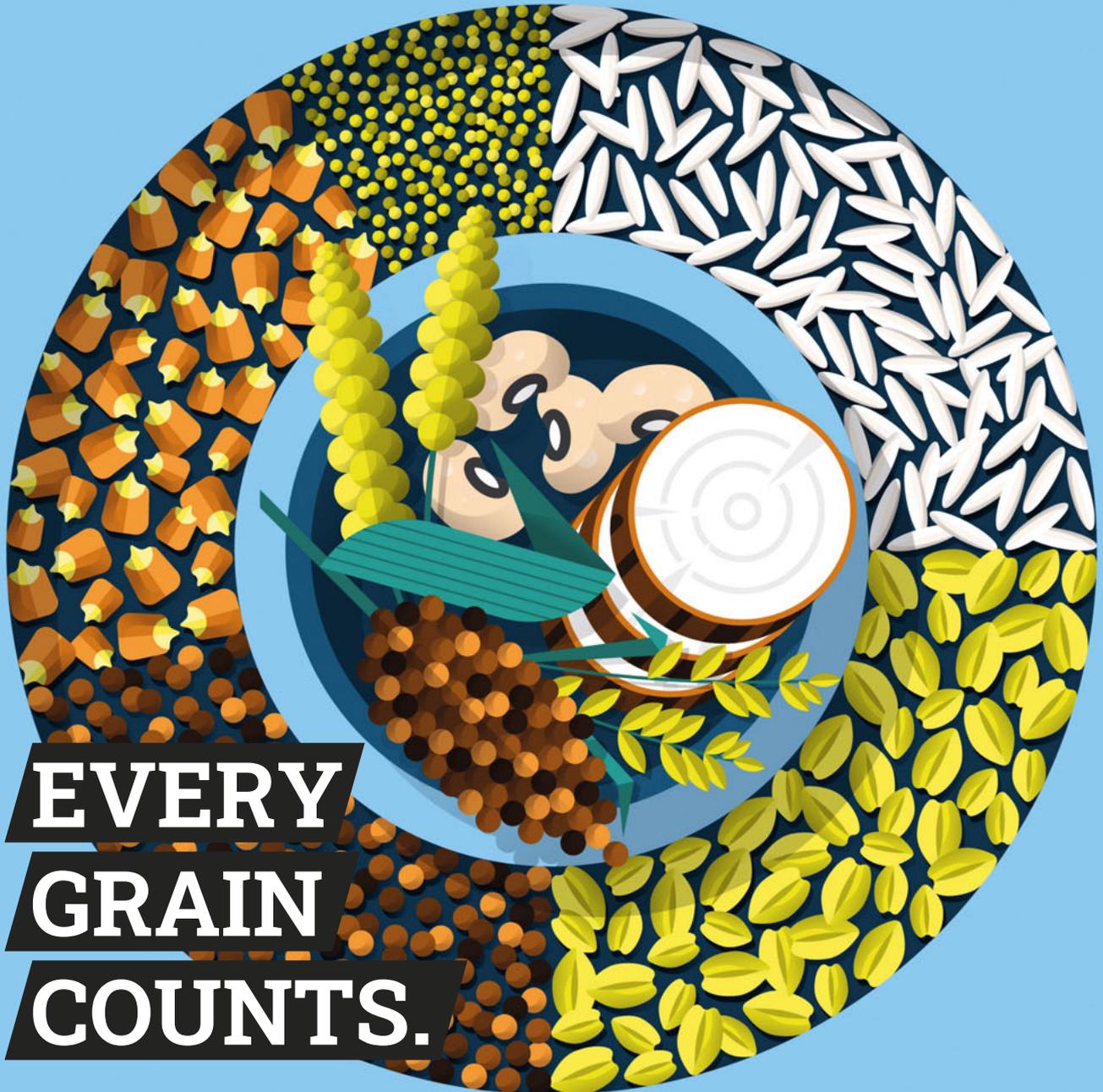


diagram

#187 / November 2023

the Bühler magazine



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ENOUGH TO FEED
THE WORLD?

**THE PRIVATE SECTOR PLAYS
A DECISIVE ROLE**

MAXIMIZE EFFICIENCY,
MINIMIZE FOOD LOSS

**HOW FOOD PARKS LEVERAGE
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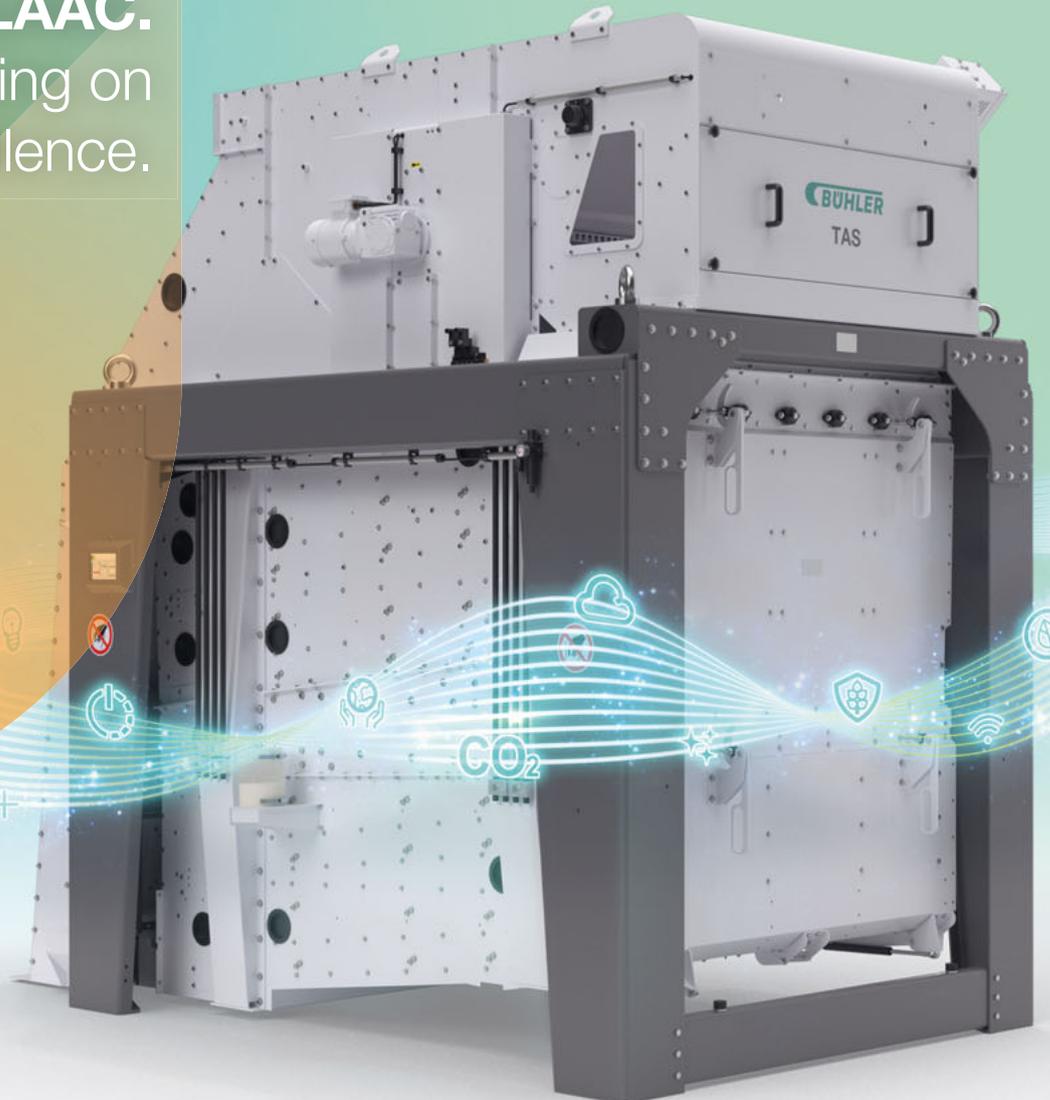
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EDITORIAL



STEFAN SCHEIBER
CEO BÜHLER GROUP

DEAR READERS,

This issue of Diagram focuses on the importance of ensuring food security across the world. The challenge of food security – especially in the most vulnerable regions – has in the past years been exacerbated. I see it as our duty as industry leaders in global food and feed processing to do everything in our power to provide safe, nutritious, and affordable staple foods to consumers.

I'm very confident that together with you, our customers and partners, we can live up to these mounting expectations. In this issue, we are highlighting where the biggest levers are in our value chains, how industrial food processing plants – called food parks – unlock incredible savings and efficiency potential, and we focus on the solutions at hand to achieve the biggest impact. We're showcasing customers from Kazakhstan to Mexico, from Angola to Florida and Brazil, all of which are compelling examples of ingenuity, innovation power, and the will to take responsibility in feeding growing populations. While these only capture a glimpse of what all of you are achieving around the world, we hope that you find them as inspiring as we do.

Sharing knowledge and making education accessible are equally important factors in improving food security. Our African Milling School in Nairobi, Kenya, perfectly embodies these values. Our involvement in Partners in Food Solutions is testament to the power we can unleash when we share vital know-how in food processing.

We hope these stories will fill you with optimism and the confidence that together we have the solutions and tools on hand to turn challenges into opportunities. I would like to take this opportunity to thank you for your contribution to ensuring food security as a valued customer, partner, or supplier. Together we have a tremendous impact on the daily lives of billions of people – let's continue collaborating, innovating, and inspiring each other to rise to the challenges.

Sincerely yours,
Stefan

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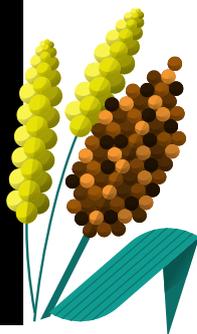
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ON THE COVER

Every grain counts. Today, most countries are dependent on five cereals – wheat, rice, maize, barley, and sorghum, with the first three accounting for 41 percent of global calorie intake. Whether it's one of the big five or more traditional crops, in this issue we explore how to make the most of every individual grain.



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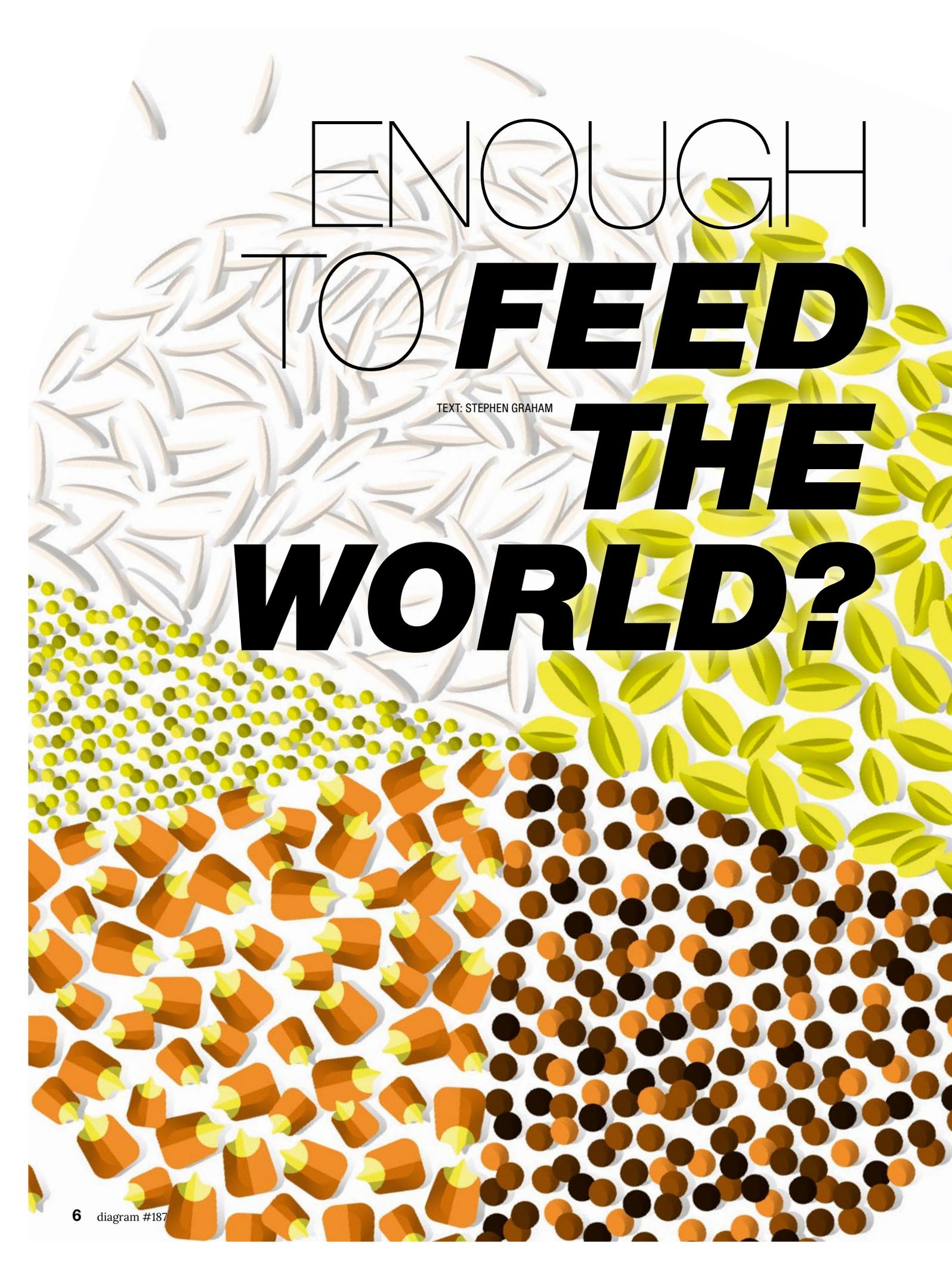
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Follow us on our social media and online channels and delve even deeper into the world of Bühler.



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ENOUGH
TO **FEED**
TEXT: STEPHEN GRAHAM
THE
WORLD?

Food security is the foundation of all human development, but in many parts of the world it is still lacking. Yet capacity is not the biggest problem: it is possible to produce enough food to feed the growing global population. Among the solutions needed to ensure everyone has access to sufficient nutritious food are better technology, logistics, and infrastructure – and this is where the private sector can play a vital role.

IN THE 18TH CENTURY. English economist Thomas Malthus, warned that the growth of the population would outstrip the capacity of the planet to feed it. An economic pessimist, Malthus did not take agricultural and technological advances into account.

In the 1960s, the “green revolution” built on high-yielding crops, chemical fertilizer, and irrigation, lifting farm productivity around the world. The green revolution now needs to increase food production without impacting biodiversity and harming the environment.

Key to this development has been significant increases in the production of staple crops, with cereals – the edible grains of cultivated grasses – foremost among them. Today, maize, wheat, and rice provide roughly two-thirds of the calories consumed by people globally, according to the Food and Agriculture Organization of the United Nations (FAO). Population growth has flattened in many countries, though the United Nations (UN) projects a world population of nearly 10 billion by 2050. Meanwhile, global poverty rates have declined.

Food insecurity is an ongoing threat

But humanity is not out of the woods. According to the FAO, between 2019 and 2022 the number of people facing hunger in the world rose by more than 122 million to about 735 million. Using a wider measure, the UN estimates that about 30 percent of the global population, or 2.4 billion people, faced moderate or severe food insecurity in 2022, meaning that they did not have constant access to food. Across low-income countries, two-thirds of the population

is affected, with hotspots in sub-Saharan Africa, Southeast Asia, and Latin America. On this trajectory, the UN Sustainable Development Goal of ending hunger, or chronic undernourishment, by 2030 will not be reached.

The main factors undermining food security in different parts of the world include economic and political instability, armed conflicts, weather extremes, and inequality. The UN also points to the resource constraints facing poorer farmers as they struggle to adapt to changing conditions.

Most recently, the war in Ukraine has triggered hikes in grain and energy prices that have exposed the fragility of global food security. Like the Covid-19 pandemic and climate-induced crises, the conflict has underlined the need for countries to build their resilience against shocks, including investing in modern food systems.

Moving food to where it is needed

According to Dr. Komla Bissi, a senior adviser on agriculture, trade, and value chains to the Secretariat of the African Continental Free Trade Area, there is generally enough food in the world. But countries often lack the systems to move it from where there is a surplus to where it is needed, as well as the technologies and infrastructure to safely store and process it into the foodstuffs that people want.

“We have the capacity to produce enough food to meet our food security requirements at a global scale,” he says. “But producing sufficient food, either domestically or globally, is one thing. It is another thing to make sure this produce is made available in

sufficient quantity, in a timely manner, as and when and where it is needed.” While Africa has enough land, water, and other natural resources to feed itself, it lacks appropriate storage technology and logistics, according to Dr. Bissi. It is often easier to import food products from outside the continent than from within Africa, he says. And while some countries have silos for storage, they do not have appropriate drying and cleaning systems, or temperature regulators and monitors. “Without these, you cannot know the volume of grain in the silo, let alone whether the quality meets human consumption requirements.”

An essential ingredient for social stability

Modern storage facilities enable countries to build up reserves of staple foodstuffs in times of abundance so that they can absorb disruptions. The lack of preparedness in some places has now been laid bare. “On the African continent, we did not realize that we had insufficient storage of food at individual country-level to be able to mitigate the effects of a pandemic,” says Dr. Bissi. “When the war between Russia and Ukraine started it was only then that we realized we did not have sufficient strategic reserves. At present, most countries in Africa have reserves that can barely take care of them for a month or two if there is any disruption.”

Maintaining food security is a prerequisite for social and economic development, even political stability. Its absence disrupts livelihoods, over-stretches health services, and wastes human capital. In the most extreme cases, it leads to malnutrition, starvation, and social upheaval.

