at all our production sites.

Disruptions in our upstream supply chain may also negatively impact our own supply capability. The substances we procure, and the companies that manufacture them, must meet all necessary regulatory requirements. These substances must also be suitable for fulfilling regulatory requirements further down the value chain. Certain materials, particularly in our Pharmaceuticals Division, are offered by only a small number of suppliers. We counter these risks by establishing relationships with alternative suppliers, concluding long-term agreements, expanding inventories or producing raw materials ourselves. Supplier risks are regularly reviewed and evaluated.

Marketing, sales and distribution (Medium: Pharmaceuticals)
New product launches present particular challenges for our marketing and distribution organization since assumptions about aspects such as the market and market circumstances may not materialize as anticipated. As a result, product launch concepts – including those related to clinical trials – and the planning or implementation of the distribution strategy could turn out to be inefficient or inadequate in terms of scheduling. In addition, if competitors' marketing activities or advertised product characteristics surpass our own efforts in this regard, this may represent a risk for sales of our products. We address these risks by conducting a forward-looking analysis of possible scenarios and devising suitable strategies for projects such as planned product launches.

Human resources (Medium: Group)
Skilled and dedicated employees are essential for our company's success. Difficulties in recruiting, hiring and retaining urgently needed specialized employees (on a regional level) – also in view of competition between employers – and in employee development could have significant adverse consequences for our company's future development. Developments such as the growing relevance of disruptive technologies, the pandemic situation and new ways of working will require our employees to possess new, innovative skillsets. It is also possible that organizational changes may reduce employee engagement or increase staff turnover if they are not implemented transparently or do not fully deliver the anticipated benefits. Based on our analysis of future requirements, we counter these risks by designing appropriate employee recruitment and development measures. In addition, the alignment of our corporate culture toward diversity and employee needs enables us to tap the full potential of the employment market. Furthermore, deliberate and transparent change management forms an integral part of our human resources management and supports our efforts to constantly motivate our employees.

Information technology (High: Group)
Our business and production processes and our internal and external communications are dependent on global IT systems. Ensuring the optimal alignment of our IT architecture, which also encompasses the use of cloud-based services and management of any service providers commissioned, therefore represents a challenge. System reliability and the confidentiality of internal and external data are matters of fundamental importance to our company. If our governance fails to address this challenging environment in an optimal manner, our operational stability could impact our business and our information security requirements may not be met adequately. If the risk of a breach of data confidentiality, integrity or authenticity, for example due to (cyber) attacks, were to materialize, it could lead to the manipulation and/or uncontrolled outflow of data and knowledge, and to reputational damage. Such attacks may also be carried

out by in-house personnel. Our business and/or production processes could also be temporarily disrupted by (cyber) attacks. To counter these risks, we evaluate and utilize new technologies. Projects and measures have also been implemented to keep technical security precautions up to date and proactively identify and examine new threats. In addition, security measures implemented by the Corporate Cyber Defense Center protect our IT infrastructure against unauthorized access.

Finance and tax (Medium: Group)

Liquidity risk

Liquidity risks are defined as the possible inability of the Bayer Group to meet current or future payment obligations. They are determined and managed by the Group Finance enabling function as part of our same-day and medium-term liquidity planning. We hold sufficient liquidity to ensure the fulfillment of all planned payment obligations throughout the Bayer Group at maturity. Furthermore, a reserve is maintained for unbudgeted shortfalls in cash receipts or unexpected disbursements, and its balance is regularly reviewed and adjusted. Credit facilities also exist with banks, including, in particular, an undrawn €4.5 billion syndicated revolving credit facility with a current maturity of 2025.

Credit risks

Credit risks arise from the possibility that the value of receivables or other financial assets of the Bayer Group may be impaired because counterparties cannot meet their payment or other performance obligations. The maximum default risk is reduced by existing collateral, especially our global credit insurance programs. To manage credit risks from trade receivables, the invoicing companies appoint credit managers who regularly analyze customers' creditworthiness. We generally agree reservation of title with our customers. Credit limits are set for all customers. In addition, all credit limits for debtors where total exposure is €10 million or more are evaluated both locally and centrally. Credit risks from financial transactions are managed centrally in the Group Finance enabling function. To minimize risks, financial transactions are only conducted within predefined exposure limits and with banks and other partners that preferably have investment-grade ratings.

Opportunities and risks resulting from market price changes

Opportunities and risks resulting from fluctuations in currency exchange rates, interest rates and commodity prices are managed by the Group Finance enabling function. Risks are avoided or mitigated through the use of derivative financial instruments. The type and level of currency, interest-rate and commodity price risks are determined using sensitivity analyses as per IFRS 7 that are based on hypothetical changes in risk variables (such as interest curves) to gauge the potential effects of market price fluctuations on equity and earnings. Although they fall below the external reporting threshold under our ERM system, we report on interest-rate and commodity price risks in this section in accordance with the provisions of IFRS 7.

