



Growing together –
100 Years Agricultural Center Limburgerhof

 **BASF**
The Chemical Company

1914 – 2014

Growing together –

100 Years Agricultural Center Limburgerhof

GROWING
TOGETHER
100
YEARS
AGRICULTURAL CENTER
LIMBURGERHOF



Dear Colleagues,

One of the most important innovations of the 20th century was the large-scale implementation of ammonia synthesis, which enabled the production of mineral fertilizers. This marked the starting point in 1914 for BASF's operations in Limburgerhof, which has been part of the Ludwigshafen site ever since. Mineral fertilizers increase agricultural yields and play a major role in producing more food to meet the needs of the world's rapidly growing population.

Much has changed since 1914 – the Agricultural Research Station has become the Agricultural Center, BASF's worldwide center of expertise in the area of crop protection. But one thing has remained the same: Over the decades, our dedicated employees have made great contributions, both large and small, to innovations in agriculture. None of this would have been possible without them. One hundred years ago, the breakthrough was fertilizers. Today, our products and services in the area of crop protection and beyond help to increase yields and the quality of agricultural products around the world.

BASF has a long tradition of working closely with farmers. A look at the history of the Agricultural Center Limburgerhof shows how the needs of farmers have changed and how BASF has helped shape this transformation. Groundbreaking products and solutions as well as the growth of global markets form this history as do crises and setbacks. But again and again, the company has transformed ideas and approaches into market-ready solutions. The history of the Agricultural Center Limburgerhof highlights one of BASF Crop Protection's key strengths: managing challenges and working together to find new solutions.

Yours sincerely,

A handwritten signature in black ink that reads "Markus Heldt".

Markus Heldt
President Crop Protection
BASF SE

Contents

The beginnings – research, development, advisory services

History	5
Limburgerhof	7
Uncertain times of war	9
Advisory services	11
Nitrophoska milestone	13
From Limburgerhof into the wide world	15



1914 – 1927

From fertilizers to crop protection

History	17
Research creates success	19
New fields of research	21
In the service of the war economy	23
Between hope and fear	25
“Weed-free fields”	27
Generational change in Limburgerhof	29



1927 – 1948

Agriculture during the “economic miracle”

History	31
From active ingredient to product family	33
Benefits and side effects	35
Under the umbrella of the “new” BASF	37
More than just weed control	39
Pioneering work around the globe	41



1948 – 1966

Growing international markets

History	43
Expansion of a successful model	45
Different countries, different cultures	47
New tasks in crop protection	49
Perseverance, narrow lead	51
Family connections	53



1966 – 1996

Partner in agriculture

History	55
Beyond crop protection	57
Acquisitions and expansion	59
New paths to healthy plants	61
Ideas for growth markets	63
Sustainability and product stewardship	65
From product to solution	67
Our story continues	68



1996 – 2014

1914 – 1927

The beginnings – research, development, advisory services

With the introduction of **ammonia synthesis**, BASF lays the **foundation** for the industrial production of **modern fertilizers**. By concentrating on this new technology, the Agricultural Research Station Limburgerhof serves as an inspiration for the future direction of the entire company. The outbreak of the **First World War** soon grounds these high-flying plans but, at the same time, increases demand for yield-boosting fertilizers to ensure the supply of **food for the country**. With its professional advisory services and the new **compound fertilizer Nitrophoska**, the Agricultural Research Station provides the basic building blocks for **forward-looking agriculture**.

History

The **First World War** is triggered by the **assassination** of Archduke **Franz Ferdinand** of Austria, heir to the throne, on June 28, 1914.

On November 25, 1915, **Albert Einstein** presents the general **theory of relativity** to the Prussian Academy of Sciences.

On November 11, 1918, the **Armistice** of Compiègne is signed, bringing an **end** to the **First World War**.

In 1919, following his initial success in silent films, **Charlie Chaplin** and his partners establish the **independent** film company **United Artists**.

The **first public radio broadcast** in Germany happens on December 22, 1920, with the **transmission** of a **Christmas concert**.

Frederick Banting and **John James Rickard Macleod** receive the **Nobel Prize for Medicine** in 1923 for the **discovery of insulin**.

In 1925, shortly before the sound film era begins, the epic film **Ben Hur** becomes one of the **biggest box office hits in American silent films**.

In 1927, **Charles Lindbergh** makes the **first non-stop, solo transatlantic flight**, from New York to Paris.





*The entrance to the Agricultural Research Station
in the early years of research in Limburgerhof*

Limburgerhof – the first research station with a new direction

Can nitrogen produced in a factory work as fertilizer on fields? This was the question that triggered the start of research at Limburgerhof, beginning in the spring of 1914. The idea was intriguing, but how to implement it was another question. On the basis of Fritz Haber's findings, BASF chemist Carl Bosch developed a large-scale process to combine atmospheric nitrogen with hydrogen to form ammonia.

But how did this nitrogen work? Could it be used as fertilizer for farmers around the world? The new method raised great hopes. Nitrogen was urgently needed as a plant nutrient because the natural saltpeter deposits in Chile, which were being used at the time, would not be indefinitely available. Synthetically manufactured ammonia could help ensure the supply of food for a growing global population.

Time was running short. Having begun operations in September 1913, the new BASF plant in Oppau, Ludwigshafen, was the first ammonia plant in the world, producing up to 30 metric tons of ammonia a day. Carl Bosch proposed establishing a research station and linking it closely to the laboratories in Oppau.

The prospects for synthetic nitrogen fertilizer were outstanding, but the first task was to prove it actually worked. For BASF, much depended on the tests because fertilizer production was supposed to serve as an inspiration for the entire company in the early 20th century.

There were fewer reservations about the new mineral fertilizers than there had been in the 19th century, but the concerns had by no means been completely eliminated. Farmers only bought and used fertilizers that proved effective in the fields. Since there were few facilities for practical agricultural research at the time, BASF built its own. A site for the Agricultural Research Station was quickly found: Limburgerhof, located only about 10 kilometers south of Ludwigshafen. BASF had acquired some buildings and 225 hectares of arable land there in 1899 to build housing for workers and additional production facilities. The uniformly sandy soil with few nutrients of its own and a low water-retention capacity, along with the moderate and rather dry climate, offered perfect conditions for field tests. The spacious site offered plenty of room for research and farm buildings.

Five employees started working there in the spring of 1914. They initiated the first trials with various plants, testing ammonium sulfate and sodium nitrate that was produced in-house. They wanted to find out whether these fertilizers were as effective as standard nitrogen fertilizers,

which at the time included everything from manure to coking ammonia, a by-product of coal use. While the small team continued its research, laboratory and office space was built. It was an impressive sight: In the glass-roofed greenhouse, tracks were laid down on

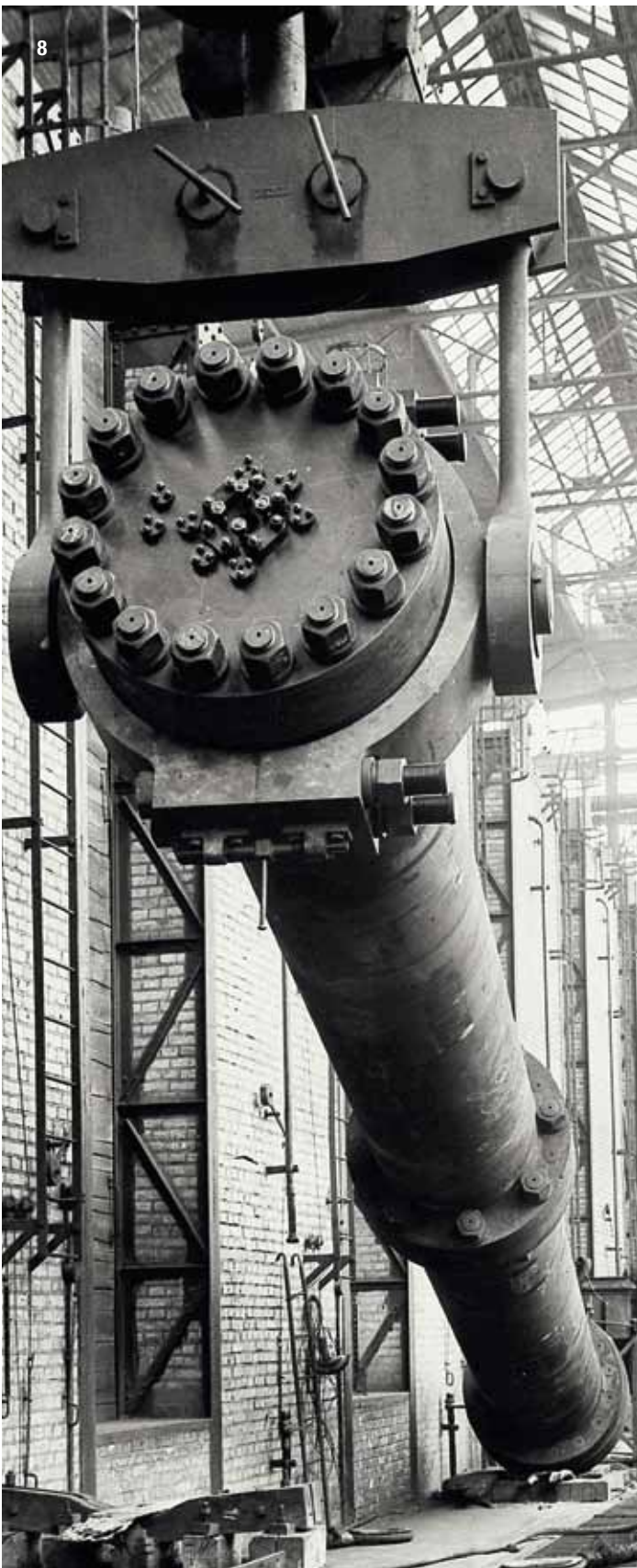
which 24 trolleys holding up to 600 containers could be moved from the greenhouse to the outdoors as needed. Testing was carried out on a field of approximately two hectares. The first buildings were completed on May 1, 1914, and the initial tests showed promising results.

**Fundamental innovation –
the synthesis of ammonia**

Nitrogen is present in the air, but how can it be combined with hydrogen? Chemistry professor **Fritz Haber** (1868-1934) and **Carl Bosch** (1874-1940), a chemist and later CEO of BASF and I.G. Farben, conducted extensive research to find an effective process. High temperatures, high pressure and catalysts led to success. After many experiments, Haber succeeded in synthesizing ammonia in 1909, and large-scale implementation followed shortly thereafter.

Carl Bosch

Fritz Haber



The main laboratory, pictured here in 1922, and the research station worked closely together from the start (image on the right)

High-pressure reactors made of heavy-gauge steel were used for the large-scale synthesis of ammonia in the ammonia plant (image on the left)

Uncertain times of war – research for explosives and nutrition

After a promising start, the company's plans were thwarted by the outbreak of the First World War. Half of all BASF employees were drafted for military service, the Oppau plant decommissioned parts of its production and the future of Limburgerhof hung in the balance.

The rules of the war economy prevailed. State organizations such as the War Raw Materials Department and Kriegsschemikalien AG restricted corporate freedom, and raw materials themselves were also scarce. BASF, like many companies, encountered difficulties in maintaining its operations. But the German army urgently needed the products made by the chemical industry. For example, there were shortages of nitrogen and nitric acid, which were obtained from ammonia and used in the production of explosives. BASF saw an opportunity here: Using the Haber-Bosch process, the company could produce ammonia in large quantities. It lacked the necessary facilities for the production of nitric acid, but once established, these facilities could also be used for the production of nitrogen fertilizer, at the latest after the war.

Against this background, in September 1914, Carl Bosch made his "saltpeter promise" to the War Department after long negotiations. BASF would provide large amounts of nitric acid and, in return, receive government support to build large-scale oxidation plants to process the ammonia into nitric acid.

Meanwhile, the Research Station Limburgerhof continued to focus on fertilizer research. With the expansion of the greenhouse in 1915, there was now room for 1,500 containers. The laboratory was also substantially enlarged and the area available for field tests totaled about 10 hectares. The nitrogen fertilizer tests extended to different soil types and all major crops, including fruits, vegetables and tobacco, in addition to the standard types of cereal grains. The team then began to experiment with combinations of various plant nutrients. Testing with a combination of nitrogen and potassium began in 1916, and the combination of nitrogen and phosphorus followed in 1917. And so just a few years after the development of ammonia synthesis, BASF made a crucial step forward by creating the first fertilizers to contain all the essential nutrients.

The work in Limburgerhof was not limited to chemical research and field tests; even during the war, research continued to focus on agricultural practices. Since 1917, BASF had farmed the previously leased Limburgerhof property with close to 150 hectares of arable land and its own livestock.

The company then purchased the nearby Rehhütte and Kohlhof operations and brought them under its management. The resulting extensive agricultural operations provided a good complement to the research station. While the scientists produced solid findings in chemistry and plant physiology, practical experience was

gained in agriculture and animal husbandry. In order to systematically develop agriculture as a business area, BASF gathered its forces in 1918, the last year of the war, and founded an agricultural department, to which Limburgerhof now belonged.



The mixed fertilizer plants in Oppau began to produce various nitrogen compounds and fertilizers in 1913



Wer nicht reichlich Düngemittel
 Streuet in der Erde Schoß,
 Der erzielet die Kartoffeln
 Höchstens wie 'ne Erbse groß.

Willst Du drum mit diesen Riesen
 Füllen den Kartoffelsack,
 Dann verwend' als Düngemittel
 „Schwefelsaures Ammoniak.“

Advisory services – the foundation for a prosperous future

After the war, the demand for fertilizers was especially large. Soils were leached, agricultural yields had fallen because Chilean saltpeter could not be imported during the war, and ammonia from coking plants and factories had been used for explosives.

As a result of the famine experienced during the “turnip winter” in 1917, the government assumed responsibility for the food supply. The question was how to accomplish this. Significant grain-growing regions in the eastern part of the German Empire had been lost, while small and medium-sized farms ranging in size from 5 to 20 hectares made up around a third of the total area under cultivation. These farms often not only lacked money for machinery and fertilizer but also expertise. BASF’s agricultural department thus began offering its advisory services to provide the necessary know-how.

Starting in 1919, advisory centers were set up in cities across Germany, including Breslau, Kiel, Münster, Munich, Kassel, Dresden, Cologne, Hanover and Stettin. The company soon began establishing similar offices abroad. The discussions with farmers at these centers always returned to the same questions: Were the

synthetic fertilizers really effective? And would using them pay off? The advisors were able to dispel these doubts. Experiments conducted in Limburgerhof had shown that fertilization increased yields and quality. And the advisors used test results to show that the investment in fertilizers was worthwhile. State agencies supported this program by strongly encouraging farmers to use more mineral fertilizers. “If this does not happen, we

will experience a famine,” the Prussian Prime Minister and Agriculture Minister Otto Braun wrote in November 1920.