“No community or society can go hungry and still be able to function,” says Dr. Bissi. “There have been many situations in our part of the world where countries suffered riots and uprisings because of small increases in food price or the unavailability of food.”

While food insecurity often results from shortages caused by failed harvests or an interruption of trade, it can just as easily result from factors such as poverty, discrimination, or disruption that puts foods beyond reach for large numbers of people.

According to the UN, food security exists when all people have access to enough safe and nutritious food for an active and healthy lifestyle. This reflects how thinking about food security has evolved from focusing on the availability of enough calories per capita to looking at whether healthy diets are affordable for all. “Lack of food, lack of income, and lack of peace are the three things that drive food

insecurity,” explains Dr. Lawrence Haddad, Executive Director of the Global Alliance for Improved Nutrition (GAIN).

Increasing resilience and productivity

Ensuring food security means providing for the current generation but also, according to the UN, designing sustainable food systems that will deliver far into a future shaped by climate change.

Farmers around the world are already suffering from ominous shifts in the climate. More extreme weather events such as storms and droughts have devastated crops in some regions, or left livestock short of grazing land and water. Yields of some crops have been affected, especially in the tropics.

Longer-term changes in rainfall and temperatures risk rendering large areas of land unsuitable for agriculture or pastoralism, while higher carbon dioxide levels are expected to reduce the protein and micronutrient content of major cereal crops. Shifts in the distribution of pests and diseases will also harm agriculture in some regions, according to the Intergovernmental Panel on Climate Change. “Farming is already one of the most unstable, volatile

**“PRODUCING SUFFICIENT FOOD,
EITHER DOMESTICALLY OR GLOBALLY,
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MAKE SURE THIS PRODUCE IS MADE
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A TIMELY MANNER, AS AND WHEN AND
WHERE IT IS NEEDED.”**

DR. KOMLA BISSI

A senior adviser on agriculture, trade, and value chains to the Secretariat of the African Continental Free Trade Area

business enterprises there is, and climate change is making it even more volatile and unstable,” Dr. Haddad explains.

To reduce the risk of future crises, food systems need to become more resilient as well as more productive. Achieving this requires investment in areas including logistics and markets, growing a wider range of climate-adapted food crops, gene-editing to improve crop strains and livestock breeds, and precision farming methods that optimize the use of inputs such as fertilizer and water. Investments in





Efficient food handling from transportation to storage to processing is critical to improving food security.

“LACK OF FOOD, LACK OF INCOME, AND LACK OF PEACE ARE THE THREE THINGS THAT DRIVE FOOD INSECURITY.”

DR. LAWRENCE HADDAD

Executive Director of the Global Alliance for Improved Nutrition

handling, storage, and processing facilities are also important to reduce foodborne diseases and the presence of mycotoxins in staples like maize and wheat. Concentrating processing steps from intake to final product in one facility – often called a food park – helps to reduce food loss along the value chain from farm to packaged good. Fortification also plays a role in improving the nutritional value of staple foods. “Infrastructure and technology are absolutely critical,” says Dr. Haddad.

Food consumption has evolved

Another growing factor is changing diets. Rapid urbanization – almost seven in 10 people will live in a city by 2050 – are reshaping food systems, including a shift in demand from traditional foods towards diets with more meat and dairy products and more convenience foods.

“As well as being ready to produce sufficient food to feed the growing global population, we also need to be aware of globalization and changing food attitudes, especially driven by urbanization and the growing middle classes,” says Dr. Bissi. “More people are now looking for more easy-to-prepare foods. The way food is consumed has continued to evolve over time because of changing societal dynamics.”

In African countries, many people are moving away from traditional foods to easy-to-make foods, like pasta. “We need to be prepared for these dynamics. We need to enhance our food processing technologies to be able to meet this growing demand,” Dr. Bissi says. “The food must be made available in the way that people want to consume it.”

To increase food security in Africa, investments in new technologies and infrastructure are needed.



“THE WORLD SHOULD BE ABLE TO FEED ITSELF, BUT WE NEED TO WORK TOGETHER. THERE IS HOPE AND THERE ARE OPPORTUNITIES.”

DR. KOMLA BISSI

A senior adviser on agriculture, trade, and value chains to the Secretariat of the African Continental Free Trade Area

Dr. Bissi sees great potential for the 55 countries of Africa to improve their food security and bolster their economies by combining improvements in domestic food production and processing with expanded intra-continental trade. “We must enhance our domestic production so that we can feed ourselves. The current import bill for food into Africa is at USD 80 billion a year – money we have to borrow,” he says. “As a continent we do not want to continue depending on the global community excessively for our food requirements.”

Countries making progress include Ethiopia and Zimbabwe, which have dramatically increased wheat and maize production in recent years to meet their own needs and export surplus to other parts of the continent. “Zimbabwe increased grain production from 200,000 tonnes a year in 2019 to a current level of 3.7 million tonnes. That enables the country to meet its own national grain requirements of about 2.75 million tonnes, and they have around a million tonnes of grain available for export,” says Dr. Bissi.

Rwanda, Ghana, and Nigeria are other African countries with successful food security strategies. In Asia, Bangladesh has achieved national self-sufficiency in rice and is emerging as a significant exporter of vegetables.

“These countries are putting in place systems at domestic level and working toward the export market,” says Dr. Bissi. But beyond production, they are also putting in place the infrastructure and technology to process food themselves. This is essential, as currently much of the food bill is for imported processed food, often based on raw food products that were grown and exported from African countries in the first place. This makes little sense, as Dr. Bissi points out: “Rice has to be milled. We’re not going to produce it in Nigeria and export it to the Netherlands or Switzerland to be milled.”

Engaging the private sector

Dr. Bissi sees huge opportunities for the private sector to catalyze development in these areas, by developing and providing technology and financial solutions along the food value chain.

“We need to enable the private sector, not just domestically but also globally, to participate effectively,” he says. “No individual country can do it by themselves. In Africa, we have the environment and the youngest population in the world, but not the technology or the financing. The world should be able to feed itself, but we need to work together. There is hope and there are opportunities.”

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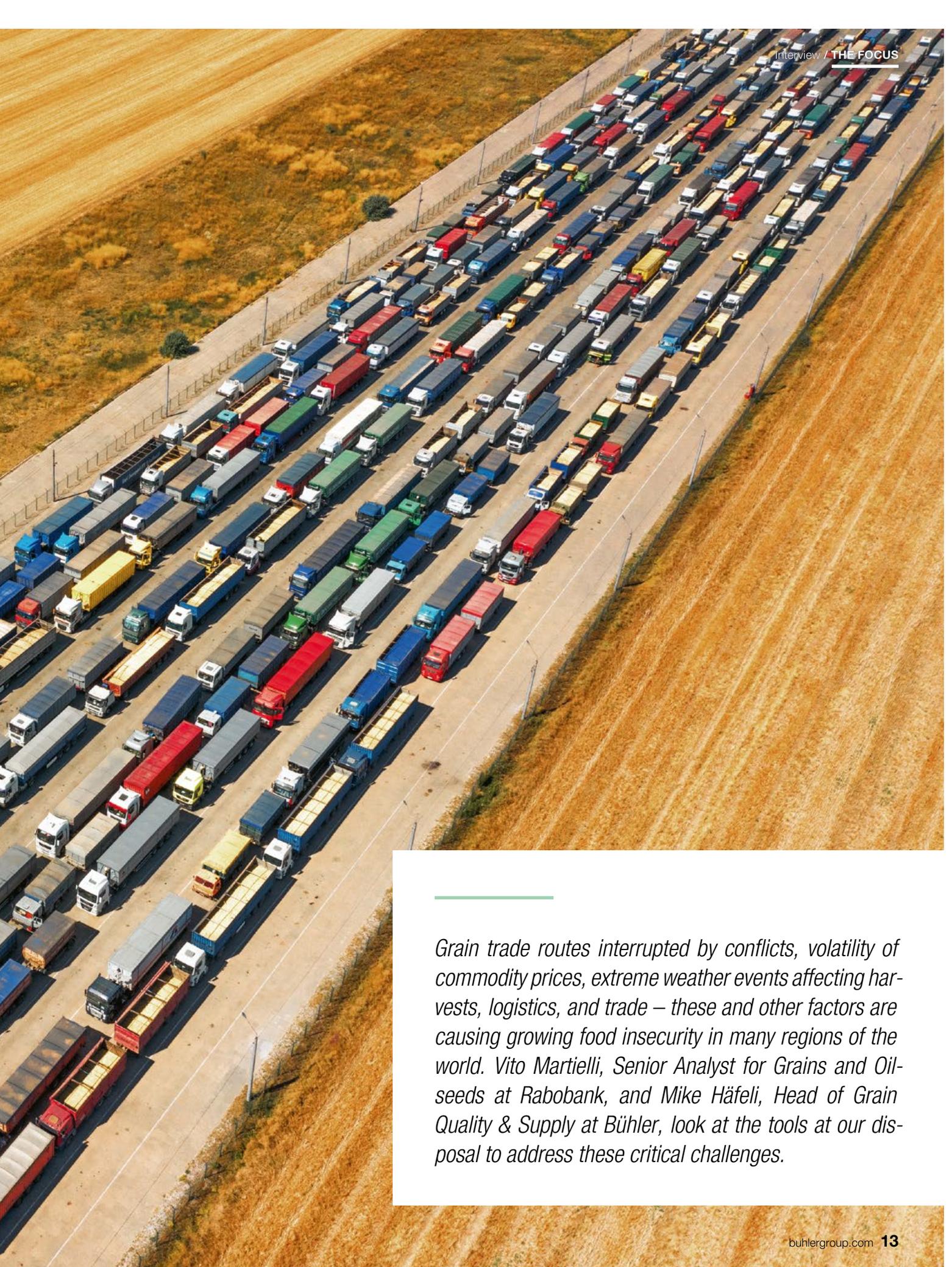
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Trucks loaded with grain crops queue for lengthy periods due to a blocked Ukrainian port.

GLOBAL GRAIN TRADE

CHALLENGES AND OPPORTUNITIES

INTERVIEW: JANET ANDERSON



Grain trade routes interrupted by conflicts, volatility of commodity prices, extreme weather events affecting harvests, logistics, and trade – these and other factors are causing growing food insecurity in many regions of the world. Vito Martielli, Senior Analyst for Grains and Oilseeds at Rabobank, and Mike Häfeli, Head of Grain Quality & Supply at Bühler, look at the tools at our disposal to address these critical challenges.

While the focus will shift to local grains in some countries, efficient and safe handling of large quantities of grain remains important.



“IF YOU ARE ABLE TO CAPTURE THE FOOD LOSS AND TO IMPROVE EFFICIENCY, THAT WILL ENABLE IMPORTANT GAINS WHICH WILL HELP IMPROVE GLOBAL SELF-SUFFICIENCY.”

Since the war in Ukraine started, grain shortages have affected many regions. Where is the impact being felt most?

VITO MARTIELLI: In terms of commodities, the biggest impact in my view is on wheat. We need to keep in mind that Ukraine and Russia together, before the start of the war, were responsible for 30 percent of global wheat trade, 30 percent of global barley trade, 20 percent of global corn trade, and 80 percent of global sunflower oil trade. In terms of absolute volumes, wheat is the biggest one – these two countries are responsible for 57 million tonnes of wheat traded globally. On the demand side, the biggest buyers of these grains are in the Middle East and North Africa. In the last three years, on average, Egypt has been the largest importer of wheat globally, followed by China and Turkey. There are also a number of developing markets in sub-Saharan Africa that are becoming more important buyers of wheat and others that are close by, for example in Southeast Asia. There are also developed markets that are impacted. The European Union is the largest buyer of corn from Ukraine. So, there is also quite a significant impact being felt there too.

VITO MARTIELLI

Senior Analyst for Grains and Oilseeds at Rabobank

What can be done to help mitigate these grain supply shortages?

MIKE HÄFELI: Our aim, first and foremost, is to support all our customers that are affected by such events. For example, we have customers in Ukraine that are still operating, and we are doing everything we can to support them. But that is not all. A more local, less import-dependent grain supply chain needs to be considered. For example, we are seeing our customers in Africa making improvements in the way they do agriculture. These are entrepreneurs who want to support local farmers in growing more grains. That includes not only the grains that they used to import, but also more local grains such as millet and



sorghum. Their aim is to provide local grains from Africa for Africa. This makes them less dependent on imports and, therefore, on events in exporting countries. Equally importantly, these entrepreneurs are also supporting local businesses and local farmers, creating jobs, and enabling local products to be used locally.

There are different ways in which we, at Bühler, can help. One key factor is our local presence. This is a big benefit. It means we can support local entrepreneurs in turning their dreams into reality. We can provide technical guidance and solutions to reduce waste or improve yields. At our African Milling School in Nairobi, Kenya, we can train and upskill our customers' employees to become more proficient in processing so that they can support local grain production.

What kinds of applications is Bühler developing for customers in Africa?

HAFELH This touches on a number of areas. On the one hand, different applications are required to transport these raw materials. Up to now, when we imported grains from Ukraine, for example, it was usually by sea on big vessels. This will change quite a bit. With stronger local production, more and more of the grain is now being transported by road or rail on trucks or freight trains. This means that fewer grain export terminals are being built at ports. Instead, we are seeing smaller collection points where trucks and trains can be loaded easily and quickly. That's a new opportunity we are exploring.

But also, if we look at capacities, the infrastructure required in Africa will be less about the huge industrial facilities with thousands of tonnes of processing capacities and more about the smaller applications that are also appropriate for local grains, such as millet and sorghum. All this requires different processing know-how and skills, but also a different size. Whereas today large facilities are needed because most grains are imported, in future local grains will not go through large import terminals but rather smaller local distribution centers. In addition, it is vital to transition the processing of these grains from what, today, is a largely manual procedure into a more industrial one. This is an area where we can contribute.

How will grain trade evolve going forward?

MARTIELLI That is a challenging question. The answer is that it depends. Because, in the short term, for wheat there are other regions that are able to supply it. For example, in the Southern Hemisphere, Australia is an important net exporter of wheat. Argentina also exports some wheat. Having said that, wheat is mainly produced in the Northern Hemisphere – in Canada, the United States, and Europe. In Europe,



VITO MARTELLI

Vito Martielli has been Senior Grains and Oilseeds Analyst for Rabobank at the Rabo Research Food & Agribusiness department in the Netherlands since 2005. As an expert in grains, oilseeds, meat, and vegetable oils, he is a regular speaker on these topics at global conferences in Europe, the Americas, Asia, Africa, and Oceania. Before joining Rabobank he worked for the Agricultural office of the Dutch Embassy in Rome. He also advised the Italian Ministry of Agriculture on the promotion and quality of Italian food in the world market. He has also worked for McDonald's Italy in Milan working in marketing research and business development.

He holds a degree in Business Administration from Bocconi University in Milan, Italy, and an International Ph.D. from the Faculty of Agriculture at the University of Basilicata, Italy, in cooperation with Wageningen University in the Netherlands.



Mike Häfeli is Head of Grain Quality & Supply at Bühler. He started at the company as an apprentice 29 years ago and has since held a variety of positions. He has been Head of Automation at Bühler North America and Sales Director for Grain Logistics. He is based at Bühler's office in Beilngries, Germany, where Bühler Grain Quality & Supply is headquartered.

He completed his Bachelor of Science in Mechatronics in 2002 at the University of Applied Science in St. Gallen, Switzerland, and completed his Master of Advanced Studies in Customer Relationship Management in 2009 at Zürich University of Applied Science in Switzerland.

the important exporters of wheat have traditionally been France and Germany. But there are other regions such as Romania, Bulgaria, Hungary, and Serbia – the Danube countries – that produce wheat. These are countries that, over the last few years, have increased their exports and can potentially do more. There is also potential in the Baltic countries. So, we might see some shift in trade, but you need to plant the seed first. That means it's not going to happen overnight. I think also that the war in Ukraine is likely to have a long tail. We do not know how long the war will last, but we can assume we will see a shift in investment. These shifts will drive demand for new grain elevators to be built in new places and, at farming level, for new storage facilities.



Geopolitical changes may shift investments in infrastructure to other regions, such as the Danube countries or the Baltic states.

What else is necessary in order to produce enough to feed, potentially, 10 billion people in the world?

MARTIELL: For me, the most important answer to this lies in our ability to improve yields at farming level in a sustainable way. For emerging markets, we need to concentrate on the yield side first. Africa is the region with the biggest expected growth in population, but it is also the region with some of the lowest yields at farming level. That is therefore one of the biggest goals that we need to achieve, because if you can improve the farming yield then you can improve self-sufficiency in Africa. This, in turn, will most likely lead to a requirement for more storage infrastructure. That is one of the key aspects.

The second most important factor is probably the ability to improve logistic infrastructure and control food loss along the supply chain, including first-degree processing – for example, milling – and second-degree processing at consumer level. If you are able to capture the food loss and improve efficiency, that will enable important gains which will help improve global self-sufficiency.



“IT IS VITAL TO TRANSITION THE PROCESSING OF GRAINS FROM WHAT, TODAY, IS A LARGELY MANUAL PROCEDURE INTO A MORE INDUSTRIAL ONE. THIS IS AN AREA WHERE WE CAN CONTRIBUTE.”

MIKE HÄFELI

Head of Grain Quality & Supply at Bühler

What role do you see a company like Bühler playing in improving self-sufficiency?

MARTIELLO: We already mentioned the African Milling School. I think that’s where it starts. It is essential to provide support on the ground in education to teach people more about the product, how to grow the crops, and how to reduce food loss and improve logistics and efficiency in the supply chain. We have to look at how we can help people to better understand and make more use of the products they have and improve access to those raw materials that they cannot easily produce. We also need to help

people use byproducts and side streams instead of letting them go to waste, and we have to look for opportunities to upcycle. Maybe we can use the husks to produce energy in a sustainable way based on circular economy principles, or maybe we can use them in the feed industry. We have to think about how we can upcycle and generate more value.