Foreign currency opportunities and risks for our company arise from changes in exchange rates and the related changes in the value of financial instruments (including receivables and payables) and of anticipated payment receipts and disbursements not in the functional currency. Receivables and payables in liquid currencies from operating activities and financial items are generally fully exchange-hedged through cross-currency interest-rate swaps and forward exchange contracts. Anticipated exposure from planned payment receipts and disbursements in the future is hedged through forward exchange contracts and currency options according to management guidelines. Sensitivities were determined on the basis of a hypothetical scenario in which the euro appreciates or depreciates by 10% against all other currencies compared with the year-end exchange rates. In this scenario, the estimated hypothetical increase or decrease in cash flows from derivative and nonderivative financial instruments would have improved or diminished earnings as of December 31, 2021, by €26 million (December 31, 2020: €16 million). Derivatives used to hedge anticipated currency exposure that are designated for hedge accounting would have improved or diminished equity (other comprehensive income) by €443 million (December 31, 2020: €319 million). Currency effects on anticipated exposure are not taken into account. Of the amount impacting equity, €132 million is related to the Chinese renminbi (CNY), €109 million to the Brazilian real (BRL), €47 million to the Japanese yen (JPY) and €37 million to the Canadian dollar (CAD).

Interest-rate opportunities and risks for our company arise from changes in capital market interest rates, which in turn could lead to changes in the fair value of fixed-rate financial instruments and changes in interest payments in the case of floating-rate instruments. Interest-rate swaps are concluded to achieve the target structure for Bayer Group debt. A sensitivity analysis conducted on the basis of our net floating-rate receivables and payables position at the end of 2021 gave the following result: A hypothetical increase of one percentage point in these interest rates (assuming constant currency exchange rates) as of January 1, 2021, would have raised our interest expense for the year ended December 31, 2021, by €14 million (December 31, 2020: €58 million).

Commodity price opportunities and risks arise from the volatility of raw material prices, which can lead to an increase in the prices we pay for seeds and energy. We reduce commodity price risks by using commodity price derivatives such as futures, which are mainly designated as hedge accounting. A sensitivity analysis with a hypothetical 10% change in commodity prices for derivatives used for hedging purposes indicated an effect of €37 million on equity (December 31, 2020: €27 million).

Financial risks associated with pension obligations

The Bayer Group has obligations to current and former employees related to pensions and other post-employment benefits. Changes in relevant measurement parameters such as interest rates, mortality and salary increase rates may raise the present value of our pension obligations. This may lead to increased costs for pension plans or diminish equity due to actuarial losses being recognized in other comprehensive income in the statement of comprehensive income. A large proportion of our pension and other post-employment benefit obligations is covered by plan assets including fixed-income securities, shares, real estate and other investments. Declining or even negative returns on these investments may adversely affect the future fair value of plan assets. Both of these effects may negatively impact the development of equity and/or earnings and/or may necessitate additional payments by our company. We address the risk of market-related fluctuations in the fair value of our plan assets through balanced strategic investment, and we constantly monitor investment risks in regard to our global pension obligations.

Tax risks

Bayer AG and its subsidiaries operate worldwide and are thus subject to many different national tax laws and regulations. The companies are regularly audited by the tax authorities in various countries. Amendments to tax laws and regulations, legal judgments and their interpretation by the tax authorities, and the findings of tax audits in these countries may result in higher tax expense and payments, thus also influencing the level of tax receivables, tax liabilities and deferred tax assets and liabilities. Significant acquisitions, divestments, restructuring programs and other reorganizational measures that we undertake could also have an impact. We counter the resulting risks by continuously identifying and evaluating the tax framework. We establish provisions for taxes, based on estimates, for liabilities to the tax authorities of the respective countries that are uncertain as to their amount and the probability of their occurrence.

External partner compliance (Medium: Group)

From the perspective of the Bayer Group as a whole, there is a risk that our partners, such as suppliers, do not pay due attention to our corporate values and requirements concerning ethics, compliance – including the observance of human rights – and sustainability. Clear sustainability criteria and standards are in place for our supply chain on both a global and regional level. With the goal of improving sustainable practices in our supply chain, we operate a Group-wide four-step management process that comprises the following elements: raising awareness, supplier selection, supplier evaluation and supplier development. Seed producers are subject to a separate human rights evaluation process, for which a new approach is being devised as we refine our human rights strategy.