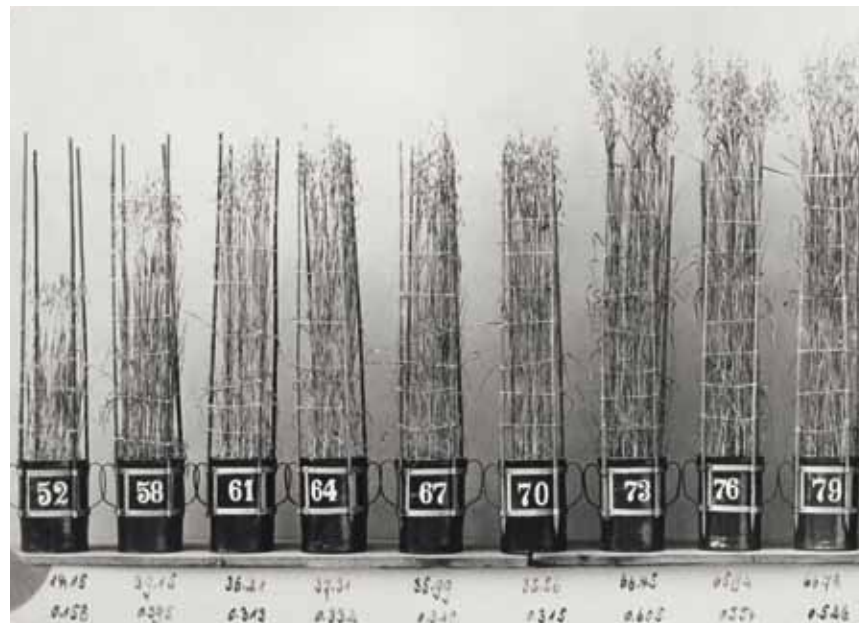
Many farmers had developed their knowledge about soils and fertilizers through experience. In Limburgerhof they knew that the adage that the dumbest farmer harvests the largest potatoes had long since ceased to apply. However, there was still some uncertainty about using the new

fertilizers. What fertilizers should be used and in which mixing ratios for specific crops and soils? The advisors from BASF used their practical and technical knowledge to convince the farmers. They worked closely with the farmers to create fertilization plans and, when needed, also advised on other operational issues. The advisory centers soon earned an excellent reputation, due in part to the fact that they did not sell the fertilizer. Sales were handled by Stickstoff-Syndikat, a Berlin-based sales organization founded by German nitrogen producers in 1919.

In addition to advisory services, advertising played a key role in raising awareness about BASF fertilizers. Postcards lauded nitrogen fertilizers using impressive images and catchy slogans. Demonstrations in Limburgerhof proved the superiority of mineral fertilizers and were attended by a growing number of visitors from the early 1920s onwards. The agriculture department also made use of modern media. A two-part film produced by Ufa (Universum Film AG) in 1921 showed how to use fertilizer and how to maximize its effectiveness. This was followed by about 30 more films that put the work of Limburgerhof on the big screen. Other topics were incorporated into the research programs – ranging from the nutritional



The targeted use of the new fertilizers measurably increased agricultural yields after the First World War



Oat plants in a nitrogen fertilizer trial with Limburgerhof soil, 1919. N-fertilizer: pot 52: 0 g N; pots 58-70: 0.2 g N; pots 73-79: 0.5 g N

physiology of plants, to the humus status of the soil, to bacteriological and enzymatic matters. BASF built new laboratory and farm buildings in Limburgerhof to handle the heavier research workload. The staff at the research station looked to the future with confidence, and rightly so, because purchasing power in agriculture grew until the mid-1920s and fertilizer sales rose.

A black and white aerial photograph showing the extensive destruction of the BASF industrial complex in Oppau, Germany, following a massive explosion in 1921. The image captures a vast landscape of rubble, with several tall, dark smokestacks standing amidst the wreckage. In the foreground, a large, dark, circular crater is visible, surrounded by debris and twisted metal. The background shows a river and some remaining industrial structures, highlighting the scale of the disaster.

In ruins and ashes – the disaster in Oppau

One of the worst disasters in industrial history devastated BASF in 1921. On the morning of September 21, a fertilizer silo exploded in Oppau. A total of **561 people died** and large sections of the **factories** and nearby **residential buildings** were **destroyed** or damaged. “The very substance intended to provide food and life to millions of our countrymen has suddenly become a cruel enemy,” said Carl Bosch at the memorial service.

Nitrophoska milestone – the world’s first fertilizer with a complete variety of nutrients

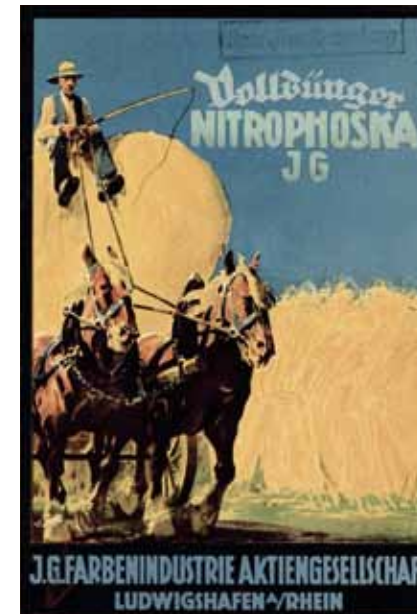
The business with individual nutrients in fertilizers was strong and experiments with combinations had been conducted. What was missing was a fertilizer that combined the three main nutrients: nitrogen, phosphate and potassium. But in what proportions did the individual substances work best? And what was the optimal combination?

In 1924, Limburgerhof began testing compound fertilizers, in some cases supplemented with calcium. A major series of experiments studied the effects of various nutrient combinations on the main crops in different soils. The result of this research in 1926 was Nitrophoska, named after the three main components nitrogen, phosphate and potassium (in German, potassium is called “Kalium”).

The Agricultural Research Station achieved a major breakthrough in just two years with Nitrophoska. The fertilizer was homogeneous, meaning that the individual nutrients were chemically bound rather than mechanically mixed, with each grain of fertilizer containing the various components in the same ratio.

Nitrophoska was immediately received with enthusiastic support when it came on the market in 1927. The new combination of nitrogen, phosphate and potassium was more stable, and the nutrient content greater than that of conventional mixtures. Nitrophoska met farmers’ demands for an affordable and easy-to-use fertilizer.

Thirteen years after being founded, Limburgerhof had more than met its objective of proving the effectiveness of synthetic nitrogen fertilizer. Nitrophoska was the first product to be developed in different varieties, and it became the starting point for BASF’s success in fertilizer production.



Early advertising posters and brochures for the new compound fertilizer

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



Gottfried Schüle knows Limburgerhof like the back of his hand. His family has deep roots here, and he grew up near the research station. He gained his first professional experience at the Rehütte Farm Estate in a career that eventually took him from Limburgerhof into the wide world.

Gottfried Schüle's family has had a passion for agriculture for generations. His father Richard grew up on the family vegetable farm in Hassloch, not far from Limburgerhof. Richard studied international agriculture in Weihenstephan and wrote his doctoral thesis on specialty crops. He brought this expertise to Limburgerhof, where he worked from 1955 to 1988, spending a total of 33 years at BASF. He successfully achieved his professional dream – to grow and learn in a large international company.



Josef Ertl on his visit to the Research Station Limburgerhof

Father Richard and son Gottfried Schüle, in the early 1960s (image on the left)

From Limburgerhof into the wide world – like father, like son

Richard Schüle's first stop was in the sales department, including technical advisory services in Germany. He gathered valuable experience in his daily contact with farmers and later, as a product manager for fungicides, he put this experience to use in the global development of new crop protection products for grains. His passion for everything related to agriculture was also evident in his later position as head of the public relations department in Limburgerhof. He not only managed to bring Josef Ertl – then Minister for Food, Agriculture and Forestry – to the research station on a public visit, but later he also hosted Ertl's successor, Ignaz Kiechle, at Limburgerhof for an informational tour.

"My father experienced the radical changes in German agriculture first-hand – the increasing mechanization and the use of the first chemical crop protection products," Gottfried Schüle recalls. "I also had a close-up view of what was happening at Limburgerhof and later had a similar experience in China." As the youngest of five children, he often brought his father's lunchbox to him at work, and he always felt very welcome at the research station. After graduating from high school, he completed an apprenticeship at the Rehütte Farm Estate before studying agriculture in Kassel/Witzenhausen. Like his father before him, he was also fascinated by the agricultural structures of distant lands, so he focused his studies on tropical and subtropical agriculture. And, naturally, he began his professional career in Limburgerhof in 1985.

Just a year later, Gottfried Schüle was sent to Taiwan to learn Chinese. Shortly thereafter, he was delegated to Hong Kong to set up BASF's Crop Protection business in China. The first steps were difficult, and laying the foundation in China required his total commitment. "Travel was generally hard and required a lot of permits. I was often traveling for a week or more before getting to my destination," he recalls. Local communication also

presented a real challenge to everyone involved. Schüle describes the communications methods used at the time: "Our handwritten correspondence often took days to arrive. So we used the now nearly forgotten telex and a numerical code – similar to Morse code – to laboriously translate the texts into Chinese. We didn't get a fax machine until the 1990s."

His stations in China included working in the province of Heilongjiang, the breadbasket of China with its huge state farms, in the northeast of the vast country. Like his father's efforts in Germany in the 1950s and 60s, Gottfried Schüle carried out groundbreaking work here from 1987 to 1990. He advanced the modernization of agriculture with the introduction of new crop protection products, such as growth regulators. "There was nobody else there to make the decisions; you had to do it yourself," says Schüle about his uncertain but exciting times in China. He finished off his time in Asia with a posting to Hong Kong from 1995 to 1997. Here he witnessed Britain's handover of Hong Kong to China. "It was an unforgettable highlight for me to be able to experience this historic event live," remembers Schüle fondly.

Accompanied by his wife Claudia, he had numerous other foreign postings in Latin

America from 1995 onward, before the Schüle family returned to Limburgerhof in 2003. The research station has now changed considerably from the one he remembers from his youth. "It's less like a family today, but the global nature of the business has made it much more cosmopolitan and multicultural," a feature that he himself has contributed to. The couple's two children, Marius and Eva, have grown

up bilingual, speaking German and Spanish, and they already have a sense of cultural differences and distinctions. Gottfried Schüle always encourages young people to gain professional experience in foreign countries. "When you're abroad, you can go your own way, and BASF has always offered the ideal platform for an international career."



Gottfried Schüle: from Limburgerhof into the wide world

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014

1927 – 1948

From fertilizers to crop protection

The findings at the **Research Station Limburgerhof** impressively demonstrate that **yields** can be **increased** with the use of **mineral fertilizers**. At the site, new technologies and facilities enable scientists to undertake research in **plant breeding** and initial studies with active ingredients for **crop protection**. With the increasing influence of the National Socialist dictatorship, Limburgerhof also begins preparing for a “**production battle**.” Even BASF, as part of I.G. Farben, cannot help achieve the “Autarkie” (self-sufficiency) in food production the regime is striving for. At **zero hour** after the war, the Research Station Limburgerhof faces an **uncertain new beginning with new areas of research**.

History

In 1928, **Alexander Fleming** discovers **penicillin** by accident as a natural product of the fungus *Penicillium chrysogenum*.

On October 24, 1929, the **New York Stock Exchange** crashes. The world quickly descends into a dramatic **economic crisis**.

In 1929, **Marlene Dietrich** sings "**Falling in love again.**"

Mahatma Gandhi's Salt March in 1930 will lead to the independence of India 17 years later.

The **Olympic Games in Berlin** set a new record with 49 participating nations and 3,961 athletes. The Games are used by the ruling National Socialists as a forum for propaganda. **Jesse Owens** is the most successful athlete of the Games, winning four gold medals.

On May 6, 1937, the **Hindenburg**, the largest airship ever, is engulfed in flames while landing at Lakehurst in the United States.

On December 17, 1938, **Otto Hahn** discovers nuclear fission of the uranium atom, the scientific and technological basis for the use of nuclear energy.

From 1939 to 1945, the **Second World War** and its consequences plunge millions of people around the world into misery.

Three years after the last entry, **the diary of Anne Frank** is published in 1947.



1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



*Greenhouses and test fields made
it possible to test various crops*

Research creates success – yields increase exponentially

With Nitrophoska, Limburgerhof had proved that sound testing can make breakthroughs in fertilizer possible. The compound fertilizer was a milestone for the research station and for agriculture, as it also put concerns about mineral fertilizers to rest.

The success of Nitrophoska strengthened the position of Limburgerhof in I.G. Farben, under which BASF and other major German chemical companies had joined forces in 1925. The ammonia laboratory in Oppau and the research station were given the key task of further researching and optimizing nitrogen fertilizer; the Group invested in research and development.

In the fall of 1927, construction began on a lysimeter plant, which to this day is one of the oldest and largest in Europe. Now, it was possible for Limburgerhof to determine how substances move through the soil and how nutrients can be lost. The site for field testing was expanded to 16 hectares, and the number of employees rose. Research turned to new crops and climates: The tropical greenhouse was greatly expanded in 1926 and was now suitable for tropical and subtropical plants, ranging from sugar cane and rice to bananas and cotton.

However, the main interest remained focused on domestic agriculture. The research team studied the best storage conditions and optimized the physical properties for standard fertilizers, such as calcium nitrate, sodium nitrate, calcium ammonium nitrate (“Rieselkorn”) and Nitrophoska. The full potential of the products could only be realized when the right combination of granulation, solubility and spreadability was achieved. Since fertilizers were still spread by hand at that time, they could not be slippery or too dusty, yet still had to be easily soluble.

In 1927, long-term field tests began in Limburgerhof on barley, rye, oats, wheat and corn (maize), as well as sugar beets, tobacco, garden vegetables and field vegetables. The key questions included: How much does fertilizer increase yields exactly? How much nitrogen is needed, in which composition and at what time it should be used? Working closely with the advisory centers, the researchers in Limburgerhof improved the fertilizers’ performance. Farmers and advisors exchanged information from test results and practical experience. After a few years, the research station presented impressive results. Yields increased by up to 70 percent when phosphoric acid and potash were supplemented with the targeted use of nitrogen.

The use of fertilizers always paid off, even if the increases were greater for some types of grain than for potatoes, and likewise for sandy soil compared to heavy clay soil.



In the lysimeter plant, leachate was collected in vessels and then analyzed

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



New fields of research – crop protection and seed breeding

Inspired by the success of fertilizers, the research station expanded its work. How does fertilization affect the quality of the harvest? And what is its impact on pests and diseases?

Protecting plants from pests and diseases was a major challenge for farmers. Harmful insects, fungal diseases and especially weeds could destroy entire harvests, making fertilization futile. Since 1922, researchers in Limburgerhof had studied different substances for possible use in crop protection. But in this area, other divisions within I.G. Farben were in the lead and already had products on the market that they continued to refine. Company management therefore decided that in the area of crop protection, Limburgerhof should limit itself to preliminary tests and general research.

The research station focused on fertilizer research, since products such as Nitrophoska were selling very well. Limburgerhof enjoyed the trust of farmers and scientists. They visited the nitrogen plant in Oppau annually by the thousands and then went to the research station to get the latest information direct from the source. Given the high level of expertise there, it was only natural to address other

issues relating to agricultural production. For example, in the early 1930s, the research station studied soil biology and plant physiology. The establishment of the storage test facility in 1933 provided new insights into silage. The year 1935 saw the first breeding of cover crops, such as Lihonova, a cross between rapeseed and kale, as well as Lihoraps and Lihoroggen – products which ultimately succeeded in the market after the war. Paul Pehl, the director of new seed cultivation in Limburgerhof since 1935, received the Federal Cross of Merit in 1968 for these achievements. However, the focus remained on fertilization, which was seen as the surest way to increase yields.

Copper and sulfur to control insects and fungi?

Were substances such as arsenic and sulfur, which were produced in Ludwigshafen, suitable for crop protection? Since the early 1920s, researchers in Limburgerhof had studied the **insecticidal** and **fungicidal effects** of these substances as well as those containing copper. The search was painstaking; many applications failed to work, “were not suitable as controls” or “caused damage to plants.” There was no major breakthrough, but the **groundwork for further research** had been laid.