How can we achieve this?

HÄFELI: I agree, education will remain of utmost importance. This is where our African Milling School or our recently opened Grain Processing Innovation Center in Kano, Nigeria, will be a big benefit. Both help tremendously to continuously improve know-how, skills, and new processing solutions. At the end of the day, it’s all about collaboration. We need to start working together.

We’ve seen great entrepreneurs, for example, Nelson Carrinho in Angola, who is creating local jobs, supporting local farmers to do more locally, and building large processing facilities to feed the local people. The more we can collaborate with such entrepreneurs, the better we can support local food production and local grain production, and through training and education, enable them to improve processing capabilities and local farming, and reduce loss in doing so.

Should we diversify production into even more countries? Are there countries that could be growing more grains that currently aren’t?

MARTIELLO: That is one of the challenges in the global grains and oilseeds industry, because you need the right climatic conditions to grow these products. This is the case for palm oil and soybeans, but also, in a certain sense, for wheat and corn. That is why grains are produced in only a few countries. And, as we have learned, if there is an issue that affects the supply in one of these countries – whether it is a climatic issue or something else – it becomes a global issue. So diversifying is therefore difficult.

Instead, I think the key in emerging markets like sub-Saharan Africa is to improve farming businesses and yields, and, at the same time, improve transport and logistics infrastructure. But there are other tools as well. For example, during the pandemic industry learned to be flexible and to use the local products that are available. Finally, the third tool is policy. Policymakers need to provide supporting policies that are viable and sustainable for the long term to stimulate private-public partnerships. This is a winning combination that brings results.

SUPER

TO MAXIMIZE



Food parks integrate intake, storage, cleaning, processing, and production of end products under one roof.

SIZE

TEXT: LUKAS HOFSTETTER



Food parks are large industrial food processing facilities that combine entire value chains under one roof and make it possible to leverage economies of scale. They produce more than 1,000 tonnes of food a day, which offers a variety of benefits in food processing with regards to efficiency, food safety, side-stream valorization, labor costs, and much more. With pressure mounting on food producers to get the most out of every grain, food parks are gaining importance across the globe.

Shorter transport routes and reduced goods handling reduce food losses and increase food safety.



GLOBAL FOOD SYSTEM emissions amount to 15.8 gigatons of CO₂e, equating to 30 percent of the world's greenhouse gas emissions, according to the European Commission's Directorate-General for the Environment. Meanwhile, the United Nations calculates that around 14 percent of food produced is lost between harvest and retail, while an estimated 17 percent of total global food production is wasted, mainly in households and in the food service industry. That's a total of 31 percent of food that is lost or wasted, meaning that almost 10 percent of the world's greenhouse gas is emitted to produce food waste or food loss.

Food waste is being tackled by local governments and organizations. Food producers, on the other hand, are doing everything they can to reduce food loss – because the biggest and most immediate impact is from how we transport, store, and process grains to produce staple foods. That's where food parks come into play.

Thomas Widmer is Head of Grain Handling at Bühler and is involved in the planning, construction, and start-up of large industrial food and feed processing plants. His wealth of experience in managing big projects around the world allows him to put things in perspective. "The global food system is facing more challenges in terms of climate change, political tensions, and supply chain disruptions. Our customers are dealing with overlapping crises: Covid-19, climate shocks, and conflicts that lead to a

spike in ingredient costs. It's always been Bühler's mission to develop and improve technologies to adapt to an ever-changing environment. That's why we're now in the position to create smart, efficient, and economically viable solutions together with our customers that enable them to provide safe and nutritious foods in sufficient quantities for a growing population. Food parks are the next logical step in this evolution," he says.

Strong lever effect

Food parks have the capacity to produce in excess of 1,000 tonnes of food per day. This provides a rough estimate of the sheer scale of such facilities. Yet it's only by looking behind these quantities that we can really see their positive impacts on food value chains. "A food park is usually located near major ports or railways and integrates intake, storage, cleaning, and processing of grains such as wheat, maize, or rice followed by the production of end products – all in one place. This leads to significant savings in transport costs, for example if flour as an intermediate is produced and processed into pasta, biscuits, or animal feed in the same facility," says Widmer.

Reducing transportation has the most profound impact in food processing. Carrinho Group in Angola, for example, produces 2,442 tonnes of food per day in its food park, providing food for around 15 million people in the southern African state with a population of 34.5 million as of 2021. Thanks to the inte-

grated design of the food park, Carrinho Group saves 250 tonnes of CO₂e per day compared to traditional operations with separate locations for process steps. A staggering 80 percent (200 tonnes) of CO₂e savings are due to reduced transportation of food.

“At the end of the day, food processors are forced to play by the same market rules as any other producers of goods competing for market share: create synergies, lower avoidable costs, and never stand still when it comes to finding new ways to improve your processes,” Widmer says. Another significant benefit of reducing transport of food post-harvest is the effect on food loss. The math is simple: Every time grains get loaded, unloaded, and loaded again, part of the total amount gets lost. The impact is even more severe in intermediate storage, where toxigenic mold diseases can contaminate large quantities of grains and lead to preventable food losses.

“Every grain that gets lost from farm to fork has a negative impact on cost, yield, emissions, and of course, food security. The single most efficient measure is finding ways to reduce food loss in the value chains of our customers – from intake all the way to packaging,” says Thomas Widmer.

Edyta Margas, Global Head of Food Safety at Bühler, sees huge potential to increase food safety by reducing the touchpoints of food with other

materials and by improving process steps. “We know that the risk of food safety incidents, such as contamination by pathogens or allergens, increases with each added process step or handling activity. Within a food park, where intake, cleaning, storage, processing, and packaging often occur in the same building, we can significantly reduce the risk of contamination, thanks to appropriate factory zoning, hygienic design of the respective machines, seamless process steps, and digital solutions.”

One such solution is Bühler’s plant automation system Mercury MES (Manufacturing Execution System). It allows forward and backward traceability of a batch in less than 30 seconds. This fast response time enables food processors to quickly determine where a food safety incident has occurred and remove the affected batch from the value stream. The faster this happens, the less food is lost.

Every grain matters

Whether its specialty foodstuff producers or industrial-sized food processing companies, they all have the same goal: to produce good food of good quality for their markets. The bigger the company, however, the more impactful it is to constantly rethink the status quo of every single process step. It’s this way of thinking, planning, and executing in

“A FOOD PARK IS USUALLY LOCATED NEAR MAJOR PORTS OR RAILWAYS AND INTEGRATES INTAKE, STORAGE, CLEANING, AND PROCESSING OF GRAINS FOLLOWED BY THE PRODUCTION OF END PRODUCTS – ALL IN ONE PLACE, LEADING TO SIGNIFICANT SAVINGS.”

THOMAS WIDMER

Head of Grain Handling at Bühler



“WITHIN A FOOD PARK, WHERE INTAKE, CLEANING, STORAGE, PROCESSING, AND PACKAGING OFTEN OCCURS IN THE SAME BUILDING, WE CAN SIGNIFICANTLY REDUCE THE RISK OF CONTAMINATION.”

EDYTA MARGAS

Global Head of Food Safety at Bühler

entire value chains that has led to the rise of food parks in the past 5 to 10 years, or as Widmer puts it: “These companies really do feel the pressure to stay competitive, day in, day out. When we add to this the need to track, measure, and reduce CO₂e footprint, we end up with a genuinely holistic approach to get the most out of every grain. And the most efficient way is to combine as many steps as possible under one roof.”

Keeping it circular

This holistic approach goes beyond handling, processing, producing, and packaging foods in the same location. Side-stream valorization plays an increasingly important role. In 2021 Bühler joined forces with the Belgian company Vyncke, a technology supplier specialized in turning biomass by-products into a climate-neutral form of energy. The targets were clear: To equip 20 percent of the installed base of Bühler’s customers and 80 percent of all new plants with Vyncke’s solutions and introduce the concept of a circular economy on energy level to industrial food and feed plants around the world.

“This partnership offers Bühler the opportunity to provide new services to our customers that help them increase efficiency and save on energy costs. These are two major challenges we’re addressing in a highly competitive environment, which will help us to deliver on our targets to having solutions ready to multiply by 2025 that reduce energy, waste, and water by 50 percent in the value chains of our customers,” says Johannes Wick, CEO Grains & Food at Bühler.

A look into one of the biggest food parks in the world in Dhaka in Bangladesh reveals the impact these solutions unleash on an industrial scale. City Group is one of the world’s largest food producers and operates a food park with a daily capacity of 17,840 tonnes, of which soy oil (8,000 tonnes), flour (6,200 tonnes), and rice (1,400 tonnes) make up the majority. In addition, they process 500 tonnes of red lentils and yellow peas per day. City’s overall storage

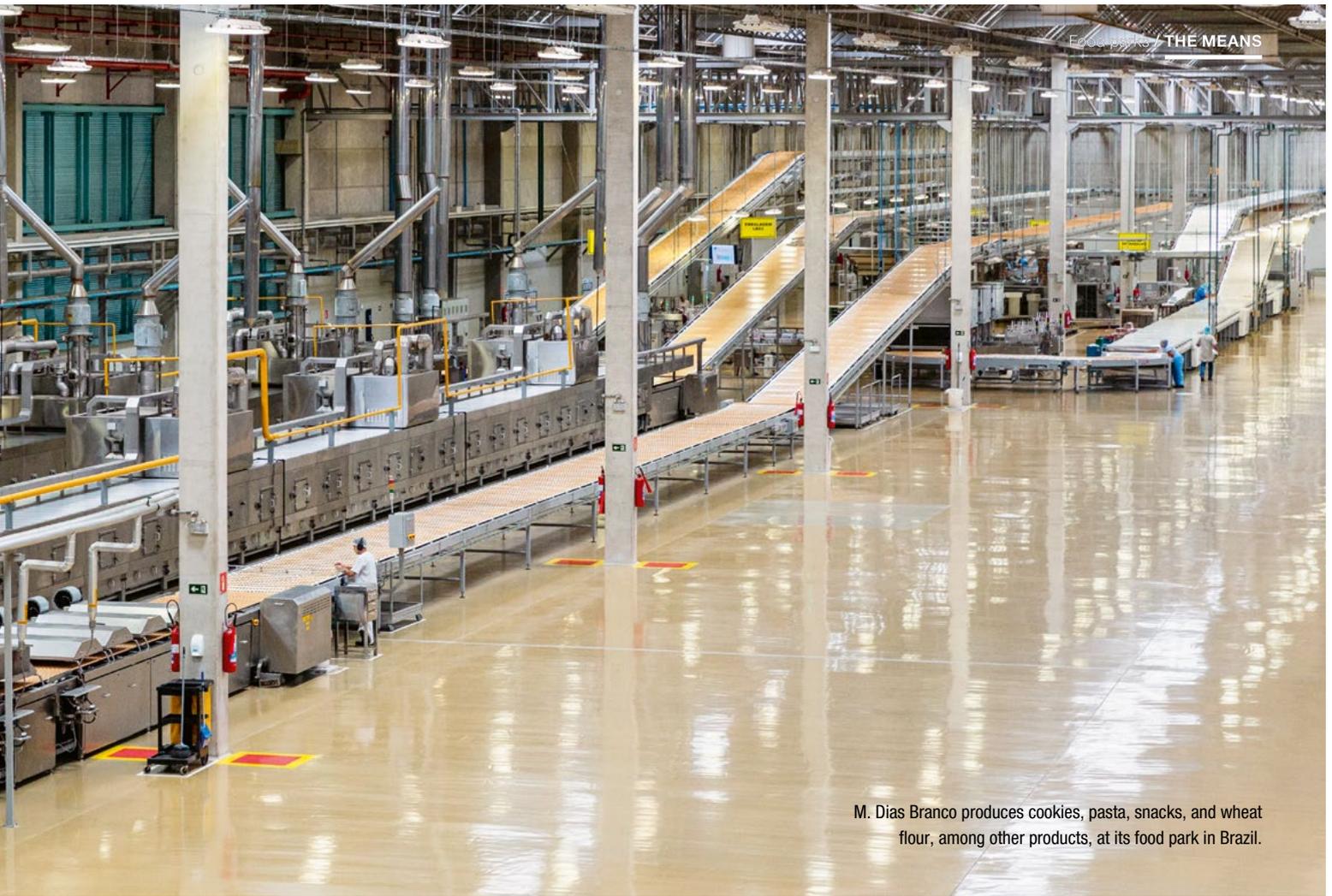
capacity is 450,000 tonnes, which helps them to avoid shortages and compensate for shipping issues or commodity price irregularities.

With two of Vyncke’s steam burners generating 32 tonnes of process steam for the parboiling plant, City Group converts nearly 300 tonnes of rice husk per day into energy that would otherwise be dumped or landfilled. The resulting energy savings is 250 tonnes of fuel oil per day, enabling City Group to reduce CO₂ emissions of their parboiler plant by 60 percent. The fact that the husks are collected, burned, and converted into energy at the same site underlines the key benefit of a food park as a one-stop-shop.

Are developed countries missing out?

Bühler has built food parks for its customers in Angola, Bangladesh, Egypt, and Brazil. While some food parks were built back in the 1960s, the majority have been commissioned in the last few years. This is evidence that the trend towards ultra-large production facilities is gaining traction, and it’s striking that they are predominately being built in the Southern Hemisphere. The question this raises is whether markets such as North America or Europe





M. Dias Branco produces cookies, pasta, snacks, and wheat flour, among other products, at its food park in Brazil.

are falling behind on this megatrend. “The biggest difference between these markets is infrastructure. In Europe or North America, supply chains have been built up and refined over centuries, experiencing constant improvements in terms of proximity, technology, and frictionless alignment across suppliers and borders,” Widmer explains. “In Africa or Southern Asia for example, a lot of this infrastructure is missing or currently being developed. This presents us with the unique opportunity to start greenfield projects together with large food processors and build food parks drawing on decades or even centuries of experience.”

This does not mean that existing players in developed countries are not evaluating the many benefits of integrating process steps under one roof. Bühler’s customer Pannonia in Hungary is a prime example. In 2012, the company started producing ethanol and animal feed from maize with an output of 200 million liters and 150,000 tonnes respectively. In 2018, they started their product diversification program to harvest the full potential of each grain of maize. Today, the company processes 1.1 million tonnes of maize into 500 million liters of ethanol, 325,000 tonnes of animal feed, and 12,000

tonnes of maize oil per year. The maize is used to its fullest extent. Starch, fiber, and protein are all processed into various products such as meat alternatives, bio-chemicals, or prebiotics, to name a few. Pannonia’s one-stop-shop uses side streams to produce biogas, which is then reintroduced as an energy into the process steps. And in 2021, Pannonia extended its portfolio by introducing barley processing to its food park to make thin stillage concentrate and organic fertilizer.

United by a common purpose

Thomas Widmer is encouraged by the collaboration with food and feed producers across the globe. “Today, the value of each grain is really seen in its entirety – from side stream valorization to using by-products as a source of energy all the way to making a loaf of bread, pasta, or snacks to name but a few,” he explains. “What really motivates me is that no matter where our customers are, what languages they speak, or what customs and traditions they celebrate, we are all united by our quest to help feed people. This purpose will keep us going and lead to many more fantastic innovations in food and feed processing.”

A GIANT ONE-STOP-SHOP

Food parks – large industrial food processing facilities that produce more than 1,000 tonnes of food a day – save thousands of tonnes of CO₂e and hundreds of thousands of dollars in operating, energy, labor, and distribution costs daily thanks to optimized infrastructure. To date, they have been built in countries where food production infrastructure is inadequate.

ENERGY GENERATION / RECOVERY

Highly efficient steam boilers can turn rice husks and other waste products into steam, which is reintroduced into the industrial plant as heat or as electricity.

STORAGE

State-of-the-art solutions for intake, cleaning and aspiration, drying, conveying, dedusting and filtering, and storage of grains ensure high food safety standards and minimize food losses.

LABOR

The concentration of production facilities in one food park leads to a reduction of labor such as admin or management functions.

FOOD LOSS

Food loss between the harbor and production site can be avoided because all raw materials are processed in the food park.

UNLOADING

Bühler's Portalink is a continuous mechanical ship unloader designed for the reliable and efficient unloading of grains, oilseeds, and derivatives.

CLEANING

Optical sorters detect and remove unwanted colors, product defects, or foreign materials such as pebbles or sticks with minimal yield loss.

+ **INGREDIENTS**
Food parks increase the potential to source ingredients locally, reducing both price and carbon footprint.

BY-PRODUCT VALORIZATION

By-products such as wheat bran can be used as animal feed or further processed into meat analogues such as spent grains from the brewing process.

+ **FOOD SAFETY**
Intake, cleaning, storage, processing, and packaging occur on the same site, reducing the risk of contamination thanks to seamless process steps.

+ **MAINTENANCE**
Technicians are trained in a variety of disciplines overseeing the entire food park. This results in maintenance savings.

PACKAGING / TRANSPORTATION

Thanks to the integrated process steps in food parks, only the final products such as pasta, biscuits, bread, or animal feed have to be packaged and transported.

+ **DISTRIBUTION**
Distribution costs can be saved on intermediates and by-products, as there are fewer logistics, sales, and marketing costs.

+ **INTERMEDIATE PRODUCTS**
Primary products such as flour have a lower carbon footprint – using that flour to produce a secondary product such as pasta then in turn reduces its footprint.

PROCESSING

From pre-cleaning to cleaning and conditioning, pearling, and milling, all grains, pulses, or spices can be processed in one facility.

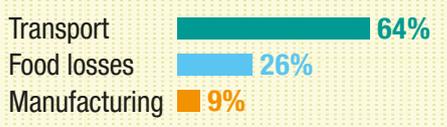
PRODUCTION

Final products such as pasta, bread, wafers, snacks, oils, and much more are produced in one facility.