Health, safety and environment (Medium: Group)

We attach great importance not only to product safety but also to protecting our employees and the environment, as well as to respecting human rights both within our own business operations and also in our business relationships along the value chain. Misconduct or noncompliance with legal requirements or Bayer Group standards may result in personal injury, damage to property, reputation or the environment, loss of production, business interruptions and/or liability for compensation payments. This includes the risk of hazardous substances being released due to an incident in production. Our principles, standards and measures ensure that our requirements are adequately communicated and optimally implemented.

Intellectual property (Medium: Crop Science, Pharmaceuticals)

Our portfolio largely consists of patent-protected products. Generic manufacturers, in particular, attempt to contest patents prior to their expiration. We are currently involved in legal proceedings to enforce patent protection for our products. On the other hand, legal action by third parties for alleged infringement of patent or other property rights by Bayer may impede or even halt the development or manufacturing of certain products. We may also be required to pay monetary damages or royalties to third parties. Our patents department regularly reviews the patent situation in collaboration with the respective operating units and monitors for potential patent infringements so that legal action can be taken if necessary.

See also Note [30] to B Consolidated Financial Statements

Legal/compliance (Group[15])

We are exposed to risks from legal disputes or proceedings to which we are currently a party or which could arise in the future. The general risks to which we are potentially exposed include those in the areas of product liability, competition and antitrust law, anti-corruption law, patent law, tax law, data privacy and environmental protection, for example. Investigations of possible legal or regulatory violations may result in the imposition of civil or criminal penalties – including substantial monetary fines – and/or other adverse financial consequences. Payments may also need to be made under out-of-court settlements. These risks may harm our reputation and hamper our commercial success. We have established a global compliance management system to ensure the observance of laws and regulations.

Glyphosate matter

A large number of lawsuits from plaintiffs claiming to have been exposed to glyphosate-based products manufactured by Bayer's subsidiary Monsanto have been served upon Monsanto in the United States. Glyphosate is the active ingredient contained in a number of Monsanto's herbicides, including Roundup™-branded products. Plaintiffs allege personal injuries resulting from exposure to those products, including non-Hodgkin lymphoma (NHL) and multiple myeloma, and seek compensatory and punitive damages. Plaintiffs claim, inter alia, that the glyphosate-based herbicide products are defective and that Monsanto knew, or should have known, of the risks allegedly associated with such products and failed to adequately warn its users. Additional lawsuits are anticipated. The majority of plaintiffs have brought actions in state courts in Missouri and California. Cases pending in U.S. federal courts have been consolidated in a multidistrict litigation (MDL) in the Northern District of California for common pre-trial management.

[15] See also Note [30] to B Consolidated Financial Statements ("Legal Risks"). The legal proceedings outlined there are those currently considered to involve material risks and do not represent an exhaustive list.

In 2020, Monsanto reached an agreement in principle with plaintiffs, without admission of liability, to settle most of the current Roundup™ litigation and to put in place a mechanism to resolve potential future claims. As of February 1, 2022, Monsanto had reached settlements and/or was close to settling in a substantial number of claims. As we now have greater visibility regarding the number and quality of claims made, we consider that, of the approximately 138,000 claims in total which have been brought, approximately 107,000 have been settled or are not eligible for various reasons.

The three adverse verdicts – Johnson, Hardeman and Pilliod – are not covered by the settlement. In August 2021, the California Court of Appeal ruled against Monsanto in the Pilliod appeal. In November 2021, the California Supreme Court denied review of the appeal. The Company is considering its options with respect to seeking review by the Supreme Court of the United States. The Johnson case was concluded with payment of the US$20.5 million final judgment plus interest in March 2021. In May 2021, the United States Court of Appeals for the 9th Circuit ruled against Monsanto in the Hardeman appeal. The company has petitioned the U.S. Supreme Court for review in Hardeman. In December 2021 the Supreme Court invited the U.S. Solicitor General to file a brief in the matter stating the government's views. In light of the Supreme Court's solicitation of views from the government, Bayer will not entertain any further settlement discussions with plaintiff lawyers at this point in time.

Bayer is convinced that the verdicts are not supported by the evidence at trial and the law and therefore intends to pursue the appeals vigorously.

In October 2021, the jury in another trial, Clark, issued a verdict in Monsanto's favor. The jury determined that Roundup™ did not cause the plaintiff's child's lymphoma. The Clark trial took place in the Superior Court of the State of California for the County of Los Angeles.

In December 2021, the jury in another trial, Stephens, issued a verdict in Monsanto's favor. The jury determined that Roundup™ did not cause the plaintiff's lymphoma. The Stephens trial took place in the Superior Court of the State of California for the County of San Bernardino.