In the laboratory, researchers studied whether substances exhibited the expected insecticidal or fungicidal effects

1914 – 1927

1927 – 1948

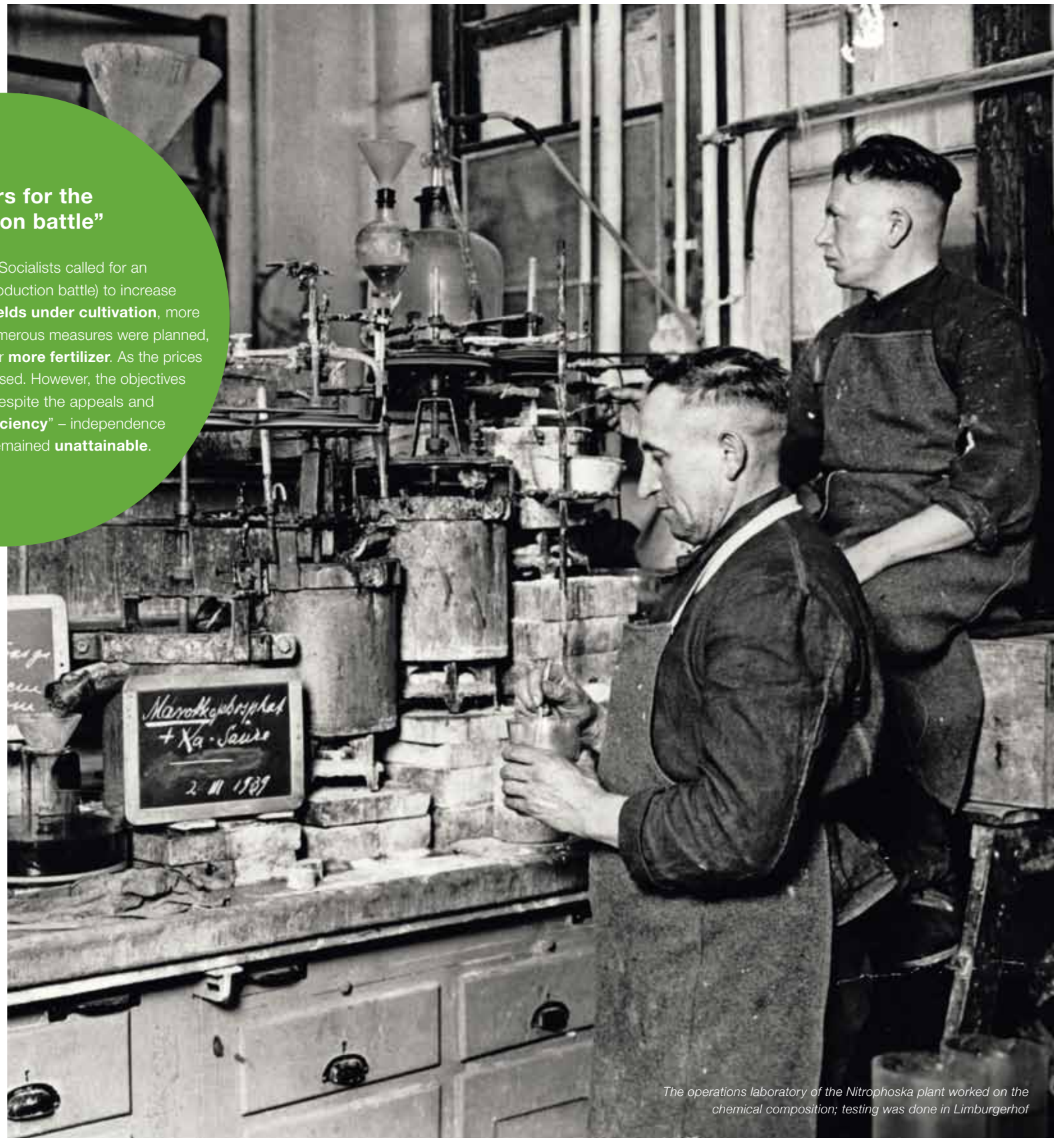
1948 – 1966

1966 – 1996

1996 – 2014

Fertilizers for the “production battle”

In 1934, the National Socialists called for an “Erzeugungsschlacht” (production battle) to increase **food production**. **Larger fields under cultivation**, more **loans** and **better advice** – numerous measures were planned, and the program also called for **more fertilizer**. As the prices of fertilizer fell, its use increased. However, the objectives were too ambitious; despite the appeals and propaganda, “**self-sufficiency**” – independence from food imports – remained **unattainable**.



The operations laboratory of the Nitrophoska plant worked on the chemical composition; testing was done in Limburgerhof

In the service of the war economy – increasing yields for self-sufficiency

The focus of research at Limburgerhof was determined by the requirements of National Socialist agricultural policy. Since taking power in 1933, and increasingly since the first four-year plan was launched in 1936, the Nazi regime called for a “production battle.” The goal was the greatest possible “self-sufficiency,” which also included food production.

The theory was that Germany should produce its own food in order to save foreign currency reserves and to be able to provide food to the German people during the planned war of conquest. In fact, in many areas, the program remained nothing more than a call to action, as defense activities took precedence over agriculture, and the goal of self-sufficiency was unattainable. Mineral fertilizers were, however, exempt from sales tax, so their prices fell sharply. This convinced many farmers to finally use straight nitrogen fertilizers, Nitrophoska and other fertilizers. The consumption of mineral fertilizers doubled in Germany between 1932/33 and 1937/38. There was no longer any question about the benefits, especially with nitrogen. Consumption reached a peak of 718,000 metric tons in the 1938/39 financial year.

The agricultural department, which included the administration of the Limburgerhof property and 21 advisory centers in addition to the research station, experienced a boom and by 1939 had about 400 employees. In addition to 10 academics carrying out the scientific work, the research station had 28 administrative employees and nearly 120 workers in the greenhouses and fields. Research activities received funding from the state, and the results were published by the Research Service (“Forschungsdienst”) of the National Socialist institution for the agricultural sciences. As with the I.G. Farben Group as a whole, Limburgerhof was also integrated into the National Socialist system. In a publication celebrating its 25th anniversary in 1939, the research station emphasized its role “in the great labor front of German agricultural science.” The research station recognized its duty to “aid the work of German farmers which is so vital for our people.”

The beginning of the Second World War on September 1, 1939, posed threats to production similar to those in the First World War because nitrogen was needed not only for fertilizer but also for explosives. But the Nazi regime also considered the food supply important. Carl Krauch, an

executive at I.G. Farben and an administrator in the implementation of the Nazis’ four-year plan, announced in 1940 that the company would continue to supply German farmers with nitrogen, “this nutrient so vital to crops.” Around 150 employees continued their work at the research station, initially without major restrictions. Women replaced the 60 workers who had been drafted into military service. Between 1940 and 1944, at least 33 prisoners of war and civilian forced laborers were used. In addition to Poles, there were also Ukrainians and Russian prisoners of war.

Since the research station promised immediate benefits for German agriculture, its work was allowed to continue. However, the focus changed. The work was exclusively application-oriented and increasingly aimed at improving harvest yields and quality; less emphasis was placed on basic research on micronutrients and soil issues.

Promotional posters for Nitrophoska from the late 1930s. The designs targeted “Heimstätteniedler” (homestead settlers)

Towards the end of the war, concerns about the future grew. What would become of the research station after the war? Would it be assigned new tasks or would it be closed as part of I.G. Farben? In March 1945, American troops initially took over the plant in Ludwigshafen, before French soldiers arrived in July 1945.

It was still unclear whether the occupiers would weaken the factories or continue to operate them. In Limburgerhof, rumors were already circulating that the research station was to be closed or transformed into an independent agricultural institute.



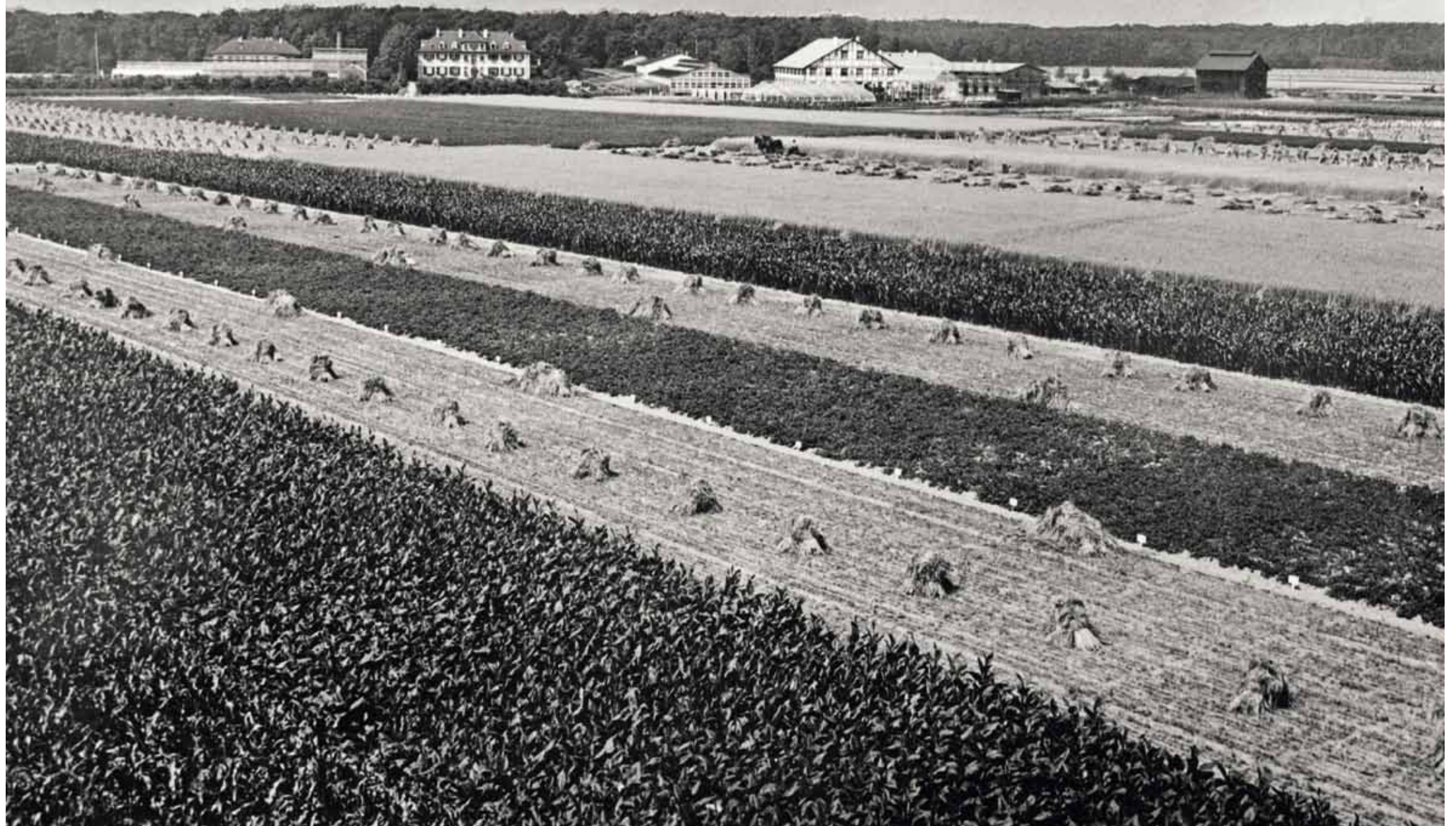
1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



Between hope and fear – the future of the research station

Managers at the research station took the initiative to keep the operation in Limburgerhof running. One thing was certain: The development of fertilizers had reached its limits.

In order to achieve higher yields in Germany, more effective crop protection was needed, especially for weed control. This was evident to every farmer and agricultural scientist: The grain fields of Germany were full of weeds after the war. Limburgerhof had stayed in close contact with farmers through its advisory centers and knew their expectations. But how could products for commercial sale be created? Every possible idea was considered, even some fairly absurd ones. For example, one could test the countless chemical compounds whose formulas sat in the filing cabinets of the I.G. Farben chemical plants, and suitable substances for crop protection would surely be found eventually. But a workable solution was much closer.

In 1946, an article entitled “Kobolde im Garten” in a popular magazine mentioned the substance 2,4-D (2,4-dichlorophenoxyacetic acid). It had been used in England and the United States as a herbicide, but it was later withdrawn due to numerous

complaints. The principle behind the substance was very well known in Limburgerhof. Its properties acted selectively, boosting the growth of some plants and damaging others. This was the key to the effective control of weeds. Researchers in Limburgerhof risked everything on this one product and began experiments with this substance in the fall of 1946. The first task was to determine the optimal dosage

and its spectrum of action. A free greenhouse at the research station was quickly found, but the substance itself presented difficulties. The laboratory could produce small amounts, but for large trials it needed considerably greater quantities. The necessary phenol component was particularly scarce and could only be obtained through barter. In addition, in fall and winter 1946, there were no test

plants for the various cereal weeds and their cultivation proved “extremely difficult,” as employees later recalled. In this situation, the network of advisory centers proved its value. They provided threshing waste containing the seeds of the weeds, and they selected around 100 farmers who each received 100 grams of the substance, an instruction manual and a questionnaire. The response was over-

whelming: The farmers were impressed by the herbicidal effects and the scientists confirmed their experiences with a wide range of experimental results.



Greenhouses – built for fertilizer research – were used for herbicide testing immediately after the war



Harvesting fodder mustard in the nursery garden

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



“Weed-free fields” – the breakthrough in crop protection

After all the successful tests, it was hoped that production and distribution could start right away. The only thing missing at this point was an official approval, which was very difficult to obtain in the chaos of the post-war years.

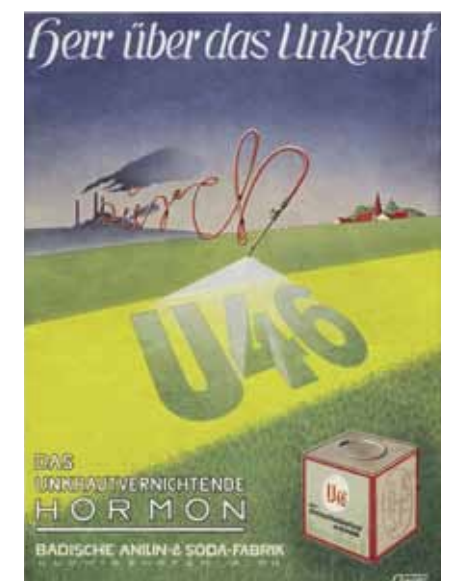
The Central Institute for Biological Agriculture and Forestry in Braunschweig, a forerunner of the Federal Biological Research Center for Agriculture and Forestry, established in 1950, offered only a provisional permit and it seemed that the long path to an official application would be too much of a burden. Dr. Herbert Stummeyer, the director of crop protection testing, immediately traveled to Braunschweig. Since he had no actual research findings, he presented the questionnaires returned by the farmers. The practical responses of the farmers won over the director of the chemical inspection authority. Because

there was not enough time to decide on a name, the working name of U 46 was retained (an abbreviation of the year 1946 and “Unkrautmittel,” the German word for herbicide). Official registration was finally granted at the very end of 1947. A leaflet for the new herbicide had already been printed and the registration certificate was quickly added. Sales of U 46 began in the late 1940s.

With U 46, the Agricultural Research Station now had a second pillar in addition to fertilizer: chemical crop protection products. U 46 was just as big of a break-

through for Limburgerhof as Nitrophoska. The research station probably survived the uncertain post-war period only because it managed to bring this product to market. For farmers, the product was a dream come true. The tedious and not particularly effective mechanical control of weeds could soon be a thing of the past. Instead, weeds would be controlled chemically. “A spray in May rids a thousand fields of weeds,” promised an advertising slogan. The herbicide U 46 was a milestone on the way to a more intensive approach to agriculture.

*Weed control:
BASF's first important crop protection
product revolutionized agriculture*



1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



You wouldn't think so from looking at her, but Brigitte Johannes has 75 years of BASF experience – of course that figure includes the more than 40-year career of her husband Helmut. She worked at BASF from 1975 to 2009 – a total of nearly 35 years. She is proud that her son Alexander has followed in her footsteps in the Crop Protection division and is continuing the BASF family tradition.