SAVINGS POTENTIAL:

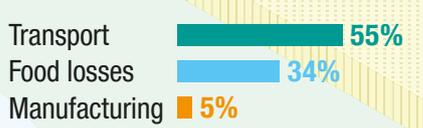
With a daily capacity of 17,840 tonnes and a Vyncke rice husk burner on site.

TOP 3 EMISSION SAVINGS



5,000 t
saved CO₂e per day

TOP 3 COST SAVINGS



\$490,000
saved costs per day

Carrinho's food park in the Angolan desert consists of 17 fully integrated factories on 43 hectares, the equivalent of 60 soccer fields.



In Angola, the family-owned company Carrinho Group has built one of the most modern food parks in the world – and in doing so has embarked on the country's transformation to a better future. Comprising 17 factories producing more than 20 different consumer products, the food park is a driving force for the country's food security.

IT IS AS IF A UFO has landed in the desert – a gigantic one, 43 hectares in size, equivalent to 60 soccer fields. Anyone approaching it from the city of Benguela cannot help but be struck by the contrast with its surroundings. Along the unpaved roads that cross the arid landscape are scores of townships.

Children play while adults search in the litter that is piled everywhere for recyclable materials to sell. The poverty is clear to see. According to the latest statistics from the World Bank, around a third of the people of Angola are still living below the absolute poverty line, facing high unemployment and the rising cost of living, particularly when it comes to the price of food. As a result, food insecurity and under-nutrition are serious problems.

Carrinho Group

FEEDING ANGOLA'S FUTURE

TEXT: BURKHARD BÖNDEL
PHOTOS: STEVIE MICHELSEN

Entering the food park is like stepping into another world. The buildings are equipped with state-of-the-art technology, equipment, and machinery. The offices are bustling with employees, while fully-automated robots load packages onto pallets. There is an infirmary that provides free health care for employees, a cafeteria, and an academy for training and continuing education.

This is not science fiction, but one of the largest and most modern production facilities for basic foodstuffs – a food park with 17 fully integrated factories. Built by the family-owned company Carrinho, the food park in Benguela is a beacon of hope for the entire country. “Our mission is to transform Angola. We want the country to be able to supply

itself with food again,” says Nelson Carrinho, CEO of Carrinho Group. Today, the country imports more than half of its food products. But with Carrinho’s efforts, that is changing.

Big steps toward a brighter future

Rice, pasta, wheat and corn flour, cookies, cooking oil, mayonnaise, margarine, ketchup, and cereals are all produced here from raw materials, and packaged for sale as final products, in sophisticated and automated production and logistics processes. “Our goal is to build the entire value chain of food production in the country,” Carrinho explains. For Angola, the Carrinho food park in Benguela is a turning point, the beginning of a new, brighter future

for the country. When the Carrinho Group production complex is completed in 2023 with its third expansion, 610,000 tonnes of staple foods will be produced here every year, including 180,000 tonnes of rice, 250,000 tonnes of wheat flour, and 180,000 tonnes of maize flour. This is enough to feed almost half of Angola's entire population of 34.5 million. Carrinho Group sells most of the goods through its own network of wholesale stores, with a smaller portion going to the small local markets.

Driven by a love of Angola

As gigantic as the food park appears with its silos that have an impressive capacity of 100,000 tonnes of cereals and 55,000 tonnes of crude vegetable oil products, its creator, Nelson Carrinho, speaks only modestly about these achievements. But it's important not to confuse his reticence and humbleness with his visionary power and strength of determination. "We have to deliver on our purpose, every day," he explains.

Nelson Carrinho's optimism and his belief in a better future for his country have carried him from the beginning. His father died when he was 15-years-old. Nelson then took over the bookkeeping at the bar run by his mother, Leonor Carrinho. The business, which she established in 1993, was doing well and this enabled him to study in South Africa. On his return to Angola, rather than seeking his fortune in the oil industry, as his mother had envisioned for him, he started a business of his own and opened a bar as well.

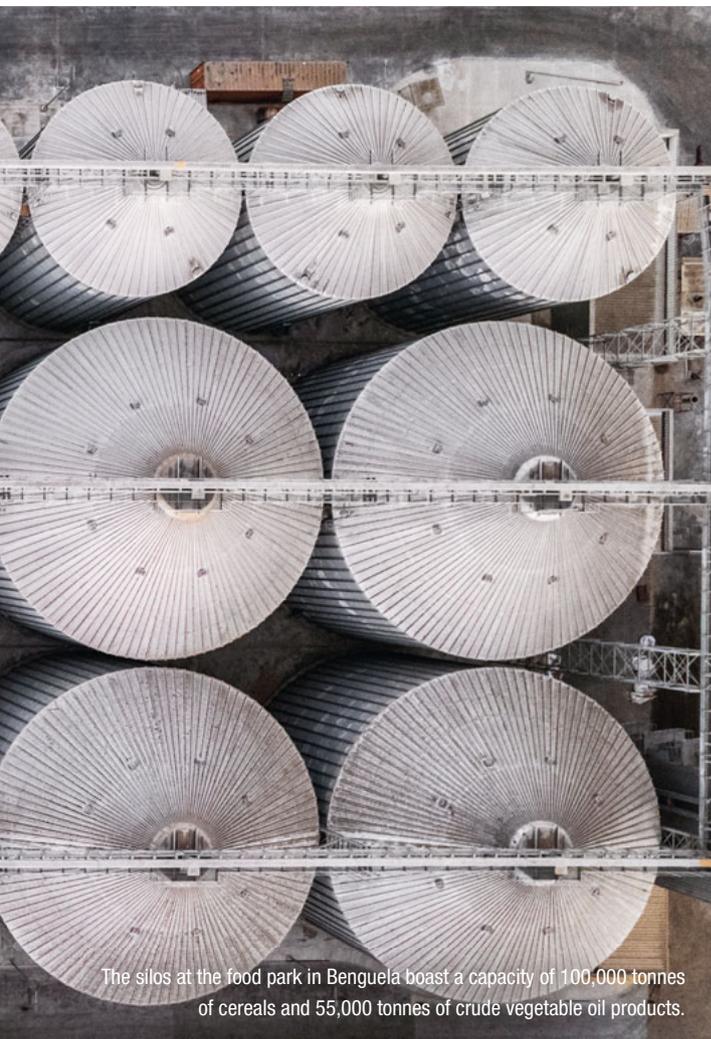
After making the bar the best hangout in town, he moved on to catering, and then to the Carrinho family business. Once again, the Carrinhos proved themselves successful entrepreneurs, catering first to Angola's booming construction industry, then to the military, and in this process gaining important experience with food, its logistics, and preparation. The knowledge and the confidence that grew with success allowed the dream of a self-sufficient Angola to mature in Nelson Carrinho. When asked why, he





“OUR MISSION IS TO TRANSFORM ANGOLA. WE WANT THE COUNTRY TO BE ABLE TO SUPPLY ITSELF WITH FOOD AGAIN.”

NELSON CARRINHO
CEO of Carrinho Group



The silos at the food park in Benguela boast a capacity of 100,000 tonnes of cereals and 55,000 tonnes of crude vegetable oil products.

answers clearly and simply: “I love my country. There would be no need at all for dependence on foreign imports. We used to be self-sufficient in all the basic food crops except wheat, but that was before the Portuguese left the country in 1975 and it subsequently sank into misery and chaos in a civil war that lasted almost 30 years. We just need to remember that again.” Nelson Carrinho wants the people of Angola to be able to have access to safe, affordable food; he wants raw materials to come from Angola and be processed there; he wants to help bring the people of Angola out of poverty with new jobs. He wants a better future for his country and its people.

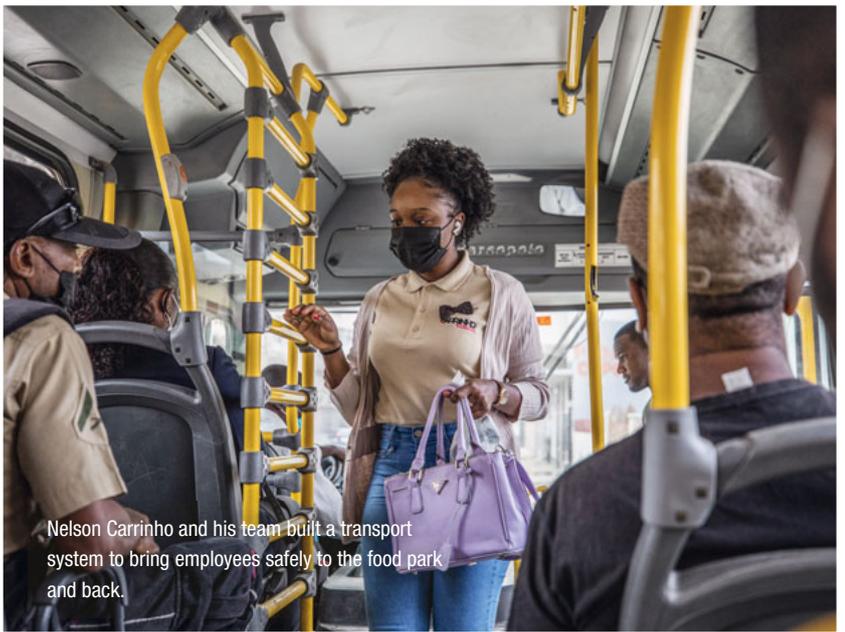
Partners make the dream reality

The most important thing at the beginning was to find fellow campaigners. In this, Nelson Carrinho was three times lucky. The new Angolan government supported the project and a consortium of banks agreed to provide financing; but above all, Carrinho found a kindred spirit in Décio Catarro, a Portuguese engineer and factory manager in the food industry who brought with him the necessary experience and knowledge.

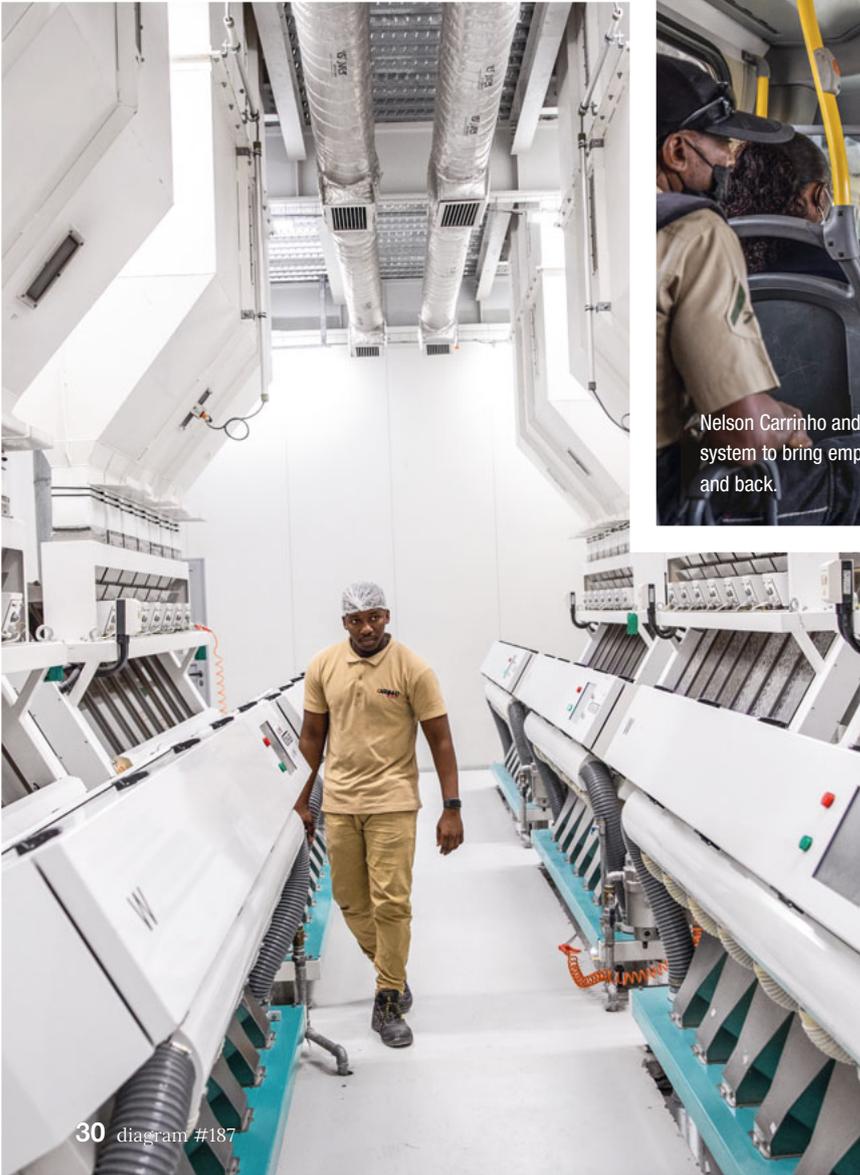
“You only get an opportunity like this once in a lifetime,” says Catarro, who is a Board Member Holding and CEO of Carrinho Indústria. Together with other specialists from his network he brought into the project, they set to work in 2014. At the beginning, there was nothing – only desert sand. No electricity. No water. No roads. The pioneers had to



Carrinho aims to transform Angola's food system and enable the country to supply itself with food again.



Nelson Carrinho and his team built a transport system to bring employees safely to the food park and back.



VIDEO Watch this video about Carrinho to discover the standard-setting food park in the Angolan desert.



The food park is equipped with the latest technology from Bühler, ensuring reliable production 365 days a year.

organize the entire development of the huge site themselves. It took two years to engineer the plant, and two years to work on the plans. They started working out of just two office containers.

In Phase 1, they focused on grains – rice, wheat flour, and maize flour, as well as pasta, biscuits, breakfast cereals, and animal feed. This includes a blending and mixing plant, and a packing plant for beans, sugar, milk powders, salt, and also yeast. In Phase 2 they expanded into oils and fats, with an oil refinery for sunflower, palm, and soy, as well as a plant for bottling and filling. They also began producing mayonnaise, condensed milk, soap, margarine, vinegar, and noodles. In addition, Carrinho, Catarro and their team built a meat processing and packing plant and the capacity to produce hard and soft candy. In Phase 3, they are building a sugar

refinery, a glucose processing plant, and a seed crushing plant, along with a sugar storage warehouse. Once fully operational, the seed crushing plant will be the biggest in Africa.

To date, Carrinho has already created more than 4,000 new jobs. Because there was no infrastructure to fall back on, Nelson Carrinho organized transportation for his employees. For the three-shift operation, the company's own buses pick up the workers from their homes and bring them back again; to be able to perform demanding tasks well, they are provided with a meal before starting their shift.

Leading solution providers

In terms of operations, Carrinho was keen on achieving maximum efficiency and food safety. He and Catarro therefore decided to buy equipment from

“THIS WAS A LARGE-SCALE AND CHALLENGING PROJECT, AND IT GAVE US THE OPPORTUNITY TO MAKE USE OF ALL OUR CAPABILITIES AS AN ALL-ROUND SOLUTION PROVIDER.”

HARRY BLÖCHLINGER

Managing Director Southern Africa at Bühler

the leading solution providers on the market, like Bühler. In addition to equipment, Bühler also brought in its knowledge of whole value chains.

“When Carrinho Group started this exciting project, they chose to do the initial stage of Phase 1 with all projects in parallel. However, coordinating various suppliers and interfaces was extremely challenging,” explains Harry Blöchlinger, Managing Director Southern Africa at Bühler. “We were chosen as the trusted project partner for the extension of Phase 1 as well as the grain processing solutions in Phase 2 and 3, and we made this happen.”

Bühler was able to offer suitable process solutions not only for single production lines, but for entire product value streams, from the raw material to the finished products. The responsibility of managing all the interfaces was given to Bühler. In addition, Bühler provides data transparency over the entire production process and an overall maintenance concept.

“The close cooperation between the Carrinho teams, our regional Bühler organization, and the specialists at our headquarters in Uzwil, Switzerland, helped make the project the success it is today,” says Blöchlinger. “This was a large-scale and challenging project, and it gave us the opportunity to make use of all our capabilities as an all-round solution provider and partner. We look forward to working with Carrinho on the next phase and building the future of both our companies together.”

Far-sighted decisions

Two examples show how far-sighted Carrinho and his team have been in designing the facilities: The wheat and corn (maize) processing plant is built to handle both domestic and imported raw material, while the rice processing plant can handle both brown and white rice. In addition, it has the capability to process paddy rice to white rice. This means that the plant technology is already set up for regionally produced raw materials. The buildings for the Bühler grain and rice mill, which will complement the existing facilities, have been built, the equipment is on site and being commissioned; the “start of operation” is scheduled for mid-2024.

The supply of these will still take some time, however. Two figures suffice to illustrate the challenge ahead: In the 1950s, the average Angolan family produced 5 tonnes of corn per hectare of arable land; today, the figure is 700 kilograms. The country has 35 million hectares of arable land, of which only approximately 10 percent is currently cultivated. Although 2.5 million tonnes of food is grown locally, and production has grown rapidly over the course of the past 15 years, much of it is not of a sufficient quality to be used for industrial processing. Meanwhile, local consumption stands at 2.8 million tonnes.

A lot is still lacking – know-how, equipment, seeds, logistics, irrigation, and industrial buyers. “That’s the crucial point,” says Carrinho. “As long as farms don’t have secured buyers, all attempts to develop agriculture remain doomed to failure.”

Getting ahead for the future

That gap is now being filled and, with the “Agri” branch of the company, Carrinho is in the process of connecting small farmers and their families. Through NGOs such as Saiver, which train and mentor and supply seeds to local farmers, he has begun to build a nationwide network of raw material suppliers. The plan is to contract 50,000 in a first test phase. That is just the beginning. “Our potential in the coming years is around 1 million,” Carrinho says.