The mechanism to resolve potential future claims involved a class settlement agreement between Monsanto and plaintiffs' counsel. In May 2021, this agreement failed to obtain approval by Judge Chhabria of the U.S. District Court for the Northern District of California. Following the judge's denial, in May 2021 Bayer announced a series of measures to resolve potential future glyphosate litigation, combining both legal and commercial actions. In July 2021, Bayer provided an update on the progress made and announced additional details. Bayer has developed two scenarios based on a potential ruling by the Supreme Court of the United States in the Hardeman case. If the Supreme Court accepts the petition filed by Bayer in August 2021 for review and rules in favor of Bayer, it would effectively end potential future litigation. The second scenario assumes that the Supreme Court either refuses to hear the Hardeman case or issues a ruling in favor of the plaintiff, in which case Bayer would activate its own claims administration program. Bayer has implemented corresponding accounting measures for this scenario, resulting in a discounted allocation to provisions for litigations of €3.5 billion in the second quarter of 2021 on top of the existing provisions. As of December 31, 2021, Bayer had a provision of US$7.5 billion for the aforementioned settlements to resolve existing and future glyphosate claims.

Bayer is confident that this provides an effective path to manage and address any risks from potential future Roundup™ litigation, while simultaneously giving Bayer more control going forward. Bayer continues to believe there is no reason for safety concerns in connection with these products.

As of February 1, 2022, a total of 28 Canadian lawsuits relating to Roundup™ had been served upon Bayer, including 11 seeking class action certification.

Bayer believes it has meritorious defenses and intends to defend the safety of glyphosate and our glyphosate-based formulations vigorously.

We may incur considerable financial disadvantages from the pending lawsuits and/or potential future cases if, for example, we are ordered to pay compensatory and possibly punitive damages or if we assume payment obligations under out-of-court settlements. We could be compelled to cover any such increased financial requirements by issuing additional external debt, increasing our equity capital or divesting assets – possibly on unfavorable terms – or through combinations of these measures. The terms on which we obtain external financing could become less favorable as a result of any increased financial requirements. These risks may also adversely affect our reputation.

Product safety and stewardship (Medium: Crop Science, Pharmaceuticals)
Despite extensive studies prior to approval or registration, products may be partially or completely withdrawn from the market due, for example, to the occurrence of unexpected side-effects or negative effects of our products. Such a withdrawal may be voluntary or result from legal or regulatory measures. In the agriculture business in particular, there is an additional risk that our customers could use our products incorrectly. Furthermore, the presence of traces of unwanted genetically modified organisms in agricultural products and/or foodstuffs may have wide-ranging negative repercussions.

We counter these risks, which could give rise to liability claims and also harm our reputation, by taking comprehensive measures in the areas of pharmaceutical and crop protection product safety and testing, including, in particular, a comprehensive stewardship program for genetic product integrity and quality with regard to seeds. These measures are based on globally defined principles and include analysis and monitoring measures, an alert system and training programs.

Quality and regulatory requirements
(Medium: Crop Science, Pharmaceuticals, Group)
In almost every country we operate, our business activity is subject to extensive regulations, standards, requirements and inspections that also apply to our local contract manufacturers. In the area of health, this pertains to clinical studies and production processes, for example. Acquisitions may at times also be subject to requirements, compliance with which must be ensured both during and after the integration process. Potential infringements of regulatory requirements may result in the imposition of civil or criminal penalties, including substantial monetary fines, restrictions on our freedom to operate, and/or other adverse financial consequences. They could also harm our reputation and lead to declining sales and/or margins. We counter these risks through binding principles, standards and the control mechanisms in place. Quality requirements are defined and implemented in global quality management systems.

Security (Medium: Group)
Potential criminal activities targeting our employees, property or business activities represent a risk for our company. These include intellectual property theft, vandalism and sabotage. In addition, counterfeit or adulterated versions of our products could be put into circulation. There is also the risk of crises such as a pandemic or a prolonged power outage that could lead to a breakdown of our information technology infrastructure and our production. We counter these risks – which in addition to financial effects could negatively affect our reputation in some cases – through our (local) crisis organizations, which produce response plans and take further measures. We have implemented early warning systems, ensure continuous reporting and carry out regular crisis simulation exercises. We also have a security organization in place that operates globally. In addition, we have established a global safety community. The Business Continuity Management unit within the Internal Audit & Risk Management enabling function assesses business continuity risks and defines appropriate measures together with the responsible specialist units.

3.2.3 Overall Assessment of Opportunities and Risks by the Board of Management

No risks that could endanger the company's existence

In the opinion of the Board of Management, based on the current evaluations, none of the risks described above endanger the company's continued existence. Nor could we identify any potential threat to our continued existence, including when comparing our risk-bearing capacity with our aggregated risk situation. We see our risk status as stable compared with the previous year. We remain convinced that we can take advantage of the opportunities resulting from our entrepreneurial activity and successfully master the challenges resulting from the risks stated above.