In early 1975, Brigitte Johannes – just like her husband before her – started working at BASF, as a secretary in the newly established Environmental Protection – Air Emissions Monitoring department. She gained her first professional experience in this forward-looking department and then, in 1976, she switched to Special Transactions in sales, from which the Eastern Europe regional department was created in 1980. After 10 years working in various assistant roles, 1984 brought a new challenge for her – her son Alexander was born in August of that year. The latest addition to the family was “molded” early on because his parents’ jobs and their BASF colleagues were often the topic of conversation at dinner.



The mother looks back, her son ahead: Brigitte and Alexander Johannes on their time in Limburgerhof

Growing up with BASF: Alexander and his parents on his first day of school (top left image)

Alexander Johannes now works on web-based solutions for farmers and agricultural experts around the world (lower left image)

Generational change in Limburgerhof – a BASF family

Brigitte Johannes returned to work soon after the birth of her son. This was not a given at the time because the demand for part-time jobs was far higher than the supply. Brigitte Johannes' application was no. 1,600 in the entire company. But she was given a chance to work half-days in the Eastern Europe regional department, a unit that was primarily responsible for the agricultural sector.

The many changes also reflected the upheavals that the countries of Eastern Europe were going through at the time. Brigitte Johannes remembers some uncertain and probably even risky business experiences during the Cold War, and in the period immediately thereafter. The foundational work of Brigitte Johannes' department proved to be key in developing the Eastern European market, with its large farms, into one of the most successful agricultural markets for BASF worldwide.

Another fundamental change Brigitte Johannes experienced came with the technological advances in her office. "At first we worked with steno pads, telex and 'golf-ball' typewriters. Letters to the Board at that time were often edited for days until they were error-free," she remembers with a shake of her head.

New electronic media sped up work significantly but had other pitfalls. She recalls an anecdote, one of many, from her days in the office: "A colleague from Kazakhstan always worked very fast. She was supposed to write an email for her boss that was going out to a large distribution list, and he was supposed to approve it before it went out. Just as she was hitting the 'send' button, he came to the door, wanting to make some changes. She was horrified and ran behind her desk, pulling all the plugs, hoping to stop the email before it went out. That story still makes us laugh." She always enjoyed dealing with international colleagues. "I made a lot of friends and some colleagues have become like members of my own family."

If colleagues have become part of the family, it is no surprise the family itself produces new colleagues. Her son Alexander developed an early interest in his mother's department: "Alexander always asked a lot of questions and was very eager to find out what his parents did at BASF. When he turned four, I brought him into the office now and then." This was obviously a formative experience for little Alexander, who would later join BASF as a young adult. Even before starting his business studies in Mannheim, where he received his degree in the spring of 2005,

he gained experience as an intern in BASF's HR department. During an internship abroad with BASF in Prague in 2007 and his subsequent thesis on marketing in Limburgerhof in 2010, the student decided that he would eventually like to start his career at BASF in the Crop Protection division. After graduating, he submitted just three applications – all for jobs at BASF. The very first one was successful. A year after his mother left the Agricultural Center Limburgerhof in September 2009, Alexander Johannes continued his family's history at BASF in Global Sustainability & Product Stewardship.

Like his mother, he also appreciates the close relationship he has with his colleagues. The Johannes family has connections with many colleagues that go beyond work. In 2013, Alexander Johannes celebrated his wedding with his family – including, of course, many of his colleagues at BASF.



The agriculture business has certainly evolved, but office work has also dramatically changed over the past few decades

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014

1948 – 1966

Agriculture during the “economic miracle”

The success of **U 46 serves as the basis** for the growth of the Agricultural Research Station. Increasing **mechanization** has been changing **agriculture** fundamentally since the 1950s. With the end of the I.G. Farben era, Limburgerhof reaches a **new level of prosperity** under the umbrella of the “**new**” **BASF**. With the **fungicide Polyram®** and the **herbicide Pyramin®**, key **milestones of crop protection** come on the market. The continuous transformation of agricultural production and the **internationalization of markets** create challenges in all business areas for the researchers in Limburgerhof.



History

After the **currency reform** on June 20, 1948, the West Germans now have the **deutschmark** in their hands, but initially only the 40 deutschmark “allowance.”

The **Nuremberg trials** end in April 1949. That same year, the **Federal Republic of Germany** and the **German Democratic Republic** are established.

In June 1950, the ARD (German public television broadcaster) is established. The **Tagesschau** news program is **broadcast** for the **first time** in December 1952.

In 1954, **Helmut Rahn’s** goal lifts **Germany** to a 3-2 victory against Hungary, giving the country its **first World Cup championship in soccer**.

In 1960, the **Beatles**, still an unknown band, play their **first concert** in Hamburg.

On April 12, 1961, the Soviet cosmonaut **Yuri Gagarin** becomes the **first human in space**.

On August 13, 1961, construction of the **Berlin Wall** begins.

“**I have a dream.**” **Martin Luther King’s** most famous words are delivered in 1963 and become the embodiment of the **U.S. civil rights movement**.

U.S. President **John F. Kennedy** is **assassinated** in Dallas on November 22, 1963.

England wins the 1966 **World Cup championship in soccer** with a 4-2 victory against Germany.



1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014

AUS DER BIOLOGIE
DER BLATTLÄUSE

**KLEINE
LAUS
GANZ
GROSS**

EIN FILM

DER LANDWIRTSCHAFTLICHEN VERSUCHSSTATION LIMBURGERHOF

Badische Anilin- & Soda-Fabrik A.G.

LUDWIGSHAFEN A. RHEIN

“Little aphids up close”

Films like “Little aphids up close” provided farmers with information about crop protection products from BASF. It was followed by “Potato concerns – Potato blessings” and “Strong stalks – heavy ears of grain.” Most of these films were directed by **Svend Noldan** (1893-1978), one of the most controversial figures in German film history. In the 1920s, he was deeply involved in the Berlin avant-garde scene surrounding George Grosz, later he made propaganda films for the National Socialists. His **industrial films** for BASF in the 1950s received honors such as the **German Film Award**.

Schnell u. sicher



PERFEKTAN

gegen die Schadinsekten in Feld, Hof und Garten

From active ingredient to product family – the success of U 46

U 46 arrived on the market at just the right moment. German agriculture was in good shape after the currency reform of June 20, 1948, and the stabilization of the West German economy. The prices for agricultural products were high, and spending on fertilizer and crop protection provided immediate returns.

I.G. Farben had a large portfolio under the BASF brand, ranging from nitrogen fertilizers to Nitrophoska to cover crop seeds such as Lihoraps and Lihoroggen. Everything in Limburgerhof was continuously reviewed and refined; expertise expanded in the area of applications, effects and interactions. The journal “Kurzt und bündig” (“Brief and Concise”) began providing information to farmers in 1947; “Ratschläge für den Bauernhof” (“Advice for the Farm”) was launched in 1949 and publications for advisors were later added. A new agricultural advisory office was formed in Munich in 1948, and it served as a prelude to the founding of additional offices. Limburgerhof itself received thousands of visitors each year. But the employees of the research station were not satisfied with the success of the highly-effective herbicide U 46, and they continued to forge ahead in their research. Although weeds were

considered a major problem, pests such as the Colorado potato beetle and fungal infestations also caused a lot of trouble for farmers. While the launch of U 46 went relatively quickly thanks to a lot of research skill and a little luck, researchers from Limburgerhof found the going more difficult with regard to insecticides and fungicides. For this reason, they first relied on existing research and well-known products.

The fungicide Kumulus®, a refinement of the first sulfur products from the 1920s, came on the market in 1950. It is still used today in both organic and conventional farming to treat powdery mildew on fruit and vegetable crops. Later the same year, the insecticide Perfektan was launched.

The key product in the range remained U 46. It quickly gained a legendary reputation, but some farmers were unable to use it. Some lacked the technical equipment to use the product, while others were battling particularly stubborn weeds such as cleavers, chickweed or woody species on which U 46 had no effect.

The research station took on these problems and, in a few years, had developed a whole family of U 46 products to meet various needs. By 1964, a range of products around U 46 had been created on the basis of research at Limburgerhof. These products provided solutions for all common weed problems in grain fields and grassland.



U 46, Kumulus® and Perfektan: the “new” range of crop protection products in the 1950s



A solution for every type of weed: the full range of the U 46 product family in 1964



Field tests impressively demonstrated the effectiveness of U 46

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



Benefits and side effects – research and progress in crop protection

There were no doubts about the effectiveness of the U 46 products, but farmers sometimes raised concerns about unwanted side effects. These were mostly the result of improperly applying the products. For example, if farmers used a herbicide at the wrong time, it damaged not only the weeds, but the crop as well.

Intensive advisory services remained essential to ensure that crop protection products were applied correctly. Research expanded to include new active ingredients, such as organic compounds that could be better tolerated by the crops. This resulted in the 1953 market launch of Lutiram® (thiram), an organic fungicide for grapes. Unlike its copper-based predecessors, when Lutiram® was used to

treat vines, the foliage remained fresh and healthy, meaning that the grapes ripened better and produced higher yields. The research station had much to do: How could crop protection products be effective but, at the same time, also as compatible as possible? And what was the best way to combine fertilizer and crop protection? The nearly 200 employees in Limburgerhof sought answers to these and similar

questions in the mid-1950s. The ongoing research in fertilizers might have yielded less spectacular results than in crop protection, but it remained highly significant due to the sales volumes. The range of studies conducted were more in-depth. How and in what combination does nitrogen fertilizer act on potatoes, sugar beets, fruits or grassland? What impact do soil type and weather conditions have?

Limburgerhof reported the findings in the advisory centers and in its publications. The use of fertilizers increased in the 1950s, not least because the favorable price-performance ratio made them worthwhile for the German farmer.



The extensive testing site offered groups of visitors a wide variety of things to see in the areas of fertilization, crop protection and plant breeding



New products, new machines: The 1950s and 1960s witnessed a profound transformation in crop protection

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



Growth under the umbrella of the "new" BASF: impressive crop yields in the greenhouse



Even today, seedlings are still thinned and planted by hand

Under the umbrella of the “new” BASF – on the road to modern agriculture

While crop protection products and fertilizers were being further refined in Limburgerhof, the I.G. Farben era came to an end in Ludwigshafen. On February 5, 1952, the “new” BASF was entered in the commercial register, and on March 28, 1953, French soldiers removed the French flag from the Ludwigshafen site.

All signs pointed toward further growth for the company, and the agricultural department was expected to play a significant role. In 1954, BASF generated nearly a quarter of its total sales of 1 billion deutschmarks with fertilizers and crop protection products. The products developed in Limburgerhof were an integral part of improving the efficiency of West German agriculture.

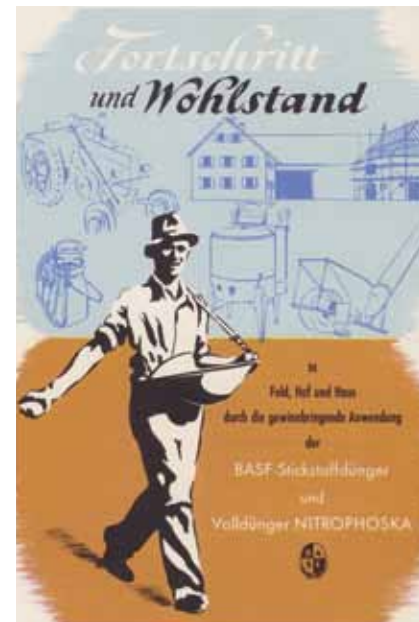
The structural change after the Second World War fundamentally altered the way farmers worked. Cultivated fields grew larger and more agricultural technology made farming more efficient, resulting in the loss of some jobs. And this trend accelerated as the “economic miracle” gathered steam in the 1950s. More and more workers moved to industrial jobs and the number of people employed

in agriculture fell from around 5 million to 3 million. Nevertheless, production rose sharply, mainly through the use of machinery, fertilizers and crop protection. Farmers were positively euphoric about the progress. Between 1948 and 1960, the number of tractors increased tenfold to 900,000, and the use of combine harvesters and milking machines became widespread. Technical innovations and agrochemicals made the difficult everyday lives of agricultural workers easier, and yields and incomes rose. In this environment, excesses were inevitable. Especially when they applied fertilizers, farmers sometimes went by the motto “more is better,” even if the additional nutrients were of almost no use.

After the great success of the herbicide U 46 since the late 1940s, Limburgerhof had been looking for a fungicide that could be more widely used. In 1956, Polyram® (metiram) came on the market, followed in 1957 by Polyram® Kombi (metiram and zineb), a contact fungicide with even better efficacy. Polyram® Kombi was a milestone in BASF’s Crop Protection product range; Polyram® WG, with a modified formulation, is still on the market today and has proved its worth in a variety of crops, from fruits and vegetables to vineyards.

BASF’s agricultural products led the company to a new era of prosperity. By 1958, the company’s total sales had risen to 2 billion deutschmarks, with fertilizers and crop protection still contributing more than 20 percent.

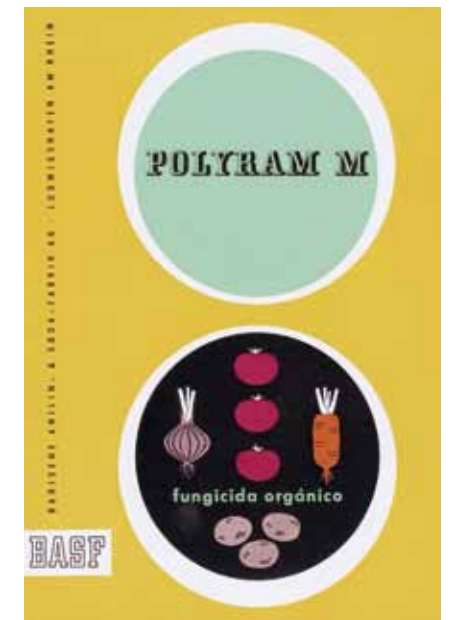
At the beginning of the 1960s, BASF was the second-largest manufacturer of crop protection products in West Germany, due



Advertising in the 1950s: Fertilizer and machinery lead to higher yields and prosperity

to its effective products and its strong advisory services. In Limburgerhof and at eight other advisory centers, farmers could receive information on product use, an offer that continued to draw thousands every year. The advisory services helped established BASF’s products in agriculture, and the company maintained its leading position.

Studies in Limburgerhof showed that fertilizers and crop protection products fortuitously complemented each other. “Sufficient and balanced fertilizer use ‘creates’ high yields and timely crop protection ‘ensures’ them.” But new challenges also arose from these modern agricultural practices. For example, the application of high levels of nitrogen made cereals grow taller with higher plant density. This sometimes severely affected the stability of the cereals; the stems of some varieties could no longer support the heavier ears, and the plants then tended to bow. This process not only endangered crop yields and quality, it also made it difficult or even impossible to use the new combine harvesters on such crops. Moreover, there was the risk of late fungal infection and outgrowth. Limburgerhof was now faced with issues far beyond the control of weeds.



Potatoes, carrots, beets – Polyram® works on many crops

Crop management, including crop protection, had to adapt to modern agriculture’s needs, especially how to manage higher yields.