The entrepreneur is not resting there, and the successful implementation of the Benguela food park has given him, his family, and his team additional impetus to make their shared dream reality.

The credibility and experience that Carrinho has gained have spurred him on to build the next, even larger complex, code-named “Wakanda”.

The Wakanda food park, to be built in northern Angola, will have the same orientation as the Benguela facility – just three times the size. Currently the concept is being developed and the planning phase is in full swing. Construction is planned to start in 2025. “We want to take a leap and finally get in the lead,” Carrinho says. The company has been running behind the curve, he explains, especially given Angola’s rapidly growing population. The country has around 34.5 million inhabitants, but experts expect this number to double to more than 60 million by 2050.

“By 2030, we will have built the value chains and platforms in the country to be self-sufficient in managing and even exporting this growth,” says Nelson Carrinho confidently. Those who have seen what has emerged in Benguela share his conviction. The next Carrinho UFO has already begun its approach into northern Angola.

Once the expansion is completed, Carrinho will produce 610,000 tonnes of staple foods annually.





Carrinho produces more than 20 consumer products such as rice, pasta, flour, cookies, and oils.

The Agri branch of Carrinho aims to connect 1 million farmers with industrial buyers in the coming years.



INFO



Carrinho Group

Benguela, Angola

- 🕒
 Founded in 2014.
- ⚙️
 Carrinho operates a modern food park of over 43 hectares comprising 17 integrated factories that produce more than 20 consumer products.
- 🤝
 Carrinho sells most of the goods through its own wholesale stores, with a smaller portion going to local markets.
- 🏠
 Carrinho relies on Bühler processing solutions for single production lines and entire product value streams, with data transparency over the whole process and an overall maintenance concept.

More and more micro-, small- and medium-sized food businesses are gaining access to experience and knowledge in processing via Partners in Food Solutions. This strengthens the local food economy and increases the availability of more nutritious food.

STRENGTH IN NUMBERS: SMEs ARE VITAL FOR FOOD SECURITY

Micro-, small-, and medium-sized enterprises play just as big a role in food security as food parks, because even though they are small, their sheer volume makes all the difference. In Africa, Asia, and Latin America, small-scale food producers account for 40 to 85 percent of all food producers, according to the United Nations (UN). And according to the Food and Agriculture Organization of the UN, smallholders provide up to 80 percent of the food supply in Asian and sub-Saharan Africa. This is also why the UN has adopted the goal of doubling the agricultural productivity and income of small-scale food producers for its Sustainable Development Goal number 2, Zero Hunger, which aims to end hunger and achieve food security. Bühler supports small and medium-sized businesses in Africa with its involvement in Partners in Food Solutions, helping to develop an underleveraged link in the food value chain – food processors and mills – to build and grow the African food economy. Strengthening the middle of the value chain has a ripple effect, boosting markets for smallholder farmers and bringing more nutritious food to consumers.



SHARING

KNOWLEDGE AMPLIFIES IMPACT

TEXT: NIKKI SEE, DIRECTOR COMMUNICATIONS, PFS

ACCORDING TO the International Monetary Fund, staple food prices in sub-Saharan Africa surged by an average of 23.9 percent in 2020-2022. The African Development Bank says Africa spends USD 75 billion each year to import more than 100 million tonnes of food, pinching household budgets and keeping Africa especially vulnerable to larger shocks in the global food system.

Local processing can go a long way to both lessen dependence on imports and strengthen local food value chains, creating jobs, responding to local needs, and bringing African countries online as a net food exporter. For the past 10 years, Bühler has been part of a novel, business-to-business approach to improving African food processing as a member of Partners in Food Solutions (PFS). A consortium of seven international food industry companies also including Cargill, General Mills and dsm-firmenich, PFS connects their employees to entrepreneurial food companies in 12 African countries to virtually share technical and business expertise on specific projects, through ask-an-expert engagements, mentoring, and more. It's a way Bühler employees can personally engage and use their expertise to improve food security in Africa.

Tackling challenges together

Helping in that effort is Michael Gothe. He has been a Sales Engineer with Bühler for nearly 25 years. His equipment expertise, combined with many years of working in Africa, are exactly what PFS client companies need to solve challenges that are barriers to their growth.



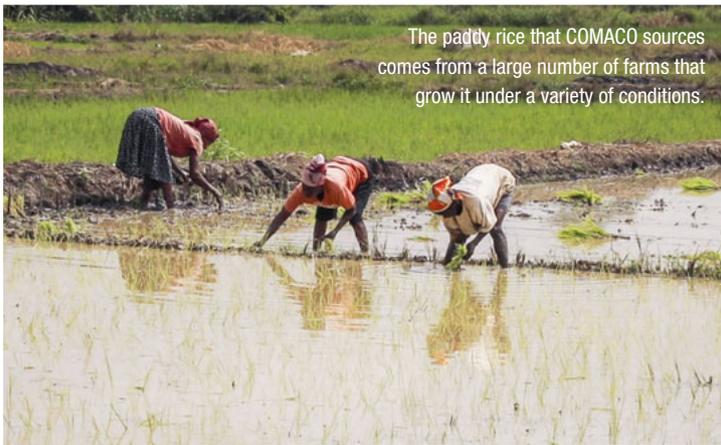
COMACO produces and sells rice, honey, and peanut butter under its "It's Wild!" brand.

With the uncertainty of two years of a global pandemic, growing inflation, and war in a region of the world that is critical to supplying much of the food, fertilizer, and fuel that Africa needs, assisting local food production across the continent has never been more urgent. Partners in Food Solutions has been at the forefront of connecting local food entrepreneurs with experts from large food industry companies to increase food security in 12 African countries – one project at a time.

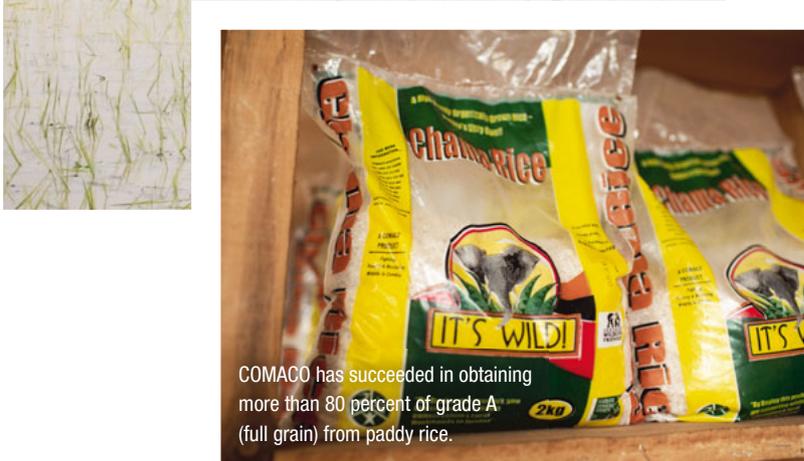




COMACO buys the harvests of more than 230,000 farming families in Zambia and creates incentives for the protection of land and wildlife.



The paddy rice that COMACO sources comes from a large number of farms that grow it under a variety of conditions.



COMACO has succeeded in obtaining more than 80 percent of grade A (full grain) from paddy rice.

Since 2021, Gothe has supported five PFS projects, including two with COMACO. The company's name is an acronym for Community Markets for Conservation and it's a unique type of business that is having an outsized economic and environmental impact in the rural regions of Zambia, where it is based. The company incentivizes farmers to adopt land and wildlife conservation practices by agreeing to buy their crops. In exchange, COMACO provides a stable income source. With more than 230,000 farmer families in its supply chain, COMACO produces value-added, organic products for sale to urban populations. Their brand "It's Wild!" produces rice, honey, peanut butter, and a nutritious cereal called "Yummy Soy".

Leading towards a positive future

COMACO needed advice on how to improve their rice processing to achieve over 80 percent extraction of grade A (full grain) polished rice from paddy rice. "PFS and its volunteers are important to us to ensure we learn what we don't know and match this with local knowledge to develop the most efficient and effective company which can support our goals for environmental and farmer impact," says Stuart Hall, COO of COMACO. Gothe's rice mill experience was the expertise they were looking for to move forward.

For several months, Gothe worked with COMACO to troubleshoot their rice processing and identify solutions that would help them achieve their goal of 80 percent extraction of grade A polished rice.

“I learned that COMACO received their rice from many different farmers in the area and that the conditions in which the rice is grown are important. If some fields did not have enough water, the rice gets chalky and will break when it is processed in the mill. Another aspect of this project was to help explain the basics of rice milling itself,” he says.

“We have learned a lot from Michael,” says Hall. “It is not only our processing that can cause problems with rice breakages, but also what happens in the growing cycle and storage of rice that influences this. We always enjoy every part of our interaction with PFS and with their help we continue to learn and develop our company so we can be better.”

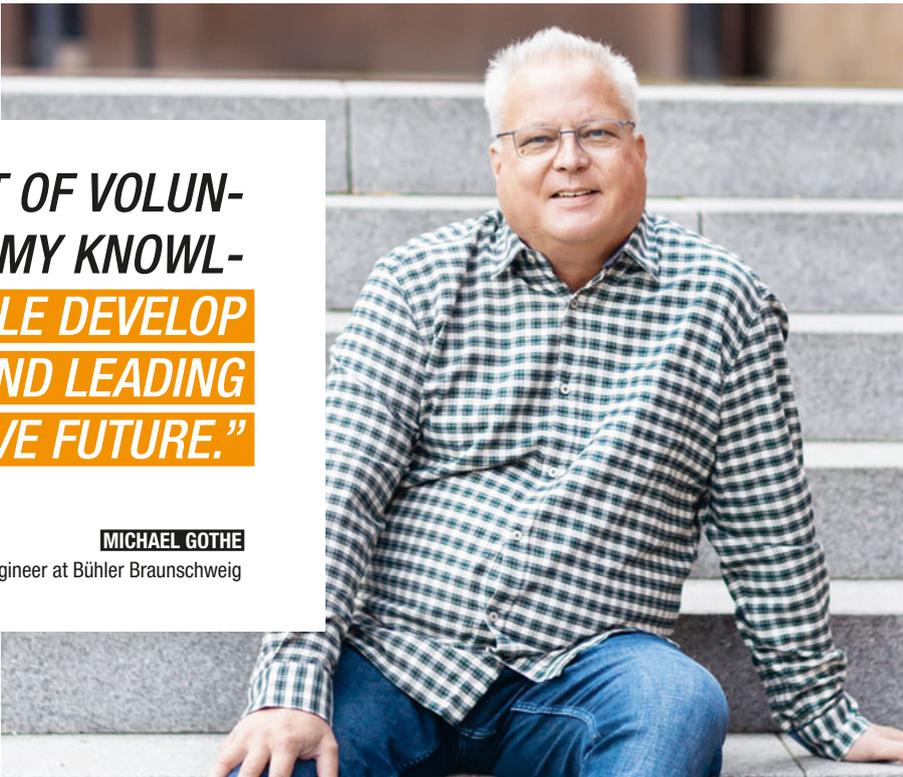
For Gothe, seeing that improvement is what has him coming back to volunteering again and again. “My favorite part of volunteering with PFS is sharing my knowledge with other people, helping them develop independence, and leading them to a positive future,” he says.

Africa is a young continent

One of the most critical elements in sustainable food security is providing livelihoods for the rapidly growing and urbanizing population in Africa. Its current population of 1.2 billion, 60 percent of whom are under 25, is expected to double by 2050. By 2030, young Africans are expected to constitute 42 percent of global youth, according to the Population Reference Bureau in Washington, DC, US.



The harvest is carried out manually and then sent to storage, which COMACO learned also plays an important role in terms of quality.



“MY FAVORITE PART OF VOLUNTEERING IS SHARING MY KNOWLEDGE, HELPING PEOPLE DEVELOP INDEPENDENCE, AND LEADING THEM TO A POSITIVE FUTURE.”

MICHAEL GOTHE

Sales Engineer at Bühler Braunschweig



“WHEN COMPANIES LIKE BÜHLER MAKE THE COMMITMENT TO UNLOCK AND INVEST THEIR WEALTH OF EXPERTISE IN THE PEOPLE AND FOOD BUSINESSES OF AFRICA, WE SEE A SUSTAINABLE AND SCALABLE WAY FORWARD IN IMPROVING FOOD SECURITY FOR ALL.”

JEFF DYKSTRA
CEO and Co-Founder of PFS

Those staggering numbers show the urgency of not only ensuring adequate food supply, but also sufficient jobs for the burgeoning population. Creating those jobs in the food sector will have a knock-on effect of more available food. Investment in training the next generation of African food professionals and workers is critical. Having strong, local food businesses in place to absorb the growing workforce needs to begin now.

PFS is already working to capture this opportunity by creating volunteer-supported, human capital focused services such as mentoring and apprenticeships. The PFS apprenticeship program places recent graduates with PFS client companies to help them gain hands-on experience in the food industry and also add capacity for the small food businesses it supports. PFS cost shares with the client 50-50 for the one-year apprenticeship. Some 41 percent of apprentices are subsequently hired by the client, and another 37 percent were hired by other local food processing companies.

One important element of the apprenticeship program's success is that each apprentice is connected with a mentor from one of the seven partner companies. The mentor provides advice, support, and coaching throughout the year, along with exposure to the global food processing industry. Apprentices cite these relationships as among the most important learning opportunities they have ever had. Mentors say they also have gained new insights and a sense of purpose, that they are truly making a dif-



ference for new professionals in a field of work that they love. In addition to apprentice mentorships, PFS also connects leaders from corporate partner companies with leaders of African client companies. These relationships have a very special quality, as the demands of leadership offer their own type of challenges and opportunities.

Through PFS, companies like Bühler can sustainably invest in upskilling and equipping the next generation of small businesses in emerging markets, and in particular, food processing companies, which will play a critical role in Africa's future economic growth. According to the World Bank, processed foods are forecast to make up 73 percent of African diets by 2040 yet the continent continues to import billions of dollars' worth of food to meet demand.

"When companies like Bühler make the commitment to unlock and invest their wealth of expertise in the people and food businesses of Africa, we see a sustainable and scalable way forward in improving food security for all," says PFS Co-founder and CEO Jeff Dykstra.



COMACO's It's Wild! Yummy soy cereal is made from maize and soy beans.



Bühler North America President & CEO Andy Sharpe (far left) with other members of the PFS Board listen to a presentation during their recent visit to Zambia.

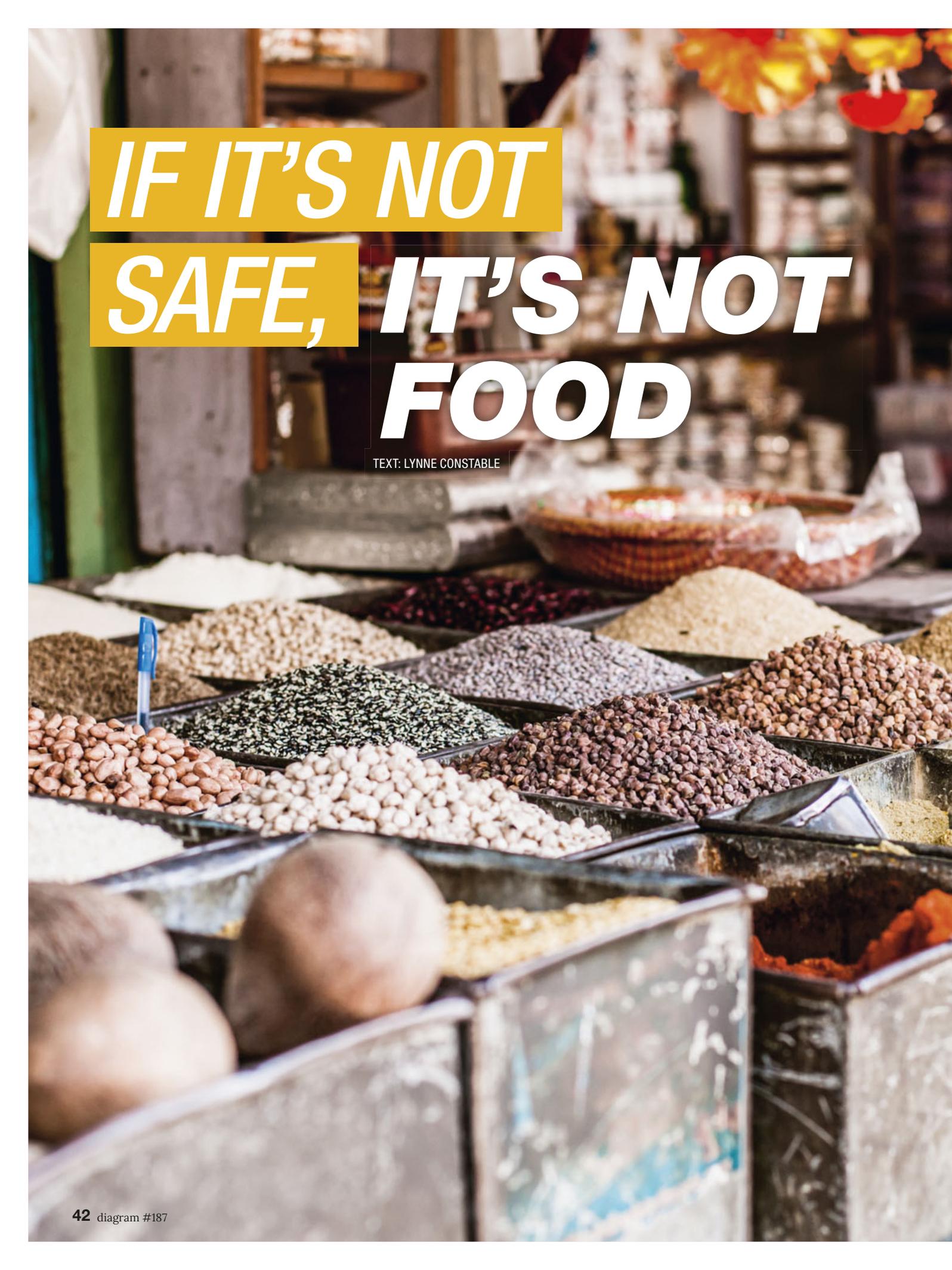
INFO



Partners in Food Solutions

Minneapolis, Minnesota, United States

-  Partners in Food Solutions was founded in 2011.
-  In 2022, PFS connected more than 750 volunteers with food companies in 12 countries across Africa, helping businesses to grow their profits while boosting nutritional and economic security across the continent.
-  Partners in Food Solutions' customers are food companies in Africa which the organization connects with experts from a consortium of seven international food industry companies including Cargill, General Mills, and dsm-firmenich.
-  For the past 10 years, Bühler has been part of this novel, business-to-business approach to improving African food processing as a member of Partners in Food Solutions.