1914 – 1927

1927 – 1948

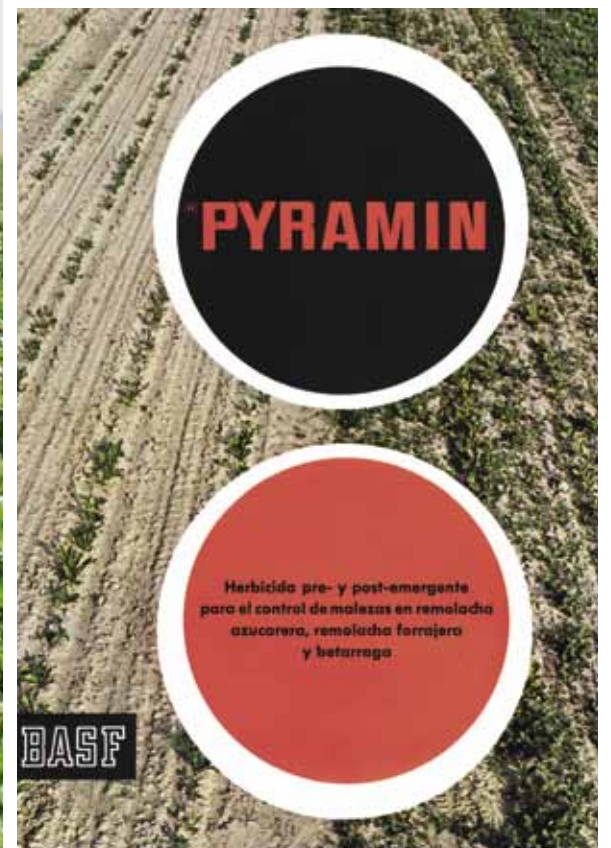
1948 – 1966

1966 – 1996

1996 – 2014

Services for beet cultivation in Europe

Dr. Adolf Fischer, Director of BASF's herbicide research and "**inventor**" of **Pyramin**[®], was awarded the honor "**Officier du Mérite Agricole**" in 1964 by the French Minister of Agriculture. "The greatest joy for everyone who contributed to its development," Fischer said in his acceptance speech, "would be for Pyramin[®] to continue to prove its worth in practice and for it to **help** many **farmers** around the world in their hard **work**."



More than just weed control – ideas for agriculture in transition

The employees of Limburgerhof were experts when it came to cereals. They had put many years of research into plant physiology and the development of U 46, which was used mainly on cereals. But what could be the solution for ears that were too heavy or for broken stems? In the United States, growth regulators were being used to maintain public green spaces. Could that work on cereals, too?

Particularly Chlormequat chloride seemed promising and was successfully tested in field trials in Limburgerhof, starting in 1962, under the working name WR 62 (an abbreviation of the year 1962 and “Wachstumsregulator,” the German word for growth regulator). In 1964, BASF filed its first patent for a growth regulator, initially as a fertilizer, under the name Cycocel®. The product was launched in 1966.

BASF sought to broaden its range of products in crop protection. The decision was made to acquire a patent in order to add an effective insecticide to its products for weed and fungal control. When the U.S.-based American Cyanamid Company withdrew the active ingredient dimethoate, BASF launched it on the market in 1962 under the trade name Perfekthion®.

However, as with the first fungicides, this product served merely to round out the range because, starting with U 46, the company’s core competence – and the greatest potential – remained in herbicides.

A particular challenge for agriculture presented itself directly at Limburgerhof’s gates. Thanks in part to government support, sugar beet cultivation was extremely profitable, but many farmers were unable to grow the crop due to a labor shortage. The entire sugar beet industry desperately wanted a “chemical hoe.” Biologists doubted, however, that it was possible to develop a herbicide that controlled weeds without harming the sugar beet plants, which were fairly close biological relatives. Since researchers in Limburgerhof were mostly in the dark with regard to “the relationship between chemical constitution and biological effectiveness,” the only possible approach was the laborious testing of many substances. The main laboratory in Ludwigshafen was on to something with pyridazones. But 100,000 hours of research were needed to create a market-ready product. By 1964, the time had finally arrived: Pyramin® (chloridazon) became the first selectively-acting herbicide on the market for sugar beets. Pyramin® was like a revolution in beet cultivation. Many farmers who

had thought about giving up on growing beets were able to continue. BASF’s new herbicide had solved a pressing agricultural problem and given a decisive boost to farmers. And, not least, Pyramin® was a great commercial success, which also benefitted Limburgerhof. BASF continued to invest and strengthen the agricultural division. In the mid-1960s, the research station struck out in new directions. Breakthrough herbicides such as Pyramin® were not just popular in Germany,

they were also selling well in many other European countries. Limburgerhof’s research had paved the way for BASF’s business in crop protection to move into international markets.

In just 20 years, the division, which was created after the war as a complement to the fertilizer portfolio, had taken a major step forward. And Limburgerhof was well on its way to developing additional solutions to the challenges faced by farmers worldwide.



Cereals treated with Cycocel® (right) showed a significantly lower tendency to lodge than the untreated control plot (left) – an important step forward for yield-focused agriculture

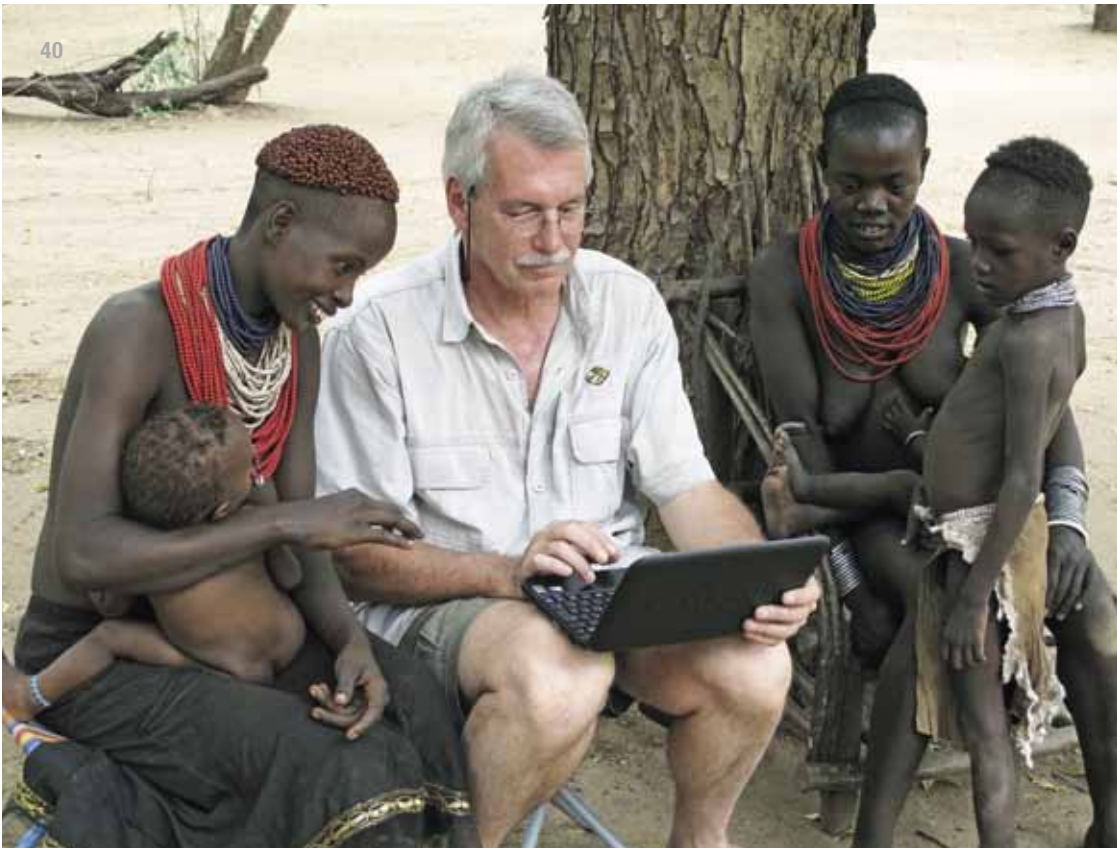
1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



In 1905, Kurt Sthamer of Hamburg decides to emigrate to German East Africa (Tanganyika, now Tanzania). He has no idea at this time that he is laying the foundation for an international family history, which decades later will be linked in a very special way with BASF.

In 1953, his son Wolf-Volker – now back in Germany – continued the tradition and moved with his wife and children to Mozambique. There he acquired a firm that represented a number of German companies, later to include BASF. Since BASF's Crop Protection business was becoming the strongest division of Sthamer's company, BASF acquired the firm in 1970 and founded its own trading office in Mozambique with Wolf-Volker Sthamer as managing director. Following in the footsteps of their father, his three sons – Kurt, Volker and Gunther – also launched global careers at BASF.



Managing director Wolf-Volker Sthamer with the employees of the BASF trading office in Mozambique in the 1970s

Development is a broad field: Volker Sthamer at an IT presentation with Ethiopian women (top left image); ox plow in Ethiopia (lower left image)

Pioneering work around the globe – a BASF family dynasty

The experiences of Volker Sthamer are representative of the numerous challenges that the three brothers – spread around the globe – have successfully mastered over decades. While still studying tropical agricultural science in Kassel/Witzenhausen in the mid-1970s, Volker Sthamer received a contract from BASF that brought him back to Africa. The company wanted the aspiring agricultural engineer to spend several months conducting various field trials with Pix® and Basagran® in the cultivation of cotton, corn, rice and sorghum. As a student of agricultural engineering, Volker Sthamer saw this as an opportunity to gain practical experience and to face completely new challenges. Far from the nearest city, camping in a simple tent for months in the middle of field trials, he learned Arabic in dealing with the locals. This made life there simpler but no less exciting. Today Volker Sthamer can laugh about an adventure he had in 1978, while working as a technical advisor along with two Polish pilots. Flying an Antonov plane that had been repurposed as a crop duster with a tank capacity of 6,000 liters, the pilots were supposed to spray a mixture of about 40,000 liters of Basagran® on government rice fields in Sudan. Without a seat of his own, Sthamer sat on safety belts suspended between the two pilots' seats and experienced one

of the most turbulent flights of his life. “But that’s Africa: You have to bend the rules sometimes,” he recalls with a smile.

Despite holding various positions in South America and Germany, he remained fascinated by Africa. In 1970s, Sthamer returned to the continent as managing director of the BASF subsidiary in Angola. During the civil war there, his family went through what was probably its most difficult time. Following life-threatening bombings, Sthamer was one of the last Germans to leave crisis-stricken southwest Africa. After further stops in Ethiopia and Limburgerhof, Volker Sthamer returned to Ethiopia in 2004 to reopen the BASF trading office in the East African region and revive the business that collapsed during BASF’s absence. Sthamer’s mission included managing the Striga project. Striga (also called witchweed) is a parasitic weed that attacks mainly corn fields; it can reduce yields by up to 80 percent in Africa. In close cooperation with partners from international research institutions and local seed suppliers, BASF eventually developed StrigAway®, an innovative seed treatment that farmers can use to effectively protect their corn fields and increase their yields. Volker Sthamer also fondly recalls the launch of Interceptor® mosquito nets and other effective tools in the fight against

malaria. As his global career came to a close, he was involved with the reopening of the BASF offices in Addis Ababa and Nairobi and the success of the company’s commercial presence there. “These jobs were good reasons to return to Africa and, at the same time, my chance to give something back to the continent that had such a great influence on me.”

After 33 active years at BASF, Volker Sthamer semiretired in 2011 and now reflects calmly on his eventful life: “It was a great time, and I am very happy. In many professional situations, I was often on my own, but I had many opportunities and a lot of freedom to make a difference and change things. It was a pioneering time, and I was able to play an active role.”

But Volker Sthamer also knows that this life would not have been possible without the support of his family. His wife Sabine played a major role in making the world their home. Very actively involved as an early “social networker” at international charitable and volunteer agencies, she maintained contact with people and customers around the world. However, Volker Sthamer has no plans to completely retire. Africa still fascinates him, and he is deeply involved in wildlife conservation.



Striga remains widespread in Africa. With StrigAway®, a protective seed treatment is available



Volker Sthamer is still actively involved in the conservation of African wildlife

Finally, one question remains: What type of cultural identity does someone possess, who grew up in Africa and was educated in Germany, who speaks six languages and has been at home (almost) everywhere in the world? “Each of my stations abroad has shaped me profoundly,” says Volker Sthamer, “but I’ve always remained a European – although my links to Africa are strong. My connection to Germany was always there, mainly through BASF.”

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014

1966 – 1996

Growing international markets

The **internationalization** of agricultural markets poses **new challenges** to research and work in Limburgerhof. In order to meet different climatic and agro-structural conditions, a **global network** of **BASF research stations** is created. International and interdisciplinary teams of researchers work together to develop new active ingredients. Three **landmark products** – Basagran[®], Basalin[®] and Pix[®] – come on the market, strengthening BASF's position in the international crop protection market.



History

1966 marks a **watershed year** in which the world is torn between stagnation and change. **Young people** rebel against the norms of the state and society. The **Woodstock Festival** in 1969 becomes the musical **high point** of the **American hippie movement**.

The **United States wins the space race** when **Apollo 11** lands on the **moon** on July 21, 1969.

Willy Brandt's genuflection in Warsaw on December 7, 1970, becomes a powerful symbol of the request for forgiveness for German crimes committed in the Second World War. Brandt receives the 1970 **Nobel Peace Prize** for his pioneering "**Ostpolitik**" (eastern policy).

Until the 1973 oil crisis, **Japan** experiences an unprecedented **economic boom** and is included in the group of the G6 countries in 1975.

The **reactor disaster at Chernobyl** on April 26, 1986, is considered to be the **worst nuclear power plant accident** in history. In Germany, it prompts **discussions** about the gradual **phasing out of nuclear power** in the coming decades.

The **fall of the Berlin Wall** on November 9, 1989, leads to the **reunification** of Germany on October 3, 1990. This brings an **end to the Cold War**.

Nelson Mandela and **Frederik Willem de Klerk** share the 1993 **Nobel Peace Prize**, and in 1994, Mandela becomes the first black **president of South Africa**.



1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014

Expanding horizons – from the United States to Japan and Brazil

With its wide-open fields, advanced machinery and modern agriculture, from the 1960s onward, the **United States** was an extremely **attractive market** for BASF's Crop Protection products. But corn, soybeans and cotton pose different demands than wheat and sugar beets, and fundamental differences existed in the **agro-economic structures around the world**.

Through its network of research stations, BASF gained expertise in local climates and crops as well as **agro-economic conditions**. The company later developed other interesting markets using similar methods. **Japan**, an industrial nation, has only a very small amount of arable land and has to make the best use of this through intensive management.

Today, thanks to its size, growing economic power and **innovations in agriculture**, **Brazil** has particularly great potential.



Campinas, Brazil



Pingtung, Taiwan



Research Triangle Park, United States

Ebina, Japan

Expansion of a successful model – the global research stations

Crop protection products such as the beet herbicide Pyramin®, which sold well outside of Germany, fit the corporate strategy. In the mid-1960s, BASF further strengthened its international orientation. The establishment of a subsidiary in Belgium (1964) and, in particular, the construction of production facilities in the port area of Antwerp served to realize the plans for a “second Ludwigshafen,” a second major Verbund site.

From 1967, in addition to manufacturing an important fiber for plastics production, this facility also produced Nitrophoska. Production of this fertilizer that was originally developed in Limburgerhof had almost doubled again since the late 1950s and was reaching its limits in Ludwigshafen. The new plant site on the Scheldt estuary was ideal since raw materials for the production of Nitrophoska arrived daily at the port of Antwerp and the large quantities of fertilizer produced could be shipped via the North Sea quickly and economically throughout the world.

After BASF joined with the U.S. chemical company Dow in 1958 to found the Dow Badische Chemical Company to produce raw materials, the focus turned increasingly to the U.S. market. There were also good sales opportunities for crop protection products there, but Limburgerhof employees had been mainly focused on the problems of European agriculture. In order to win over the American farmer, BASF had to research the local climatic conditions and their particular challenges, especially those relating to cotton, corn and soybeans.

Limburgerhof was the inspiration when BASF built its second research station in Greenville, Mississippi, on a site covering

57 hectares in 1966. Many methods and standards were transferred from Limburgerhof, but Greenville provided the first opportunity to field test active ingredients in a subtropical climate. Experts from Germany, who had studied in the United States and understood the agricultural business there, supported the development by establishing contacts with farmers and research institutions. However, as with Limburgerhof, product development required both expertise and perseverance.

The growth in international business in the late 1960s was remarkable, but was mainly due to successes in Europe. BASF had maintained a presence in Spain, for example, since 1968 with a production site in Tarragona, near Barcelona. In 1969, the company opened a 30-hectare research station in Utrera, in the agrarian part of southern Spain. Research was also intensified in other parts of the world. In that same year, BASF opened its first research station in the southern hemisphere, in Nelspruit, South Africa. Another research facility followed in 1970 in Taiwan. A network of research stations now stretched over four continents and included several climate zones and the relevant local crops. In temperate climates, experiments could be carried out year-round.

Having a local presence in many regions also had other advantages, especially in the registration of new products. In 1969, BASF acquired U.S.-based Wyandotte Chemicals and founded the company BWC (BASF Wyandotte Corp.). At the time, the purchase marked the largest single investment by a German company in the United States, and the price of 100 million deutschmarks made head-

lines. BASF now had two plants, one in Wyandotte, Michigan, and one in Geismar, Louisiana. These produced basic chemicals as well as a broadened range of higher-value products. The possibility of manufacturing crop protection products in Geismar offered a good opportunity to enter the lucrative U.S. market, but the company lacked a range of promising products at the time.



The production site in Tarragona under construction in the late 1960s (left) and today

The new location in Antwerp was logistically ideal – starting in the mid-1960s, raw materials entered by ship and fertilizers were distributed all over the world



Different countries, different cultures – new ideas for new markets

Worldwide, the foundation had been laid for the internationalization of BASF's fertilizer and crop protection business. Additional plans came together at the headquarters in Limburgerhof, including at the annual "Autumn Research Meeting." When the stations presented their findings there, lively discussions followed. Which active ingredients were successful under which climatic conditions and on which crops? What approaches were promising, and which active ingredients needed to be registered?

Ideas evolved into projects, and research led to products. In the 1970s, a number of groundbreaking crop protection products consolidated BASF's market position. It began in 1974 with the selective herbicide Basagran® (bentazone). Ten years' work went into the product's launch, and as a grain herbicide, it had excellent prospects worldwide. When employees of the research station in Greenville observed that bentazone could also be used in subtropical plants such as rice and soybeans, it quickly became apparent that Basagran® had a lot of potential, especially in the United States.

From the end of the Second World War, soybean production had increased sixfold and the agricultural policy of President Nixon (1969-1974) called for further intensification with the mantra "Get big or get out."

The post-emergence herbicide Basagran® was used for the first time in 1975 for targeted application in soybeans. Since that time, it has allowed farmers in the U.S. Midwest to reduce tillage and plow less, thus contributing to erosion control; it also made it possible to seed soybeans in narrower row spacings. These and other advantageous properties helped Basagran® become BASF's most successful crop protection product in the years that followed, and its success was global. Basagran® led to the breakthrough in the U.S. market.

Limburgerhof, as the headquarters of the agricultural division, was on the rise. In 1974, another station was opened in Ebina, near Tokyo, in order to serve the small but very attractive Japanese market. BASF also saw good opportunities in Brazil, which was greatly expanding its soybean production with government assistance. In 1976, the company opened a research station in Campinas, near São Paulo, which conducted research primarily on citrus plants, coffee, cocoa and sugar cane.

But there was far more happening locally than just field trials. BASF employees gained insights into local agro-economic structures, which in turn influenced marketing and sales. For example, Japanese rice farmers, who worked on small areas but received high prices for their products and accordingly invested heavily in crop protection, had significantly different expectations than South American farmers, who cultivated corn, soybeans and cereals on huge fields.

The worldwide success of Basagran® was supplemented in 1976 by a herbicide for use on peanut and cotton crops. Basalin® (fluchloralin), like Basagran®, was produced in Louisiana and helped consolidate BASF's position in the crop protection market internationally and especially in the United States. In cotton cultivation, the growth regulator Pix® (mepiquat chloride) was a major success from 1980 onward. The use of the substance meant that the tufts matured evenly – a crucial requirement for mechanical harvesting. Crop protection thus made a contribution to the more efficient management of cotton. With Pix®, BASF scored another success in the United States on its way to becoming one of the leading companies in agro-chemicals there.

Within a few years, some outstanding products, especially herbicides, brought the division considerable success – in Germany as well. The launch of Butisan® (metazachlor), approved in 1981, brought a herbicide to the market that was particularly useful against weeds in rapeseed. Butisan® quickly gained acceptance as the cultivation of rapeseed expanded in numerous locations, including in West Germany. New hybrids were suitable for the production of cooking oil, and



The growth regulator Pix® made the mechanical harvesting of cotton possible



Basagran®: one of the first post-emergence herbicides in soybeans

rapeseed later gained in importance as a renewable resource. In addition to herbicides, the fungicide Ronilan® (vinclozolin) – approved in Germany in 1976 and in the United States in 1981 – became an important addition to the crop protection portfolio. It was particularly used in vineyards and other specialty crops as well as rapeseed in order to control fungal diseases such as gray mold, scelotinia and monilia.

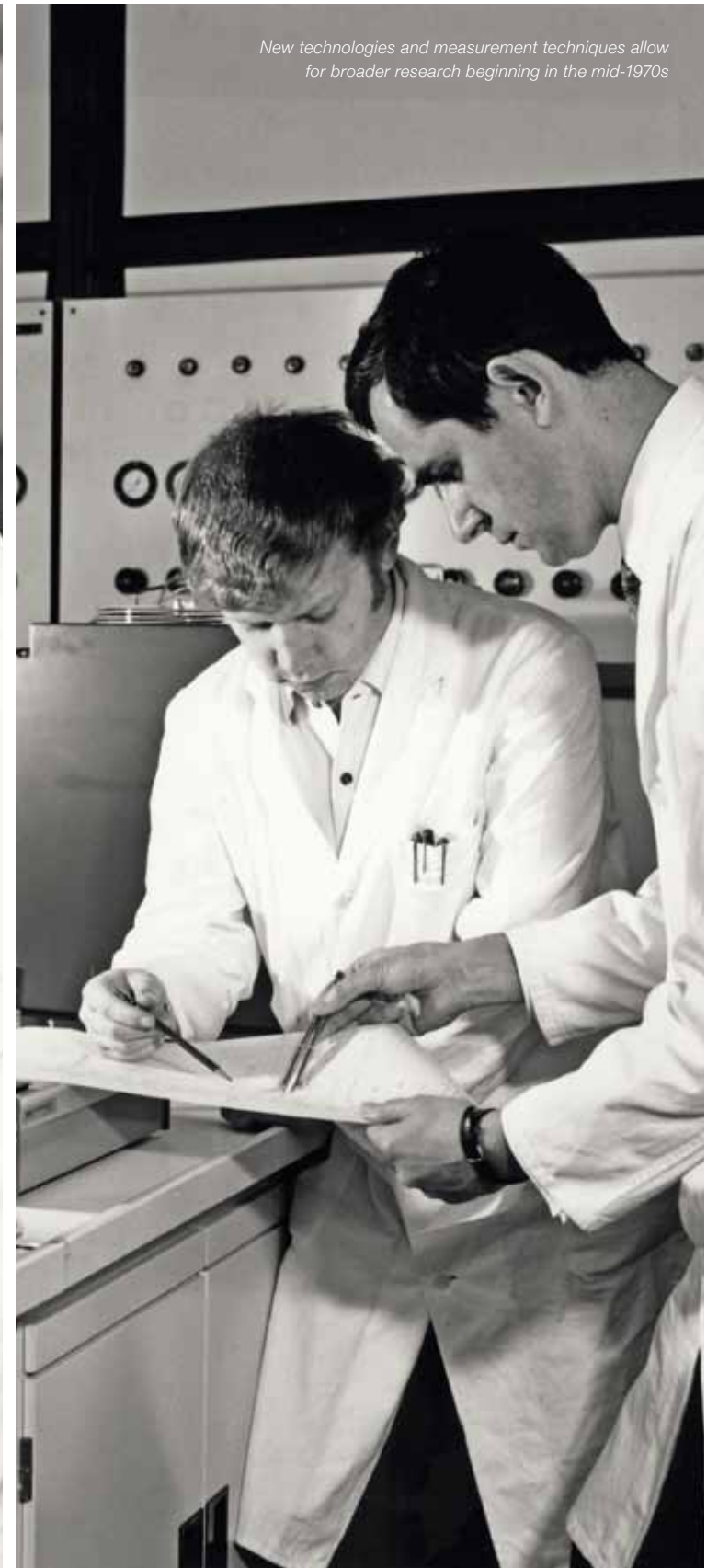
1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



New technologies and measurement techniques allow for broader research beginning in the mid-1970s

New tasks in crop protection – expanded research for forward-looking products

A change was underway in crop protection: In addition to chemistry, the fields of biology and ecology began to gain greater importance in the laboratories and fields. Increasing social criticism created the incentive for more intensive, wider-ranging research.

A laboratory for residue analysis and environmental research was opened in the early 1980s. BASF was thus well prepared for the amendments to the German Plant Protection Act in 1986, which required manufacturers of crop protection products in West Germany to perform extensive ecotoxicological tests. Is the product environmentally friendly? Or does it impact drinking water? How does it affect soils, animals and people living near agricultural land? Crop protection had to be reconciled with the increased expectations for ecological requirements; this gave the research department plenty to do.

From a business point of view, it also made sense to increase investment in crop protection research because the fertilizer business, for decades the focus in BASF's agricultural department, was suffering from oversupply and a global decline in prices.

In the mid-1980s, Limburgerhof devoted 80 percent of its research spending to crop protection in order to boost the traditionally strong herbicide group and to advance the development of fungicides. In the fertilizer business, there were still quite profitable lines of business, such as products for horticulture and fruit trees sold by the subsidiary Compo. This company, which was founded in 1956 to distribute an "original Dutch flower composting soil," had belonged to Kali und Salz AG since 1972 before being acquired by BASF in 1986. Thanks to major investments by the company, Compo had a strong position in the consumer segment. With regard to agriculture as a whole, however, the growth potential in crop protection was now considerably larger.



With Compo, BASF was able to offer a wide product range in the consumer segment

During the 1980s, the ratio between fertilizer and crop protection shifted, not just in terms of research, but also in earnings.

The starting point for successful product development in crop protection remained BASF's main laboratory in Ludwigshafen, where chemists synthesized substances in specialized working groups that focused on developing new active ingredients in, for example, herbicides or fungicides.

Ludwigshafen and Limburgerhof worked very closely together to develop crop protection products from these substances. The Research Triangle Park (RTP) site near Raleigh, North Carolina, also became very important to the company's research activities.

Numerous international companies employed thousands of researchers in the prestigious research park, which at the time was the largest of its kind in the world. BASF also invested in a new facility here to develop agricultural products.

Crop protection and ecology

Smog, loss of forests and **acid rain** – in the 1970s, there was a broad public debate about **environmental pollution**. The Western European chemical industry was also the subject of **criticism**, and the **crop protection industry** in particular was fighting to maintain its **reputation**. Views changed, and the idea of **integrated pest management** took hold. Like other manufacturers, BASF increasingly combined biological, biotechnical, physical, chemical and plant breeding methods as well as planting techniques.



Following nature's example

Fungi synthesize substances to ward off enemies, and therefore provide an inexhaustible **potential supply of natural compounds** that can be used in the development of active ingredients. Fungicide experts in the main laboratory and in Limburgerhof took advantage of this system to develop the **strobilurine** chemical class. **Dr. Hubert Sauter** and **Dr. Klaus Schelberger** of BASF were nominated for the German Federal President's Future Prize for this groundbreaking discovery in 2005.

Perseverance, narrow lead – milestones in crop protection

The potential of crop protection was obvious, but the question was how to use it. The old “spray and pray” adage still prevailed. Thousands of substances had to be tested to find one active ingredient, but the methods used to turn this compound into a market-ready product were becoming increasingly complex.

Electronic data processing had accelerated some processes and allowed for larger quantities of data to be studied. In addition, a “method book” for the field tests at all the research stations had been introduced in order to better compare research results and speed up product development. A major key to success lay in the interdisciplinary approach. Teams of agronomists, biologists, biochemists and chemists worked in laboratories with biochemical methods. They optimized the testing systems and increasingly took aspects of plant physiology and molecular biology into account.

One of the first results of this intensive research was Opus® (epoxiconazole) in 1993. The product, marketed as the “top fungicide,” soon became one of the most successful products of BASF’s Crop Protection division. Farmers in

Europe have been using it on all types of grains since then. When coffee rust hit South America, products containing epoxiconazole were developed to meet the specific growing conditions there. The result was a fungicide that could be used effectively to treat coffee rust and, later, to control soybean rust. Fenpropimorph provided BASF with an additional active ingredient to create compound mixtures with new formulations. These proved increasingly effective in controlling a range of fungal diseases. One example of success in this area is the fungicide Opus® Top, a combination of fenpropimorph and epoxiconazole, which acts both preventatively and curatively thanks to the substances’ different modes of action. BASF’s new products to treat fungal diseases helped make the company one of the leading fungicide manufacturers worldwide.

While Opus® was a great success, research on strobilurine A continued. However, at that time no one could have known what other extremely successful products would result from this research. As in many other cases, the work on strobilurines involved constant contact and exchange with leading universities.



Electronic data processing accelerated many processes and simplified international data comparison



Part of BASF’s crop protection program since 1993: Opus®, the “top fungicide”

Prof. Timm Anke, a biologist at the University of Kaiserslautern, had discovered the antifungal substance contained in the

pinecone cap mushroom, a woodland fungus. Prof. Wolfgang Steglich of the University of Bonn had described the structure of strobilurine A. Experts from the main laboratory had been working since the early 1980s to develop a fungicide from this naturally occurring substance used for defense. Researchers altered its structure and used rapid biological tests to analyze more than 18,000 synthetic variants until the effective one was discovered in 1985. Another chemical company was also working on strobilurines. It became a veritable race to get the patent – a race that BASF won by just two days in 1987. After carrying out further studies, BASF researchers synthesized the fungicidal active ingredient kresoxim-methyl for the first time. But several more years passed before it was ready for the market.

The efforts in ecotoxicological research led to another important product in 1994. With the development of Rebell® (quinmerac/chloridazon), Limburgerhof had a particularly effective beet herbicide that also had a favorable environmental profile. Rebell® gained acceptance as an inexpensive solution to control weeds. As with Pyramin® 30 years earlier, Limburgerhof had given beet cultivation a major boost.

In March 1996, years of research and testing came to a successful conclusion: The active ingredient kresoxim-methyl was approved for grains in Germany and Belgium. The first synthetic strobilurine fungicide marked a milestone in fungicide research. Chemistry trade journals even referred to it as the most important discovery of the 1990s. Farmers could use this active ingredient in very different crops, such as grains, grapes and vegetables, as well as in different mixtures. Products like Strobry®, Allegro® and Juwel® quickly gained wide acceptance. The active ingredient breaks down within a short time into biologically inactive acids and does not endanger bees, beetles or other beneficial insects. Kresoxim-methyl put BASF in the lead in strobilurine research and significantly strengthened its position in the global market for fungicides.

The new active ingredient gave the entire division a tremendous boost. A manufacturer that had only begun focusing entirely on crop protection just 10 years earlier had now become a leading provider. Strobilurines were yet another success for the company’s thriving Crop Protection division.

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



The story of the Donner family – father Johannes and his daughters Christina and Katja – is representative of many similar family histories centered around the Agricultural Center Limburgerhof. The family's passion for agriculture, both professional and personal, has been passed on from generation to generation.