A vibrant market stall with various grains and seeds in metal trays. The stall is filled with a variety of grains, including lentils, chickpeas, and other legumes, arranged in neat rows. The background shows a busy market environment with colorful decorations and other stalls.

IF IT'S NOT

***SAFE, IT'S NOT
FOOD***

TEXT: LYNNE CONSTABLE

A woman wearing a pink and purple headscarf is looking at a stall of spices in a market. The stall has several metal bins filled with different types of spices, including a bright yellow powder. The background is slightly blurred, showing other market stalls and colorful decorations.

Contaminated food is a major hazard for many people, particularly in low-income regions of the world. Food safety forms a large part of Bühler's sustainability agenda, and its technology plays a crucial role in ensuring that food stays safe.

WHEN WE TALK ABOUT food security, we quite naturally focus on the idea that there should be sufficient food for everyone. However, we tend to forget that food must also be safe and nutritious. In fact, if it is not safe, it is no longer food and should not be consumed. But often people have to choose between safety, nutrition, and price, placing them at high risk of foodborne illnesses, cancer, or even death. Consumption of contaminated food has a long-term effect on people's growth, development, and nutrient absorption, along with a higher risk of other illnesses.

Safe food is free of – or has safe levels of – harmful contaminants such as pathogenic microorganisms, natural toxins, undeclared allergens, foreign material, and chemicals. If food handling, production, transport, and storage are not carried out under controlled hygienic conditions, it can lead to food contamination and thus wasted resources, which further reduces food availability.

The food industry has put safety high on the agenda over recent decades. However, the global effect of foodborne illness is still substantial. One in 10 people worldwide become sick from foodborne illness every year and 420,000 die annually as a result, according to the World Health Organization. The burden falls heavily on poor and young populations: In Africa, a third of liver cancer cases are caused by acute aflatoxin exposure from contaminated crops.

Climate change also increases the risk of the food safety hazards. Increased humidity, higher temperatures, and extreme weather patterns affect farming practices and promote the growth and toxicity of some microorganisms. One example is the increase in mycotoxin-producing molds, which are already affecting 60 to 80 percent of the world's harvested agricultural commodities.

Bühler offers a range of grain cleaning and sorting technologies specifically designed for mycotoxin removal, such as the Sortex A.



“OUR WORK HARNESSSES SCIENCE AND TECHNOLOGY TO ENABLE HYGIENIC, EFFICIENT, AND SUSTAINABLE PROCESSING, AND TO BUILD TRUST AND TRANSPARENCY INTO THE FOOD SUPPLY CHAIN.”

DR. EDYTA MARGAS

Global Head of Food Safety at Bühler

The consumption of heavily mycotoxin contaminated crops leads to many health issues, including stunted growth, immunosuppression, liver cancer, and death. In animals, it leads to lower feed intake and productivity, reproduction issues, and organ failure. This is a major challenge in low-income countries, where contaminated food is often the only nourishment to which people have access.

Technological solutions

For all these reasons it is more important than ever to produce food that is fit for consumption. Food safety is part of Bühler’s sustainability agenda, which focuses on security, minimizing loss and waste, and developing solutions for the production of affordable and nutritious foods. Technology is crucial in reducing contamination levels and transforming raw materials into safe food.

“Bühler plays an important role in helping to ensure food safety through its technology. More than 2 billion people every day enjoy food produced with Bühler technology. The reach of our food safety solutions is therefore enormous,” says Dr. Edyta Margas, Global Head of Food Safety at Bühler.

A systematic approach is required across the whole value chain and Bühler offers numerous measures at each stage. One of the main focus areas of Bühler’s food safety solutions is mycotoxin, a major

threat to humans and animals. To control mycotoxin in plant-based materials, Bühler offers raw material storage solutions and a range of grain cleaning and sorting technologies, specifically tailored and tested for effective

and efficient mycotoxin removal. LumoVision™, for example, is a breakthrough in sorting technology to identify and remove aflatoxin-contaminated crops.

Cleaning methods, such as aspiration, sifting, density separation, and optical sorting technologies, are also used to remove foreign materials, such as glass, plastic, and stones. Reliable kill steps are required to control microorganisms for safe, ready-to-eat products. By combining engineering, process technology, automation, and microbiology expertise, Bühler has transformed traditional heat processes such as extrusion, roasting, and steam treatments into trusted kill steps.

Hygienic design and digitalization

However, implementation of a kill step alone cannot solve the microbiological contamination problem; it must be ensured that the processing that follows directly after such a step is also more hygienic. This means providing for appropriate factory zoning, separation of raw material areas and post-kill step areas, and hygienic design of buildings and equipment.

Hygienic design of equipment and processing facilities is particularly important in avoiding cross-contamination and also ensures that machines can be cleaned effectively, easily, and quickly. “Hygienic design also has an economic and sustainability benefit, which we are able to calculate using a tool we

have developed in-house. Hygienically designed machines have higher productivity, cleaning breaks are shorter, fewer resources are required to clean and operate the equipment, and less food residue is wasted,” says Dr. Margas. Often the life cycle of the machine is extended, and the consumption of water, energy, and chemicals minimized.

An example of outstanding hygienic design is the new Franz Haas WSTBF hollow wafer film-spreading machine, where the design ensures good accessibility and change over procedures for efficient and fast cleaning. “We also offer a number of digital solutions to enable food safety management for our customers, such as the plant automation system, Mercury MES (Manufacturing Execution System), preventative maintenance tools like ProPlant, and sophisticated tools to help with risk assessment and troubleshooting incidents such as Bühler Insights Replay,” explains Dr. Margas.

Four essential pillars

Bühler’s food safety approach is based on four pillars which are central to the delivery of value-added food safety solutions: establishing a food safety culture, ensuring compliance and hygienic design, developing food safety solutions, and building credibility and communication. Everyone working for or within the food divisions of Bühler has a moral obligation and a collective responsibility to contribute to the safety of food produced with Bühler technology.

Integrated process solutions along the entire industrial food production chain reduce the risk of contaminants, from post-harvest raw material handling, processing, kill step, and ready-to-eat food processing, to packaging and handling. Technology and data-driven services enable faster and more precise removal of contaminants, provide evidence of the effectiveness of food safety solutions, enable incidents troubleshooting as well as prediction and prevention, and also ensure good traceability.

“Our work harnesses science and technology to enable hygienic, efficient, and sustainable processing, and to build trust and transparency into the food supply chain,” says Dr. Margas. Bühler is committed to pushing the current limits of equipment design, processing, and service solutions, and to supporting customers in their efforts to raise their food safety standards.

Collaboration is key

No single company can ensure food safety alone. Collaboration between all players of the value chain is essential, from crop growers to retailers and consumers organizations, as well as other organizations supplying solutions, regulations, and knowledge to the food industry. Many of these players need training to raise awareness and equip them with the skills

that are required. Since 2010, Bühler has trained nearly 7,000 employees in this topic and continues educating employees and customers in this field.

“Everyone who has any direct or indirect touch-points with food from field to plate has a role in food safety, including consumers themselves and the small to medium enterprises that provide food for a large proportion of the world’s population,” says Dr. Margas. “When all these factors work together, the benefits are many. First and foremost, people suffer less illness and have better nutrient intake. There is also less wasted product, increased productivity, and greater availability of food. A safe food system is also a more sustainable food system.”



DR. EDYTA MARGAS

Dr. Edyta Margas joined Bühler in 2013 and has been Global Head of Food Safety since 2019, responsible for driving the Group’s global food safety strategy and building its food safety culture. She has a doctorate in food microbiology and extensive experience in food safety management and hygienic design. Dr. Margas represents Bühler at the European Hygienic Engineering & Design Group and in World Health Organization groups and industry associations, where she provides expert advice on best practice guidelines. She also supports Bühler’s customers to improve their food safety measures.

THE PROMISE OF TRADITIONAL CROPS...

Many traditional grains, pulses, and tuber crops grown across the African continent could make a substantial contribution to its food and nutrition security. Boosting production and processing of these crops reduces Africa's reliance on imported grains. Bühler technologists are working on industrial-scale processing solutions for these superfoods.

creates new markets



improves biodiversity

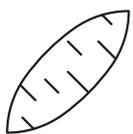


01



CASSAVA 202 M tonnes*

Benefits:

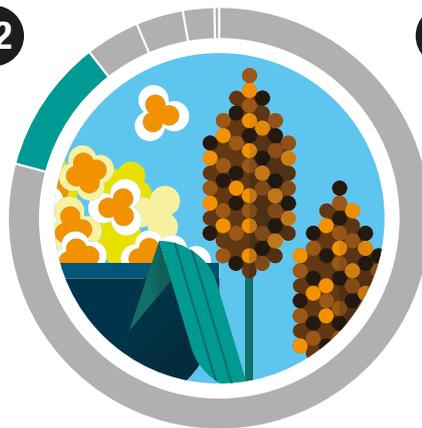


- drought tolerant ●
- gluten-free ●
- nutrient-rich ●
- fiber-rich ●
- high protein ○
- pest tolerant ○

Use: As a root vegetable, full or partial wheat-flour supplement

Amazing fact: The tapioca pearls in bubble tea are made from cassava flour

02



SORGHUM 26 M tonnes*

Benefits:

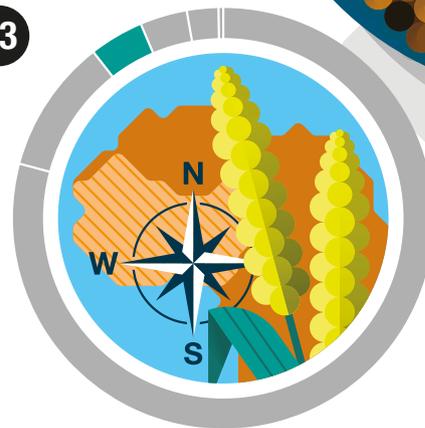


- drought resistant ●
- gluten-free ●
- nutrient-rich ●
- fiber-rich ●
- high protein ●
- pest tolerant ○

Use: As whole grain or flour, full or partial wheat-flour replacement

Amazing fact: Sorghum can be popped like popcorn

03



MILLET 11 M tonnes*

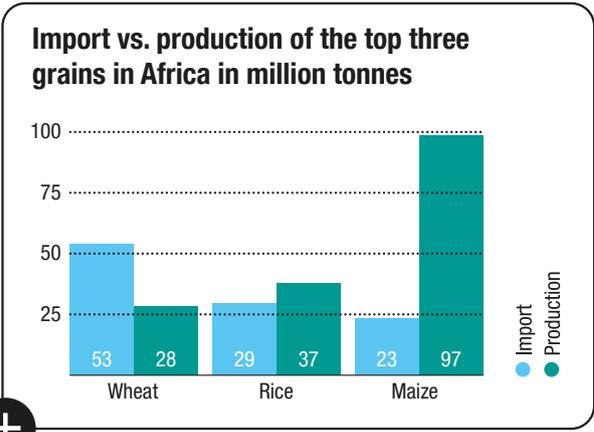
Benefits:



- drought resistant ●
- gluten-free ●
- nutrient-rich ●
- fiber-rich ●
- high protein ●
- pest tolerant ●

Use: Flour, full or partial wheat-flour supplement, beer and liquor, porridge

Amazing fact: Millets are among the first plants to be domesticated in West Africa



MAIZE, RICE, AND WHEAT

African countries spend more than \$75 billion to import over 100 million tonnes of cereals a year, despite having a booming agriculture sector. The most consumed grains are maize, rice, and wheat.

- 01** World's most produced crops: Wheat, rice, maize, barley, sorghum.
- 02** Wheat, rice, and maize account for 41% of the world's caloric intake.
- 03** Import dependence on a few crops makes populations vulnerable to shocks.



04 COWPEAS 9 M tonnes*

- Benefits:**
- drought tolerant ●
 - gluten-free ●
 - nutrient-rich ●
 - fiber-rich ●
 - high protein ●
 - pest tolerant ○



Use: Flour, wheat-flour supplement, stews, soups

Amazing fact: Cowpeas are also called black-eyed peas



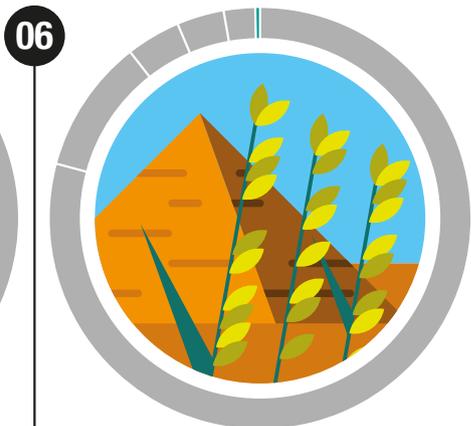
05 TEFF 6 M tonnes*

- Benefits:**
- drought resistant ●
 - gluten-free ●
 - nutrient-rich ●
 - fiber-rich ●
 - high protein ●
 - pest tolerant ●



Use: Flour, wheat-flour supplement, porridge, baby food

Amazing fact: Most grains don't contain Vitamin C, but teff is full of it



06 FONIO 0.7 M tonnes*

- Benefits:**
- drought resistant ●
 - gluten-free ●
 - nutrient-rich ●
 - fiber-rich ●
 - high protein ○
 - pest tolerant ●



Use: Whole meal, couscous, porridge, full or partial wheat-flour supplement

Amazing fact: It was found entombed in Egyptian pyramids

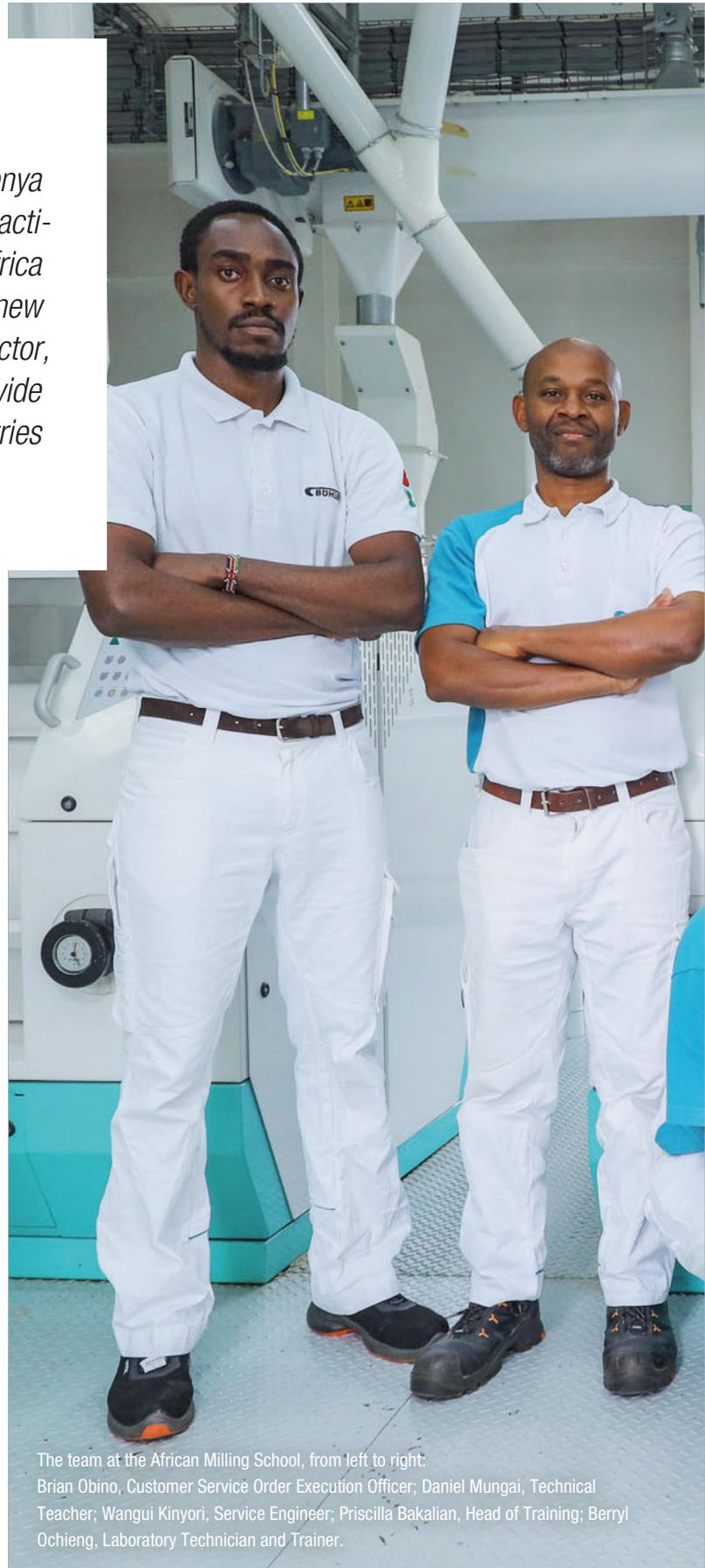
Bühler's African Milling School in Nairobi, Kenya provides a unique combination of hands-on practical and theoretical training to millers across Africa and the Middle East. With global events creating new challenges and opportunities for the milling sector, the school is now expanding its offering to provide further support to the wider food and feed industries and to help drive growth and diversification.

THE FOOD AND FEED INDUSTRIES have their fair share of challenges amid global uncertainties. Apart from rising raw material costs and tight supply chains, concerns abound including intense competition, thin margins, and gaps in the training of the new generation of millers as the older generation go into retirement. Meanwhile populations in many regions of the African continent are growing, and so too is the demand for affordable food products. Although the Covid-19 pandemic has now been declared a non-emergency health concern, it is one of several factors, including conflict, weather extremes, and rising prices, that have triggered a global food crisis.

These issues could reduce the performance of the food and milling industry in the future if not addressed. One company meeting the challenges is Bakhresa Group, an industrial conglomerate based in Tanzania that works primarily in the food and beverage sector. Mounir Bakhresa is the Managing Director and CEO of the Bakhresa Group's subsidiaries in Rwanda, Burundi, South Africa, Zimbabwe, and Mozambique. He sees very clearly the impact these forces have on markets in his region, but he also sees great growth opportunities that can be tapped to boost food security across the continent.

"Our sector is booming. We are seeing growth on the milling side, and we think it will continue. On the other hand, I feel that the flour milling market in the countries we operate in is becoming saturated, so there's not much room to play," he says.

That's why his company is exploring new ways of growing by producing value-added products such as noodles. Bakhresa Group looks to Bühler to support them in this journey, not just with technology, solutions, and services, but also by providing education



The team at the African Milling School, from left to right: Brian Obino, Customer Service Order Execution Officer; Daniel Mungai, Technical Teacher; Wangui Kinyori, Service Engineer; Priscilla Bakalian, Head of Training; Beryl Ochieng, Laboratory Technician and Trainer.



TEXT: HERALD ALOO
PHOTOS: JOEL MULWA

THE
NEXT **HEAD**
MILLER
STARTS HERE

“WE NEED TO GENERATE THE NEW FUTURE MILLERS AND HEAD MILLERS AND THEY NEED TO HAVE THE TRAINING TO PRODUCE THE PRODUCTS THE CONSUMER OF TOMORROW WANTS.”

MOUNIR BAKHRESSA

Managing Director and CEO of Bakhresa Group for Rwanda, Burundi, Zimbabwe, South Africa, and Mozambique



and training for their millers and managers. The African Milling School (AMS) was established in Nairobi, Kenya by Bühler in 2015 to improve grain processing know-how. Equipped with a state-of-the-art in-house milling plant, an analytics laboratory, and classrooms, the school weaves together theory classes with hands-on training. This was a big gap in most African education and training institutions, and addressing it makes AMS special. More than 1,200 trainees have graduated from the school to date.

Increasing resilience and sustainability

“The milling industry previously suffered due to a lack of practical training,” says Bakhressa. “Before the African Milling School was set up, millers would either send trainees outside the continent or source expensive foreign professionals. This was not sustainable financially.”

Bakhressa, for instance, attended his executive course in Switzerland. “I realized that we needed such a facility somewhere in Africa where we could easily send our apprentices,” he explains. “Now, people with no background in milling want to come to work in our mill to get the AMS scholarship. And with that training we get a professional who knows how to address issues quickly without waiting for the head miller. They now know how to get a good extraction and how to lower the kilowatts per tonne, and they understand how this impacts the business.”

Bakhressa Group sent two of its top managers from different subsidiaries to attend the AMS executive training offered in French in June 2023, and three millers for the apprentice miller program in January 2023. With the help of AMS and Bühler, the company has already commenced the path of value addition in some production lines.

Africa has 24 percent of the world’s agricultural land, yet a large proportion of grain has to be imported from outside the continent. This is often due to declining harvests. But there are other causes. Poor handling of grain also leads to regular losses and contamination. With improved technology in cleaning, drying, and silo storage, many of these challenges can be overcome. But technology alone provides only part of the answer – the rest is provided by training and education.

“We really need to approach milling in the most efficient way possible to make the industry more resilient and more sustainable. This is a very big topic and one that is close to my heart,” says Priscilla Bakalian, Head of Training at the AMS. “We cover everything from maintenance and food safety to raw material handling. We must ensure we are not losing any of these raw materials because of post-harvest losses and bad storage conditions.”

Bakalian gives the example of a Kenyan miller who recently completed the first module of the apprenticeship program at the AMS. When he applied the knowledge he gained on the course on the job, he was able to lower electricity consumption at his mill by 8 kilowatts per tonne of flour produced. “That translated into a very big financial gain,” she says.



In the baking technology class, students learn about the quality aspects of grain, flour, and bread.

“WE REALLY NEED TO APPROACH MILLING IN THE MOST EFFICIENT WAY POSSIBLE TO MAKE THE INDUSTRY MORE RESILIENT AND MORE SUSTAINABLE. THIS IS A VERY BIG TOPIC AND ONE THAT IS CLOSE TO MY HEART.”

PRISCILLA BAKALIAN
Head of Training at the African Milling School



Priscilla Bakalian is Head of Training. Knowledge is transferred to the students through theory as well as practical classes.

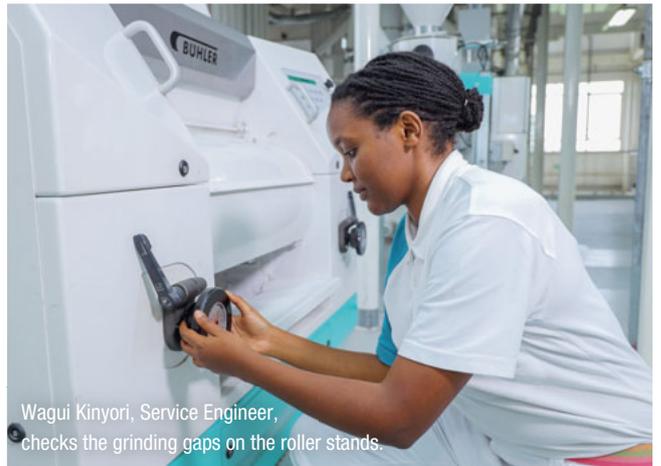


At the African Milling School, students learn and practice on the latest Bühler technology.

WEB Learn more about the courses offered at the African Milling School. 



At the sample table, students can compare a variety of flour samples from different passages in the mill.



Wagui Kinyori, Service Engineer, checks the grinding gaps on the roller stands.



Berryl Ochieng, Laboratory Technician and Trainer, shows students how to check the dough extensibility.



“WE NEED TO BE EMPOWERED IN TERMS OF KNOWING THE PROCESS FOR US TO MAKE INFORMED DECISIONS RELATING TO ALL MILLING OPERATIONS; PROCUREMENT OF WHEAT, QUALITY CONTROL, AND CONTRACTS.”

MILLION CHINGOMBE

Human Resources Manager at Mega Market Milling Pvt Ltd., Zimbabwe

Evolving to meet today’s challenges

The AMS continues to evolve. It is already more than a year into restrategizing to help food industries bounce back to their full fighting weight after the pandemic. As part of the preparation, AMS brought in Bakalian, a fourth-generation flour miller from Lebanon, fluent in Arabic, English, French, and German. Under her guidance, AMS is expanding its training portfolio, with the aim of supporting a larger part of the food industry in Africa, Middle East, and India – its core markets.

“The school has, since its foundation, mainly focused on wheat and maize milling. Going forward, we are broadening the scope to include millet, sorghum, pulses, nuts, coffee, and baking and consumer foods, as well as feeds, because we know the market is changing. It is important to consider locally available crops to ensure food security and invest in value-added products to serve market opportunities and increase profitability,” explains Bakalian.

The state-of-the-art facility, located 25 minutes from Nairobi airport, includes classrooms, a laboratory, and a fully equipped school mill. AMS is transforming step by step from a milling school into a grain processing knowledge and training center. As of 2023, it also includes training courses on coffee handling and roasting.

The AMS flagship long course, a two-year apprenticeship, is split into four modules, each consisting of one month of classroom instruction. In between, the students apply their newly acquired skills in their companies. Other long courses include the Head Miller program – offered for either apprenticeship graduates or those already with extensive experience working as millers – and the Intensive Milling program offered in French.

Technical staff from different departments can benefit from the extensive AMS short course portfolio ranging from Electrical Maintenance and Mechanical Maintenance to Baking Technology Grain and Flour Analytics. As pushing for increased sustainability in the food and feed industries requires a more circular approach to grain processing, the AMS has reinforced its animal nutrition and aqua feed course offerings. From September 2023, the school will, for the first time ever, offer a new course: Feed Milling for Executives.

For trainees, the courses boost their technical abilities and improve general safety in the milling industry. The benefit for the companies that send their staff to the school is that they can improve efficiency and build sustainability. All the training sessions are conducted in English and French, with an option for Arabic.

Exchanging, empowering, expanding

The training is adapted to the students’ individual needs, based on intensive exchange between the trainees and the AMS staff. Since Bakalian joined AMS in November 2022, she has taught 120 trainees, both executives and apprentices from various countries, on the 2-year program.

“WE ARE DIVERSIFYING FROM MILLING TO VALUE-ADDED PRODUCTS. I REALIZED WE NEED THE KNOWLEDGE TO GET BISCUIT FLOUR OUT OF WHEAT.”

SANJAY YENUGWAR

Research and Development Head at Capwell Industries Ltd., Kenya

Many executives attend the one-week Milling for Executives course, which equips decision makers with technical knowledge and practical skills to cut post-harvest losses, improve quality standards, and move into food products with added value. Million Chingombe from Zimbabwe is among those who completed the training, held in Nairobi in June 2023. He is the Human Resources Manager at Mega Market Milling Pvt Ltd., a leading milling company in Zimbabwe which, since December 2022, has expanded into commercial wheat milling. It is a huge, capital-intensive investment, and therefore the firm cannot afford any misses.

“We need to be empowered in terms of knowing the process for us to make informed decisions relating to all milling operations such as the procurement of wheat, its storage, quality control, and contracts,” Chingombe explains. “Bühler is known for the quality of equipment and support they give to customers, and we thought it was best to learn from the best.”

Supporting growth

Million Chingombe is optimistic that with proper training and application, Mega Market Milling will continue expanding its market share by providing higher quality products. He now understands the key stages of the milling process, he says, and will share important lessons with his team for continuous improvement. Back home, he wants to ensure that his organization continues to leverage such training programs to compete and win in the market.

Like Chingombe, Sanjay Yenugwar also attended the Milling for Executives course. He works for Kenya’s Capwell Industries Ltd. Amid the uptick in the price of flour in Kenya due to grain shortages, the company was among millers the government picked last year to distribute subsidized maize flour

for a period. Since then, Kenyans have been urged to diversify and embrace other food alternatives, a niche Capwell Industries is now looking to exploit by producing flour, rice, and pasta brands. As such, the firm is now looking to have a reliable in-house wheat milling facility to produce the right quality of flour required to make biscuits.

This is one of the many reasons why Sanjay Yenugwar, the Research and Development Head at Capwell Industries, attended the AMS Executive training. “We are diversifying from milling to value-added products. I realized we need the knowledge to get biscuit flour out of wheat. Getting the best quality of biscuit is a necessity that requires the best raw materials and milling processes,” he says.

The training is important to the firm’s overall sustainability in terms of finances and product quality. Yenugwar has over 24 years of experience in the biscuits and confectionery industry across East Africa markets. He says the company wants to stop sourcing biscuit flour from third parties as part of its cost-cutting measures. “Why should we purchase from outside when we have an in-house wheat milling facility?” Yenugwar says. “We are just coming into the biscuits market, so our goal is to shift the milling capacity we have into biscuit flour. It is the right time for me to start sharing the secrets behind milling processes and quality with my colleagues.”



The growing shift to value addition means the continent will need more investment, and Bühler is helping to drive this. “We do a lot more than milling in this region. In East Africa, Bühler also provides grain storage, green coffee handling, coffee roasting, biscuits, pasta, feed milling, and other solutions,” says Matthias Grabe, Managing Director of Bühler East Africa.

Thinking ahead

From bringing the training facility nearer to the markets in Africa and the Middle East, to offering quality expertise, the impact of AMS is wide-ranging and always future-oriented. Its ethos is summed up by Grabe: “As a business playing in rapidly changing markets, you should not be where the ball is, but where the ball will be in future. That is how we aim to support our customers.”

Mounir Bakhressa agrees: “As we grow, we need to think ahead, for example, about resourcing talent for our company. So, starting now, we need to generate the new future millers and head millers and they need to have the training to produce the products the consumer of tomorrow wants.”

INFO



African Milling School

Nairobi, Kenya

-  The African Milling School was founded in 2015 to provide theoretical and practical training for the next generation of millers.
-  The school offers comprehensive and intensive training from the Apprenticeship Program to the Head Millers Program and Milling for Executives, as well as short courses on Coffee Handling and Roasting, Mechanical Maintenance, Electrical Maintenance, Programmable Logic Control (PLC) and Automation Maintenance, Baking Technology, and Lab Analytics.
-  Over 1,200 students have graduated from AMS to date, with 174 students graduating from the 2-year apprenticeship program so far.



The school is situated in Ruiru, Nairobi, just 25 minutes from Nairobi airport, and offers three floors of classrooms, equipment, and labs.

AROUND THE WORLD

Our customers make a major contribution to food security in their regions and further afield. Find out how Bühler supports these thriving companies to achieve their missions.



A PROBLEM SORTED

Buxton, US Central Valley Bean in North Dakota is a cooperative that processes 10 percent of the United States' pinto bean crop. After years of struggling with keeping good product out of reject in their sorting process, they recently switched to Bühler's Sortex H. Utilizing machine learning and Artificial Intelligence, Sortex H has drastically improved performance and reduced the amount of good product being rejected. Thanks to this reliable – and constantly improving – sorting process, Central Valley Bean is now able to save time and money and to focus even more effectively on their goal: to provide a healthy, nutritious, and sustainable protein crop in times of arable land loss and population growth.



IN THE REGION FOR THE REGION

Sorghum is the fifth most commonly processed cereal worldwide after wheat, rice, corn, and barley.

Kano, Nigeria Bühler's aim is to increase food security in Nigeria – and Africa – by providing the know-how and infrastructure to process locally grown grains to produce food for one of the fastest growing populations in the world. The Grain Processing Innovation Center (GPIC), currently being built in Kano, is testament to this vision. Kano is the trading and processing hub for agricultural commodities in West Africa, where local crops such as sorghum, millet, maize, and cassava, as well as soybeans, beans, groundnuts, cashew nuts, sesame, hibiscus flour, cassia tora, and grains of paradise are consumed and traded. Building up industrial processing capabilities for these key ingredients for local dishes is essential, and by the beginning of 2024, Bühler – together with customers – will be developing products, recipes, and processes for traditional crops as well as offering trainings at the GPIC.

3



Teff is an ancient cereal that was domesticated about 6,000 years ago.

VIDEO

Learn more about Merxy Trading in this video.



MODERN SOLUTIONS FOR A TRADITIONAL GRAIN

Debre Birhan, Ethiopia Teff flour is the major ingredient of injera, an important staple food in Ethiopia. Its unique characteristics provide a multitude of challenges for food producers, such as keeping ash content below 3 percent and moisture content below 11 percent in order to preserve its natural quality. Scaling up processing capacities of the fine grain is something no one has been able to do until recently. Together with Bühler's local experts, Merxy turned these challenges into opportunities and built the most modern teff processing facility in the world. Combined with in-depth training at Bühler's African Milling School in Kenya, Merxy today produces teff of the highest quality and plays a vital role in ensuring Ethiopia's food security.

5

THREE DECADES OF GROWTH AND SUCCESS

Bengaluru, India For 30 years, Bühler India has been synonymous with the country's economic rise. In the coming months, Bühler India will begin producing a wider variety of core product portfolios for Bühler's grain milling and food industries, addressing the demands of the flourishing domestic market and customers around the world.

What started out as a small operation is now a key pillar in Bühler's global network of production sites, Applications & Training Centers, and apprenticeship hubs. Over 600 employees are living up to Bühler's vision of innovations for a better world, manufacturing high-quality solutions for thousands of customers.



Bühler India celebrates 30 years and looks to a promising future.

4

BUILT ON A STRONG RELATIONSHIP

Nairobi, Kenya Pembe Flour Mills is one of Kenya's largest maize producers and plays a key role in ensuring food security for a growing population. Having relied on Bühler technologies to process maize, sorghum, wheat, and animal feed since the 1980s, Pembe decided to build a brand-new maize mill on its Nairobi site in 2019. Pembe uses the plant automation system, Mercury MES (Manufacturing Execution System) and state-of-the-art processing technology. Its proximity to Bühler's East African

office means it can get spare parts right away if needed. Pembe today produces about 450 tonnes of maize per day – providing a safe, nutritious, and affordable staple to millions of people in Kenya.



VIDEO

Watch the inspiring video about Pembe Flour Mills.





Ardent Mills

A MILL

TO FEED

MILLIONS

TEXT: LUKAS HOFSTETTER

Ardent Mills is driven by a clear purpose and mission – to enhance people’s quality of life and standard of health. With their new state-of-the-art mill in Florida, they are leading the way in efficiency, quality, and quantity. The mill is testament to the long-standing partnership between Ardent Mills and Bühler, and perfectly embodies their path to ensure food security for an ever-growing population.

Ardent Mills is North America's biggest producer of conventional wheat flour.