Born in Düsseldorf, Johannes Donner discovered his enthusiasm for agriculture on his uncle's family farm in the Sauerland region (North-Rhine Westphalia), where he grew up during and after the Second World War. These experiences inspired and motivated him to later take up the study of agriculture in Bonn. Johannes Donner gained his first professional experience as a post-doctoral research associate at the Institute for Rural Engineering at the Technical University in Berlin. He applied for a position at the Research Station Limburgerhof based on a recommendation from one of his fellow students in Bonn, Dr. Herbert Bohle, who would later become head of the Rehhütte Farm Estate.



Katja Schweikert and Johannes Donner describe their interesting work in the Crop Protection division

The Donner family in the 1970s: Father Johannes and mother Jutta with their daughters Christina (left) and Katja (top left image)

Johannes Donner giving advice at the demonstration field in the mid-1970s in Limburgerhof (lower left image)

Family connections – rooted in agriculture

In 1968, Johannes Donner started working for BASF's branch office in Cologne. After a year of intense training, he became an advisor in the North-Rhine area around Cologne. At the time, Donner only came to Limburgerhof for the annual meetings of the advisory offices and the research meetings, where all the advisors participated in lively discussions about future product developments. "Even then we had a very solid product portfolio, with Pyramin® in beets, Cycocel® in wheat and Calixin® against mildew," says Donner, recalling his very interesting first years at BASF. To him, the key to success lies in the combination of compelling products with a competent advisor who can serve as a trusted contact person for the farmer. "Life as an advisor was always exciting. The direct feedback I received from farmers let me know right away if a product was successful or unsuccessful." One of his colleagues had an unusual experience during the regional launch of the growth regulator Cycocel®. "BASF had its usual huge demonstration fields. There were violent thunderstorms the day before the Corpus Christi procession. Almost all the fields were affected by lodging, and only the plots treated with Cycocel® were still standing. After the procession was over, the participants went to the demonstration fields together



His daughter Christina now lives her passion for agriculture on the family farm

to admire the excellent results," he recalls, still laughing at one of many amusing episodes.

Donner soon reaped the benefits of his experience and expertise in advisory services and product development. He assumed leadership positions in the company, serving from 1974 to 1978 as Director of Advisory Services and Development for Germany, and from 1978 to 1981 at the international level as Director of European Advisory Services. Then, Johannes Donner gained a global overview of agricultural structures from 1981 to 1988 as Director of Market Services in

crop protection marketing. In 1988, he was named Global Marketing Director for crop protection, a position he held until his retirement in 1998. His 30 years of experience at BASF makes him optimistic about the future of agriculture. "But it's a shame that Europeans have emotional barriers to new technologies. I am sure professional farming is on the right track, even if political conditions in Europe could be better."

His job frequently kept him on the road, leaving him little time for his family. "My older daughter Christina once called me uncle because I was so rarely home." Nevertheless, his two daughters Christina and Katja never wanted anything more than to follow in their father's professional footsteps. "In a very real sense, I grew up with BASF," says Katja (whose married name is Schweikert), remembering her childhood. BASF's international guests often came to dinner at the Donner house, and many became friends of the family. Agriculture and BASF remained frequent topics of conversation in the Donner household. It is no wonder, then, that both daughters wanted to study agriculture just like their father. Before starting her university studies, Christina completed an apprenticeship at the Rehütte Farm Estate, where she met her future husband, who happened to be an intern

there. After working as a BASF advisor in the Hanover region, today she and her husband Hans-Christian run a 300-hectare family farm in North Friesland. Her sister Katja took a job at BASF in 2001 in order to return to the area where she grew up. Today, she has now put down roots in nearby Altrip and works at the Agricultural Center Limburgerhof in the area of web content management. She has managed to balance her family and career at BASF far better than was possible when her father was working. "I now work part-time, mostly in my home office, and that gives me time to take care of my three

sons. I really appreciate my situation." But her father Johannes also appreciates his good fortune in having been able to turn his hobby into a profession. Agriculture is still his passion today. Several times a year, he visits his son-in-law's arable farm with pig and cattle operations. Looking back, he says: "My 30 years at BASF were a wonderful time. And now I have a lot of time for my family."



A strong team: Katja Schweikert and her sales colleagues in 2005

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014

1996 – 2014

Partner in agriculture

With “**green biotechnology,**” plant breeding research in Limburgerhof heads into **new research fields**. With the acquisition of American Cyanamid, BASF becomes one of the world’s top three crop protection manufacturers and a global supplier of crop protection products. The **main site** in **Limburgerhof** is thoroughly modernized and in 2004 is renamed the **Agricultural Center Limburgerhof**. The **fertilizer business**, which once represented the original core business, is **sold** in 2012. BASF takes a new approach to shaping the **agriculture of the future**.



History

The **World Wide Web** experiences a breakthrough at the end of the 1990s. **Mobile phones** begin to be widely used.

The construction of the **International Space Station (ISS)** begins in 1998 as a cooperative project among the leading space agencies.

The **terrorist attacks** in the **United States** on **September 11, 2001**, shake the world.

In 2002, the **euro (€)**, the **European common currency**, is introduced in 12 E.U. countries.

The American swimmer **Michael Phelps** wins a total of **22 Olympic medals** at the Summer Olympics in Sydney in 2000, in Athens in 2004, in Beijing in 2008 and in London 2012, making him the **most successful Olympian** of all time.

Angela Merkel becomes the **first female Chancellor of Germany** in 2005 – after seven men had held the office.

Barack Obama is elected **44th President of the United States** on November 4, 2008. He is the first African-American to hold this office.

On March 11, 2011, Japan is rocked by an **earthquake** of magnitude 9.0, which results in the **nuclear disaster** at **Fukushima**.

Following the resignation of Pope Benedict XVI, the **Argentine Jorge Mario Bergoglio** is elected as the new **Pope Francis** on March 13, 2013.

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014

Better properties for higher yields

“**Green biotechnology**” involves optimizing the properties of plants.

It uses methods from biochemistry, systems biology, microbiology, molecular biology and chemical engineering to strengthen plants’ ability to tolerate drought and resist diseases. The science, also referred to as **green genetic engineering**, is thus a **modern refinement** of traditional **plant breeding**. The main objective of BASF Plant Science is to improve agricultural productivity by **increasing yields** and endowing **crops** with properties that **protect** them **against stress factors** and **diseases**. Another goal is to enhance crops’ ability to tolerate BASF Crop Protection products in order to **simplify agricultural management**.

Beyond crop protection – plant optimization through biotechnology

The development of strobilurins showed the innovative power of BASF's Crop Protection division. And demand for innovation grew stronger than ever in the late 1990s, as the industry looked back at the first major phase of consolidation worldwide. Of the 20 suppliers who had more than 80 percent of the global market as recently as the mid-1980s, only half remained. Large international corporations dominated because only they had the financial strength to invest heavily in research and development.

BASF also strengthened its position in 1996 through an acquisition. It purchased part of Sandoz AG's global business with corn herbicides, which increased sales in North America, the most important market for herbicides. Among the major suppliers, BASF's Crop Protection division was on the small side, but its ambitions were great.

The strobilurins were a solid base to strengthen and grow the company's position in the fungicide market. But new active ingredients alone were not enough; the agricultural department of BASF faced a major decision about its future course. The expertise was there and the prospects on the international markets were good – greater investment was needed to strengthen the agricultural department even further.

While BASF had long been involved in the area of crop protection, in 1998 the company took another important step in green biotechnology with the founding of BASF Plant Science – a global research platform as a separate company in the BASF Group. This division has since specialized in using biotechnology to improve plants' properties.

Corresponding research units were set up in 1998 in Limburgerhof and at today's corporate headquarters in Research Triangle Park (RTP), North Carolina, right next to the Crop Protection division. Under the umbrella of BASF Plant Science, two other companies got their start that same year. The Metanomics research unit was created in collaboration with senior staff at the Max Planck Institute for Molecular Plant Physiology in Potsdam, and BASF set up the joint venture Sun-Gene together with the Leibniz Institute of Plant Genetics and Crop Plant Research in Saxony-Anhalt, later taking it over completely and managing it through the end of 2013. BASF acquired DNS Landmarks in Canada in 1999. In 2006, BASF Plant Science integrated the Belgian biotech start-up CropDesign in Ghent into its global research network. Since that time, scientists at these sites have been analyzing and developing the complex biological functions and interactions of plant genes. For BASF, the entry into green plant biotechnology was another step on the path towards making the company a global leader in the agricultural industry.

In 1999, BASF began to move away from the fertilizer business – the origin of its activities in agriculture. K+S Aktiengesell-

schaft, a supplier of fertilizers, plant care and salt products, took over exclusive marketing and distribution rights of BASF's agricultural fertilizers as well as the subsidiary Compo. This made K+S the second largest supplier of fertilizers in Europe. Since then, a subsidiary of K+S has operated the former agricultural

fertilizers business of BASF: fertiva was located in Limburgerhof from early 2000 and then moved to Mannheim in 2001. As BASF retained the production plants for nitrogen, it was natural to cooperate closely in the production and development of fertilizers.



In the greenhouse, young corn plants grow under controlled environmental conditions and are exposed to certain stress situations. This allows researchers to identify the most efficient plants

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



New perspectives in crop protection. Researchers study new active ingredients in the greenhouses. The goal is to consolidate the number of test substances, which are then developed further in field tests



Acquisition and expansion – growing into the new millennium

The year 2000 began with a bang. The acquisition of American Cyanamid, the crop protection segment of the U.S. manufacturer American Home Products, was the largest acquisition in BASF's history. The acquisition nearly doubled the sales of BASF's Crop Protection division, making it one of the three leading manufacturers worldwide. BASF's purchase of American Cyanamid addressed several strategic objectives. In addition to expanding its portfolio, BASF increased its global presence in key sales regions in North and South America. For this reason, in May 2000, the management of this division was moved from Limburgerhof to Mount Olive, New Jersey, where the U.S. subsidiary of BASF had its headquarters.

The crop protection portfolio was expanded significantly. While BASF was well-established in fungicides in particular, the acquisition of American Cyanamid provided a major upgrade to the herbicide range, and well-known insecticides rounded out the portfolio. The joint research pipeline was filled with new active ingredients, and the research and development strategy was strengthened across all indications. The merger created a broad and inno-

vative portfolio for crop protection. In addition, there were new active ingredients such as pendimethalin, dimethomorph and the new imidazolinones.

The Clearfield® Production System, which had already been introduced for corn in the United States (1992) and for rapeseed in Canada (1995), was also taken over and further developed. The Clearfield® Production System is a combination of herbicides and seeds, with the seeds tolerant to a



The Clearfield® Production System offers a combination of herbicides and herbicide tolerant seeds for a variety of crops

specific class of herbicides. The increase in tolerance, as compared to imazamox, for example, was achieved through traditional breeding methods. The Clearfield® Production System is currently available for rapeseed, rice, sunflowers, wheat, corn and lentils.

The international orientation of the Crop Protection division also changed the corporate culture in Limburgerhof. While research and technology had been con-



Juwel® Top combines protective and curative effects against a broad range of diseases and provides reliable protection for all types of grains even today

sidered its major strengths, increasing priority was now being placed on marketing and sales. Employees in Limburgerhof had long focused mainly on agricultural issues in Europe, but following the acquisition of American Cyanamid, they gained an even greater global orientation. Guests from around the world, conversations with colleagues from different continents and, last but not least, the addition of English as a second corporate language made everyday life more international. Some research

sites in the United States, Japan, South Africa and the United Kingdom were closed as BASF and American Cyanamid had previously maintained their own stations. Of course, the process of internationalization was not always smooth and there were challenges. As expected, all the teams and employees needed some time to settle into the new structures. But the changes were necessary to be prepared for the demands of international markets.



Whereas the focus in Limburgerhof had previously been on research and technology, with the internationalization of the entire Crop Protection division, increasing emphasis was placed on marketing and sales

The expansion of capacity at its production sites is crucial for the growth of the division as a whole. In Schwarzheide, Germany, the third identical F 500® plant is now in the final stages of completion



Guaratinguetá, Brazil



Ludwigshafen, Germany



Hannibal, United States

New paths to healthy plants – back to Limburgerhof

The performance of BASF's Crop Protection division varied greatly: While fungicides were a success, the herbicide business, including the long-time best-selling Basagran®, lagged behind. The introduction of glyphosate-tolerant soybeans, corn and cotton in the mid-1990s in North and South America seemed to have solved weed problems for the foreseeable future and crippled the market for selective herbicides.

In 2002, BASF acquired rights to the insecticide fipronil, which is sold in more than 70 countries and is one of the most successful products in BASF's Crop Protection portfolio. The active ingredient fipronil works quickly, is long-lasting and is used in various application forms. Important business fields include seed treatments for soybeans (Standak® and Standak® Top) and soil applications in sugarcane as well as pest control to protect homes and buildings against termites and ants (Termidor®).

The fungicide F 500® (pyraclostrobin), which was launched in 2002, became a true blockbuster – synthetic strobilurins continued to be the basis for successful products. By changing the molecular

structure, researchers had increased the fungicidal activity compared to kresoxim-methyl, and testing under field conditions brought another pleasant surprise. In experiments on peanut crops, the treated plants repelled not only fungi, but exhibited a more intense green color and thus increased starch production as well as better resistance to stress. F 500® also had a very favorable toxicological and ecotoxicological profile. F 500®, in combination with epoxiconazole, played a vital role in helping rescue the soybean harvest in South America, particularly in Brazil, in 2002. The soybean crop was threatened by an aggressive fungal disease, Asian soybean rust, which put the entire region's agricultural economy at risk.

Products containing F 500® are among the best-selling crop protection products in the world. In products like Opera®, Cabrio® and Comet®, F 500® is sometimes combined with other active ingredients such as metiram or epoxiconazole to expand the spectrum of activity and, as part of integrated crop protection, to control the build-up of resistance. Crop protection products with benefits that go beyond controlling harmful fungi and insect pests, such as increasing the yield and quality of crops, are now marketed under the global brand AgCelence®. Boscalid, a fungicide

launched by BASF in 2003, has also proved effective in various combinations. It works as a fungicide, especially on grains and specialty crops, such as fruit, vegetables and ornamental plants.

After years of restructuring and reorientation, BASF also modernized its historic research site in Rhineland-Palatinate. In 2003, new offices and a new laboratory were constructed in Limburgerhof. The lab featured the most modern technical equipment for prescreening, which had originally been introduced in 1998.



The BASF-Bauernmarkt (farmers' market) at the Rehhütte Farm Estate attracts thousands of visitors from the region every year

Prescreening is a fully automated method for testing active ingredients to determine their biological effects. Herbicide screening now involves the testing and evaluation of new substances throughout the entire plant. This test system is based on a tiered approach: As the selection of the compounds proceeds, the intensity of the test increases, meaning the higher the level, the more agronomically relevant the questions. The efficiency of active ingredient testing urgently needed to be increased because the hit rate was declining. While in the 1970s testing had to be done on an average of 10,000 substances to develop one new product for the market, increased requirements, such as ecotoxicological properties, now meant that an average of 140,000 chemical compounds had to be tested to develop a single market-ready active ingredient. Prescreening allows the most promising ones to be filtered out from a pool of substances.

The Rehhütte Farm Estate, which is part of Limburgerhof, was comprehensively restructured in the mid-1990s. The stables were transformed into a meeting center. As of 2003, farm operations focused solely on growing crops. As one of the largest farms in Rhineland-Palatinate, with approximately 500 hectares of arable

land, the operation serves as an interface where research findings can immediately be incorporated into practice. Today, the Rehhütte Farm Estate also functions as a communications center. The Crop Protection division provides information about its work with scientific symposiums and tours. BASF's annual farmers' market has been held since 1996 and attracts thousands of visitors from the region every year.

With the modernization completed, the management of BASF's Crop Protection division returned to Limburgerhof in 2004; the former Research Station Limburgerhof was now known as the Agricultural Center Limburgerhof. BASF increased its investment in crop protection research and achieved remarkable results: With sales of €3.35 billion in 2004, BASF's Crop Protection division had taken a leading position in a growing global market.

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



Ideas for growth markets – building blocks for the future of agriculture

BASF continued to strengthen its pest control business, which was especially important for the growing markets in Asia and South America. In 2009, the division created the global business area **Pest Control Solutions**, which provides solutions for professional pest control in both urban and agrarian settings. There are also several **BASF products on the market in the area of public health.**

The mosquito net Interceptor®, which is coated with an insecticide, provides reliable protection against mosquitoes and the serious diseases they transmit. Abate® (temephos), a larvicide that controls insect larvae in stagnant water before they hatch, also helps control the spread of disease. This business area was strengthened by the December 2008 acquisition of the pest control business of Sorex Holdings Ltd., with approximately 200 employees.

Investments in research have also paid off in other segments. In the mid-1990s, glyphosate seemed to have solved every weed problem, but now increased resistance was creating new challenges for farmers. In 2010, BASF launched Kixor® (saflufenacil), a herbicide used on corn, soybeans and wheat to control weeds

that have become resistant to glyphosate. Just one year after its introduction, U.S. farmers were using Kixor® on more than 4 million hectares. The fungicide Initium®, which is used primarily on specialty crops such as tomatoes, potatoes and grapes, also came on the market in 2010. It has favorable environmental characteristics and long-lasting efficacy – in the best cases, during the entire cultivation period.

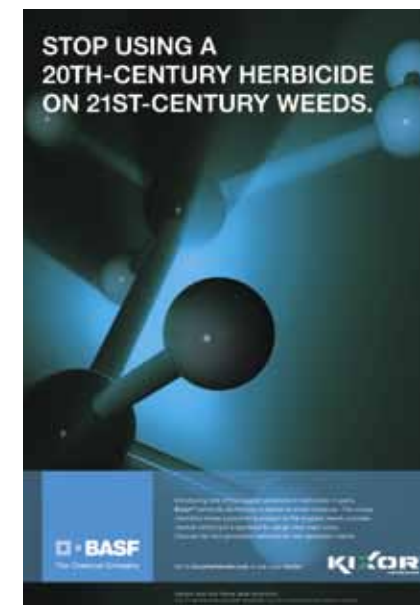
Xemium®, another fungicide, made it to registration in record time in 2011. This was the result of close collaboration between departments in Ludwigshafen, Limburgerhof and the research stations around the world. Researchers took advantage of the expertise gained in the development and registration of Boscalid.

The active ingredient from the class of carboxamides helps farmers around the world to control key fungal diseases in more than 20 crops, including soybean rust and septoria in grains. This product significantly extends BASF's fungicide portfolio, as it is used in combination with other BASF active ingredients and is thus an important building block for the company's future strategy.

The remaining fertilizer business, however, no longer fit in the corporate strategy of either BASF or K+S, its collaborator at the time. The priorities had changed. While BASF sharpened its focus on crop protection and other services, K+S concentrated on its core business of potash. The professional business of Compo and the activities of fertiva were merged into K+S Nitrogen in 2009, while the remaining part of Compo was sold to the investment company Triton in 2011. In 2012, Russia's largest fertilizer producer, EuroChem, acquired both K+S Nitrogen as well as BASF's fertilizer activities and production plants in Antwerp. With this sale, BASF completely withdrew from the fertilizer business.

There were major changes in the Plant Science division in 2012. Due to the continuing difficult regulatory environment and the lack of acceptance of plant biotechnology in Europe, BASF decided to focus its plant biotechnology activities on the main markets in North and South America and on the Asian growth market. Following the realignment, all research projects that focused exclusively on commercialization in Europe were shut down. The European research sites Ghent and Berlin were retained and expanded over the following months.

The headquarters of Plant Science were moved from the Agricultural Center Limburgerhof to Research Triangle Park (RTP), North Carolina, and the size of the research unit in Limburgerhof was subsequently greatly reduced. The scientists from Plant Science at the Agricultural Center Limburgerhof now work closely with their colleagues in crop protection on fungus-resistant soybeans for non-European markets.



Kixor®: the herbicide provides weed protection for many different crops



Systiva®: a seed treatment product containing Xemium®

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



Sustainability and product stewardship – AgBalance™ provides better transparency

BASF Crop Protection has taken sustainability and product stewardship into account for many decades. Developing effective, environmentally friendly products remains a challenge. How can the economic interests of farmers and the company's shareholders be aligned with sustainable development in order to fulfill the public's expectations for social and environmental responsibility?

In addition to traditional product development activities, this goal is becoming increasingly important. BASF Crop Protection broke new ground in an effort to find a solution.

A team of farmers, biologists, social scientists and economists developed AgBalance™ – a model to measure and assess sustainability. The method includes indicators that measure environmental factors such as the education index, energy and water consumption and land use. It also takes into account social indicators, such as the further education and training of farmers and employees, consumer interests, international aspects and economic indicators. This allows AgBalance™ to answer the question of how agricultural

production can be made more sustainable. With the support of independent experts, the Agricultural Center conducts studies around the world. In these studies, BASF analyzes its products' contribution to sustainable agriculture in order to continuously shape the company's research.

The responsible use of crop protection products supports sustainable farming, which takes account of social, economic and environmental factors. The questions are wide-ranging: Which product is the most efficient solution? How can crop protection products be used as sparingly as possible so that they do not pose any inherent risk to humans and the environment? What is the right way to recycle spray containers? Product stewardship includes BASF's commitment to making the entire production chain sustainable – from laboratory research all the way to disposal and recycling of spray containers. BASF is committed to product stewardship in order to promote sustainable agriculture around the world.

Measurably sustainable

Can sustainability in agriculture be measured? In 2011, Limburgerhof unveiled **AgBalance™**, a method that pursues this goal. The model uses scientifically collected data and practical algorithms to **analyze** the **value chain** of agricultural production and agricultural products. AgBalance™ thus offers farmers a fact-based decision-making tool to help them improve their **overall sustainability performance**.

This method of analysis considers **ecological, economic and social criteria**.

The Agricultural Center Limburgerhof will continue to expand structurally and technologically in order to meet all the demands of modern crop protection



From product to solution – good prospects for crop protection

The Agricultural Center Limburgerhof has extended its focus in the area of crop protection. The goal is to develop solutions for sustainable agriculture that help farmers improve their agricultural production and increase the success of their operations. The new Functional Crop Care business unit is at the forefront of this movement. The unit develops solutions for resource and stress management that both increase yields and have good environmental performance. These solutions focus on soil management, seed treatment and optimal crop care.

Since 2012, the U.S. company Becker Underwood has been part of BASF. With this acquisition, BASF's Crop Protection division gained one of the leading global providers of technologies for biological seed treatment, colorants and polymers for seed treatment as well as products in the areas of biological crop protection, turf and horticulture. The addition of this innovative supplier of system solutions for agriculture has allowed BASF to expand into additional areas of research. For example, seeds can now be treated with biological products, such as microorganisms and bacteria that fix nitrogen and

supply the plant with additional nutrients. This acquisition made BASF one of the leading suppliers in the fast-growing market for biological seed treatments. BASF's strong global position also creates the opportunity to broaden the core business of Becker Underwood and thus to expand internationally.

In addition to providing effective crop protection, AgCelence® products make it possible for farmers to sustainably increase their agricultural yields and yield quality. By improving plant health and vitality, AgCelence® offers real added value beyond effective crop protection. At the same time, the agriculture portfolio offers farmers more than just ways of improving quality and yields. Many ideas have already been implemented, ranging from the crop protection app for farmers to comprehensive advisory services and support for marketing of agricultural products in places like India. Many more projects are still in the planning stage and they will shape the work at Limburgerhof in the years to come.

BASF Crop Protection is one of the leading companies in the industry worldwide. The division had sales of €5.2 billion in

2013 and has more than 8,000 employees worldwide. What does the future hold for BASF Crop Protection and the Agricultural Center as headquarters?

The division's plans for 2020 not only forecast sales of €8 billion, but also set a clear strategic goal: BASF Crop Protection will become *the* solution provider in agriculture worldwide. Innovative fungicides, insecticides, herbicides, seed treatments and pest control products continue to form the basis of the portfolio. They are complemented by services and solutions that go beyond crop protection and target areas like plant health and improved absorption and utilization of nutrients in the soil (e.g., fertilizer efficiency) because healthier and hardier plants also provide higher yields and quality.

Securing yields is vital if agriculture is to meet the global demand for food and feed products, as the population continues to grow while the quantity of arable land remains relatively stable. Crop protection will play its part in the future, but it must be both effective and environmentally friendly. The great challenge, therefore, is to offer solutions for sustainable agriculture throughout the world.

These solutions should help farmers optimize their agricultural production, increase the commercial success of their operations

and thus improve the quality of life for a growing world population.



BASF supports farmers around the world in the key tasks facing modern agriculture, including the challenge of achieving higher yields while still acting with ecological and social foresight

1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014

Our story continues – future prospects for and from Limburgerhof

The **history** of the **Agricultural Center Limburgerhof** is inextricably linked to the development of **global agriculture** – and this will remain true in the **future**. The **tasks** are as diverse as **our employees** worldwide, who will remain crucial in **shaping this story**. Some colleagues share their personal **experiences** and **expectations**:



“Critical consumers can be won over only if we can educate them about the need for crop protection. That’s why I’m always looking to engage in dialog wherever and whenever I can.”

Roland Kramm



“By 2020, we will have production facilities in Asia. We need to think big conceptually and act pragmatically in the implementation in order to deliver excellent results.”

Antonius Utomo

“For 40 years, it has been my pleasure to work in Limburgerhof and, in spite of constant changes, the goal has always remained the same: developing new active ingredients.”

Rosina Schwab



“Our aim is to improve our products and their application so that they pose no risks to the environment or to human health. As a responsible company, we support farmers in the proper application of our products.”

Simone Vogel





“Innovative research technologies are the key to finding new active ingredients in a targeted way. This requires flexibility and creativity.”

Torsten Herpich

“For me, a pragmatic management culture is critical to achieving our goals – that’s true today, and it will be true 25 years from now. I think this saying says it all: You can recognize a boss’ skills by the way he recognizes the skills of his employees.”

Kim Krause



“The opening of Eastern Europe has significantly changed European agriculture, creating new possibilities and opportunities for BASF. My job is to support the marketing of new product solutions.”

Agnieszka Baker



“Practical agriculture is more than a job for me. In cooperation with my colleagues from research and the field, I like to optimize cultivation methods so that farmers will continue to be able to produce high-quality, affordable food. At the same time, we want to address the public’s increasing awareness about the environment and sustainability.”

Dirk Wendel



“Many factors will play a role in securing the harvests of today and tomorrow. One of these is effective crop protection. I’ve been working on this in active ingredient research for 33 years.”

Matthias Hoffmann

“The development of new classes of active ingredients will continue to represent a major challenge for future research. Prescreening is vital for the evaluation of new active ingredients in the search for innovative fungicides.”

Franz Röhl



“I have worked for BASF Crop Protection in three different regions. And I’ve gotten to know very different agricultural structures. The diversity of crops and farming methods fascinates me again and again.”

Jorge Cartin



1914 – 1927

1927 – 1948

1948 – 1966

1966 – 1996

1996 – 2014



“My time here at the Agricultural Center has been extremely important in preparing me for future tasks in the region. Interacting with my colleagues both at the working level and personally has been a very valuable experience.”

Takeshi Inoue

“Manufacturing our products requires that the raw materials are available and of the best quality. Given our growth plans, this is a challenge that we, the members of the Formulants Task Force, gladly accept.”

Christian Miyagawa



“In the Supply Chain department, we constantly work to optimize the shipment of goods to our customers and ensure that our products arrive reliably and on time.”

Anne Wenzel



“Herbicide research has been undergoing a renaissance since 2009, and our test methods from the Leadfinder to follow-up testing require continuous adaptation to new strategic markets.”

Liliana Parra



“From occupational safety to working safely, I am committed to ensuring that colleagues exchange information about risks in their teams and make joint arrangements for managing these risks.”

Lars Benedix

“In my 33 years of research work, I have always remained curious. My interest in entomology and the teamwork in the Leadfinder department motivate me every day.”

Claudia Emmer



“Healthy crops are essential to ensuring that high-quality fresh foods that also look appetizing arrive on our tables. The targeted use of crop protection will continue to support this objective in the future.”

Steffen Scheid





“The strong growth of BASF Crop Protection requires record investments in production. We have an excellent team, and we are planning several new production plants worldwide that will go into operation at the same time in the next few years.”

Jochen Schröder

“We deliver intelligent solutions for project management and cost transparency to efficiently use our resources and to comply with the regulatory requirements. This is how we set the course for sustainable product development.”

Christian Rase



“Farmers have to react flexibly to market and weather conditions, and they expect the same of BASF in terms of product availability. To meet these expectations, we have to provide the best possible link between the internal teams of global production and inventory control of our active ingredients.”

Peter Berg



“Our products in professional pest control, such as the rodenticide Storm® or the cockroach gel Goliath®, prevent the spread of pests and associated diseases. In this way, we offer sustainable and innovative solutions that improve public health.”

Thomas Grünewald



“The diversity of Africa cannot be reduced to just a few words, but our goal for Africa can be: knowledge transfer and innovative product solutions for African farmers.”

Fabrice Robin

“BASF Crop Protection is a diverse and dynamic business division. A can-do attitude and mutual appreciation and respect define our team spirit. This is what makes us successful.”

Andrea van der Velde



“My home country Argentina played a big role in my early interest in agriculture. I want to contribute to the development of our active ingredients, which means coordinating the global field tests for the key crops of corn, soybeans and sugar cane.”

Mariano Etcheverry



Image credits

- Page 2** fotolia | scaners3d; (image on the left)
- Page 7** akg-images | Science Photo Library | Carl Bosch (1874-1940), German chemist; (image on the top)
- Page 7** akg-images | Science Photo Library | Fritz Haber, German chemist; (image on the bottom)
- Page 8** akg-images | BASF, an ammonia reactor | Photo around 1913; (image on the left)
- Page 9** akg-images | BASF, mixed fertilizer plant | Photo around 1913; (image on the right)
- Page 10** akg-images | arkivi U | Advertising for Ak fertilizers, Giant potato
- Page 12** ullstein bild | BASF – Oppau: Aerial view of the “Badische Anilin- & Soda-Fabrik” (BASF) after the explosion on September 21, 1921 | Photograph taken: September 22, 1921
- Page 17** Bundesarchiv (Federal Archives) | Image 183-R0210-336 | Photographer: Herbert Blunck | Photograph taken: fall 1949 | License CC-BY-SA 3.0
- Page 29** ullstein bild | Lehnartz | A look at an open-plan office 1971 | Photograph taken: 1971
- Page 43** LWL Media Center for Westphalia | Harvesting grain with the combine harvester, Münsterland, 1963 | Photographer: Hild, Hans | Photograph taken: 1963
- Page 47** 2012 John Deere & Company | 2-row John Deere 99 Cotton Picker, Fresno, CA, 1957 | Photograph taken: 1957; (image on the right)
- Page 60** Corporate archives BASF Schwarzheide GmbH; (image on the left)

Imprint

BASF SE | Global Communications Crop Protection | 67117 Limburgerhof | Germany
Tel. + 49 621 60-28012 | www.100-years-agricultural-center-limburgerhof.de

Order number: APK 0001 E-03.14-1.0

© = Registered Trademark of BASF. © Copyright BASF SE 2014. All rights reserved.



The Chemical Company