IT'S ONE OF THOSE perfect sunny winter days in Florida that have drawn millions of Americans to move to the southernmost state. The 160-foot (around 50 meter) silos tower into the crystal-clear blue sky and the first rays of sunshine illuminate the milling complex, promising another beautiful day with temperatures in the low 70s Fahrenheit, around 20 degrees Celsius. While Dan Dye appreciates the warm weather, having flown in from the headquarters in Denver, Colorado, he's here to make sure his colleagues running Ardent Mills' latest mill have everything they need to operate the company's newest facility as efficiently and safely as possible.

As the CEO of North America's largest producer of conventional wheat flour enters the facility in Port Redwing, just south of Tampa Bay on the Gulf coast of Florida, the calm but busy atmosphere of the mill is apparent. He knows each one of the workers personally, chats about the ongoing American football season, and takes a genuine interest in everyone's well-being. As he greets the staff and catches up on the latest news out of the Sunshine State, the stan-

dard-setting mill reliably runs like clockwork, almost unnoticed in the background, producing 800 tonnes of flour, 24 hours a day, six days a week. The fact that Dye can dedicate a great portion of his time to checking in on his team members is evidence of two key pillars for Ardent Mills' success story: its focus on its employees in everything they do and its high level of trust in the reliability of the equipment in this one-of-a-kind facility.

Shaping a vision

"Our people work really hard. They see the importance of the work they do, and they're very proud to be able to help to feed people. When it's more than just a job or a piece of equipment, there's a shared purpose behind it. I believe that really shows in all 35 community mills of our group in the United States, Canada, and Puerto Rico," says Dye. It's this spirit that helped create what is now known as Ardent Mills. "After 33 years at Cargill, I had the unique opportunity to move to Ardent Mills when the joint venture between Conagra Brands, Cargill, and CHS

was announced in 2013. It's been a very exciting journey to help create this new organization, to shape culture, and of course to be part of the flour milling community."

Bringing together different companies, cultures, and ways of doing things is a challenging endeavor for any industry. In flour milling – a calling that permanently balances art and technology, and relies to a great extent on personal experience, and learned nuances – the challenges are even greater. But then so are the opportunities. "Milling is one of the more traditional industries. But if you think about it, it's also very fast-paced. A mill never stands still and there's always room for innovation. For example, if we look at the last 10 years, the technology continues to improve to help us to get more yield, become more energy-efficient, or work more precisely, to name just a few benefits," he explains. Implementing new technology and finding new ways of serving the many customers all over North America played a key role in turning Ardent Mills from a merger of three major players into one company with a clear mission: to enhance the quality of life and standard of health.

800 tonnes of flour a day

While Dye is getting briefed on the facility's latest performance data by Steve Neely, Plant Manager at Ardent Mills, Tyler Adair puts on his safety gear and heads into the mill with the distinctive gait of a miller on a mission. He's the Head Miller of the Port Redwing Mill and is responsible for the smooth operations of one of the most modern mills in the world. "We work two 12-hour shifts, six days a week. Our output is 800 tonnes of flour a day, so everything needs to run like clockwork – all the time," he explains. His job certainly comes with a fundamental understanding of the responsibility of providing a key staple food to millions of consumers.

Adair's path to become the Head Miller of Ardent Mills' flagship facility was paved by his desire to combine his passion for engineering and creating something meaningful with his skills. "After high school, I got my bachelor's degree in Milling Science and Management at Kansas State University. I was immediately hooked by the unique combination of science and art in flour milling. From there, my journey took me to Ardent Mills in Kansas, Pennsylvania, Minnesota, and now I'm here in Florida thanks to the development opportunities Ardent Mills offered me throughout my career," he says.

Meeting increasing demands

The mill in Port Redwing is critical in feeding an ever-growing population. Florida is the third most populous state in the United States. Despite its population of over 22 million, it was the fastest growing state between 2021 and 2022 with an increase of 1.9

percent. With such staggering growth comes an ever-increasing appetite for flour-based foods – and the need for reliable storage capacity in a state prone to be hit by hurricanes, which can disrupt supply chains for several days or even weeks.

"Our on-site storage capacity is 4.1 million bushels (110,000 tonnes) of raw material storage. That allows us to continue producing around the clock in case of emergency," explains Adair. A bushel is a standard unit of volume in the United States. "From our silos, the grain is transported to our mills. We have the latest Bühler equipment from cleaning to grinding, conveying, sifting, dedusting, and bagging. It was clear to us from day one that to fulfill these incredible demands, we needed best-in-class equipment," says Adair.

A lighthouse in the milling industry

Enter Sven Kunz and his team. He heads Bühler's sales department for Milling Solutions in North America and was responsible for the Port Redwing mill from the first meeting to the start up in March 2022. His eyes light up as he looks back at the biggest project in his career. "We knew from day one that this was going to be anything but another mill on the map. Florida is a key market, and this mill was never intended to be one more piece of the already large Ardent Mills puzzle, but a flag-bearer for the milling industry in North America," he explains. Kunz and his team dug deep. Bühler and Ardent Mills challenged each other to build an infrastructure that can ensure food security for over 20 million Floridians and increase efficiency, transparency, and traceability with each grain processed.

The result? Two separately running mills, A and B, with a total area of 63,000 square feet (5,852 square meters) which already includes the space required

"OUR PEOPLE WORK REALLY HARD. THEY SEE THE IMPORTANCE OF THE WORK THEY DO, AND THEY'RE VERY PROUD TO BE ABLE TO HELP TO FEED PEOPLE."

DAN DYE
CEO of Ardent Mills





VIDEO

Watch this video about Ardent Mills to discover one of the most modern mills in the world.



Dan Dye, CEO of Ardent Mills, enjoys being part of the flour milling community.



Dan Dye, Tyler Adair, Steve Neely, and Sven Kunz on top of one of the silos.

“WE CHALLENGE EACH OTHER CONSTANTLY TO INCREASE SUSTAINABILITY AND FOOD SECURITY AS WE ENSURE THE MOST EFFICIENT USAGE OF OUR RESOURCES IN DEMANDING TIMES.”

DAN DYE
CEO of Ardent Mills

Ardent Mills produces 800 tonnes of flour in the Port Redwing mill per day to help feed a growing population in Florida.



for a future mill C. The heart of the mill is Bühler’s latest grinding system, Arrius, which is making headlines throughout the milling industry.

“Our integrated grinding system Arrius is at the heart of the mill. It really sets new standards in grinding efficiency and energy savings. Seeing it in operation here at Ardent Mills delivering at the highest level is living proof of our innovation power,” explains Kunz. A total of 36 Arrius systems make the Port Redwing mill one of the most modern milling operations in the world. Tyler Adair shares Kunz’s enthusiasm about Arrius: “Thanks to the integrated design of Arrius, we’re able to pick up 10 percent efficiency from an energy consumption standpoint.” A true milestone in times of rising energy costs and inflation – not to mention the positive impacts on sustainability initiatives.

Building the mill, however, was one of the toughest tasks in Kunz’s decades in the milling industry. “Right when we began with the groundwork, the coronavirus started spreading around the world.

Since milling is considered critical infrastructure, we were able to continue building. The safety of everyone involved was always our top priority, and it is only due to the flexibility, dedication, and willingness to go the extra mile of all partners involved that we were able to meet the deadlines,” recalls Kunz.

Driven by purpose

Overcoming such daunting challenges forges a long-lasting partnership. Dan Dye knows exactly what he expects – and what he gets – from Bühler in this partnership. “Bühler is having a tremendous impact on our journey. Not just as a provider of high-end technology, but as a thought leader in the industry.” He took a lot of food for thought home from the Bühler Networking Days 2022 in Uzwil, Switzerland and is still impressed by one particular speech.

“Ranjay Gulati’s keynote on ‘finding your purpose’ still resonates with me. Participating at an event with industry leaders that feed 4 billion people is a stark reminder of why we do what we do, the



The 160-foot (around 50 meters) silos have a total storage capacity of 111,000 tonnes.

responsibility we share, and the tremendous opportunities we have to accelerate our impact when we collaborate and innovate on all levels,” says Dye. “I carried that message home to Ardent Mills and challenged each one of us to take a moment to think about their purpose. I don’t believe there’s a more powerful driver than knowing that what you do matters, that your work is essential to provide safe, nutritious, and healthy food for millions of consumers day in, day out.”

The journey continues

This sense of purpose combined with a strong entrepreneurial spirit is at the heart of Ardent Mills’ success. As Dan Dye, Tyler Adair, Steve Neely, and Sven Kunz look over the Tampa Bay area from top of one of the 160-foot silos, the path forward is as clear as the blue Florida sky. “Our markets keep moving and growing at an incredible rate. We challenge each other constantly to increase sustainability and food security as we ensure the most efficient usage of our resources in demanding times. I look forward to the next steps we will be taking together,” says Dye. With mill A and B humming in the background, it seems only a matter of time before Ardent Mills will call Kunz and his team to start working on mill C.

INFO



Ardent Mills

Denver, United States

- 

Founded in 2013 as a joint venture between Conagra Brands, Cargill, and CHS.
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Ardent Mills operates in more than 40 locations in the US, Canada, and Puerto Rico, specializing in flour, quinoa, pulses, and organic and gluten-free products that drive emerging nutrition and innovation in plant-based ingredients.
- 

Ardent Mills supplies food producers from artisan bakers to major retailers all over North America.
- 

Ardent Mills uses the latest Bühler technology from cleaning to grinding, conveying, sifting, dedusting, and bagging to ensure food security for millions of people.



La Moderna has been investing in technologies and increasing capacities, enabling them to cater to an increasing demand for food in Mexico and beyond.



La Moderna

REACHING **NEW HEIGHTS**

TEXT: LUKAS HOFSTETTER

Grupo La Moderna is more than a food processing and production company. Over the last 100 years, the family-owned and -run enterprise has become synonymous with safe, nutritious, and affordable staple foods such as pasta, cookies, and snacks across Mexico, the United States, and Central America. Thanks to continuous upgrades of their existing equipment and recent investments in the latest cleaning and milling technology, La Moderna is perfectly positioned to cater to an ever-growing market with increasingly stringent quality requirements.

LA MODERNA is a household name in Mexico in every sense of the word. From its famous tomato noodle soups that every child knows and loves, to its wide variety of cookies, to the thousands of tonnes of flour it provides for end consumers and industrial bakeries – it’s hard not to come into contact with La Moderna’s products in everyday life.

Over 5,000 employees produce and distribute their products to Central and North America in a total of seven mills, seven pasta plants, two packaging facilities, and one cookie plant. With this size and relevance comes a strong sense of responsibility for providing food for millions of people – 365 days a year. José Antonio Monroy Carrillo is CEO of the Milling Division, Member of the Board, and co-owner

of La Moderna. He practically grew up with the company. “My father Don Eduardo Monroy Cárdenas acquired La Fabrica de Pastas Alimenticias La Moderna together with two business partners in 1959 and shortly after took full control of the company at just age 33. Throughout his life, he always lived up to his values to ‘live to serve’ and built what is today known as Grupo La Moderna thanks to his keen sense for business and his unwavering commitment to excellence and quality,” he recalls.

Monroy is an engineer (Ingeniero, Ing.) and is building on his father’s legacy, carefully balancing the need for producing more quantity every year while adhering to stricter quality requirements. “Our operations are spread across Mexico, combined with



Los Pirineos is a large subsidiary of La Moderna and operates a mill in Irapuato with a daily capacity of 270 tonnes of wheat.

a pasta plant in Guatemala and one in Texas in the United States. This network of production sites enables us to source our grains both internationally and locally, and to react quickly to shifts in requirements or production capacities in different regions. After all, our mills, bakeries, and pasta plants need to keep running all the time to provide food for people in 16 countries in Latin and Central America and in the US,” explains Ing. Monroy.

A strategic chess piece

One of the largest subsidiaries of La Moderna is called Harinera Los Pirineos. Located in the heart of Mexico in the state of Guanajuato, Los Pirineos operates a mill in Irapuato with a daily capacity of 270 tonnes of wheat, while the mill in Salamanca processes 530 tonnes of wheat per day. Leopoldo Giménez has been Production Manager at Harinera los Pirineos in Irapuato for the last seven years. He knows very well what it takes to keep production running while never compromising on food safety.

“In addition to the two mills in Salamanca and Irapuato, we also operate a grain silo in Villagrán, Guanajuato with a capacity of 111,000 tonnes, which we will increase to 134,000 in 2024. That’s where we take in local wheat as well as varieties from the US and Canada,” Giménez explains. “The fourth site is



Throughout the past decades, La Moderna has constantly upgraded its milling equipment, such as Bühler’s Sirius plansifter.



in Abasolo, where we buy local Bajío wheat directly from farmers and rely on a storage capacity of 45,000 tonnes. In total, we buy around 25 percent of all the wheat grown in the region,” he says. This mixture of locally sourced wheat and bulk intake and storage of North American wheat provides Los Pirineos with an important diversification in times of more uncertain supply chains.

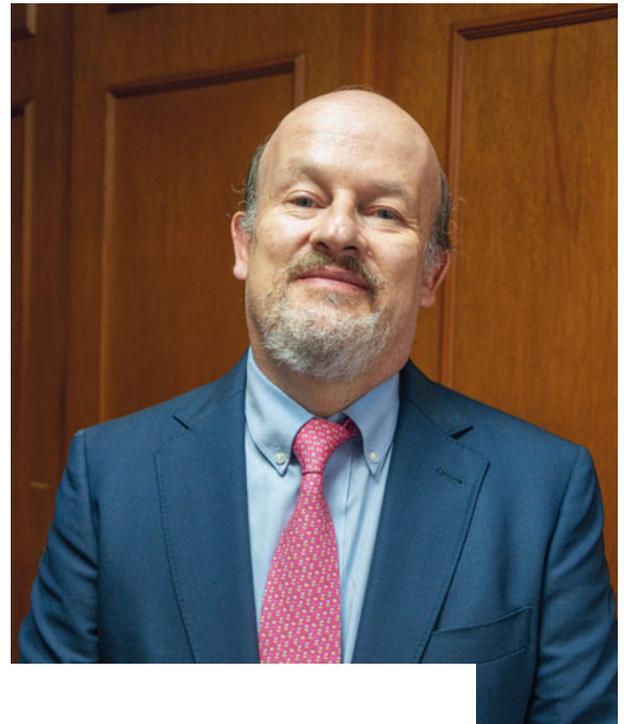
Never standing still

Back at the mill in Irapuato, Leopoldo Giménez walks through the recently upgraded mill – also known as La Montaña – together with Eikner Guecha, Area Sales Manager Milling Solutions at Bühler Mexico. “We’re one of the smaller operations of the company, but we play a key role in supplying the raw material for the cookie factory, which is in Toluca. We also produce flour for La Moderna’s snack food production plant. La Moderna is such a large company with an incredibly tight production network spread across Mexico. Every location must fulfill its purpose to keep production running – that’s why we need to be able to rely on our equipment and on Bühler’s service team in case action is needed,” says Giménez.

Throughout the past few decades, La Moderna with Bühler has consistently upgraded its milling equipment to stay up to date with the latest technological developments and to cater to the increasing demands of the industry. The last upgrade, however, was quite a challenge.

“We set ourselves a strict time frame for the capacity increase here at La Montaña. The project included bringing in new equipment such as our Dolomit eight-roller mill, our Sirius plansifter, as well as the engineering and installation of the pneumatic and aspiration system for the new mill. This allowed us to increase capacity from 150 tonnes per day to 250 tonnes per day,” says Eikner Guecha.

In only two weeks, the team finished the upgrade with minimal impact on daily operations thanks to meticulous planning and years of experience in working together. “It all comes down to two pillars: the technological side enables us to provide La Moderna with the latest innovations in milling. The engineering side, on the other hand, allows us to create specific solutions tailored to their needs,” Guecha explains.



“OUR MILLS, BAKERIES, AND PASTA PLANTS *NEED TO KEEP RUNNING ALL THE TIME* TO PROVIDE FOOD FOR PEOPLE IN 16 COUNTRIES IN LATIN AND CENTRAL AMERICA AND IN THE US.”

JOSÉ ANTONIO MONROY CARRILLO

CEO of the Milling Division, Member of the Board, and co-owner of La Moderna

One man who has experienced La Moderna’s rise to one of the major food producers in the region firsthand is José Antonio Novelo Pérez. He’s been with the company for 37 years and is now General Manager at Harinas Los Pirineos.

“Our plant here in Irapuato has a strong strategic relevance for La Moderna. First, we’re located in the Bajío region, the major wheat cultivation area in Mexico. Second, we produce regular wheat flour for our production sites as compared to all our other mills, which produce semolina for pasta. Which brings us to the third pillar – our specialty flours, in particular premix flours for use everyday in households as well as industrial use such as in bakeries,” he explains.



Grupo La Moderna

Toluca, Mexico



Founded in 1920.



La Moderna operates a wide network of grain silos, mills, pasta factories, and bakeries, primarily in Mexico.



La Moderna provides food directly to households as well as flour for industrial food producers in Mexico, the US, and Central America.



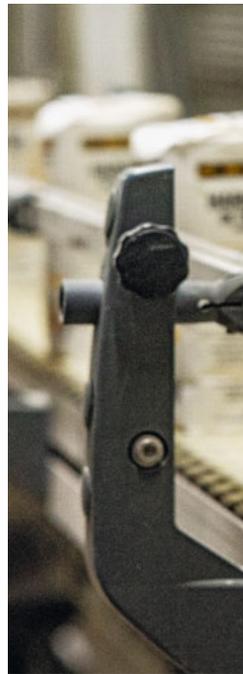
La Moderna uses the latest milling technology from Bühler from cleaning to grinding, conveying, sifting, dusting, and bagging to ensure food security for millions of people.

While his teams rely only on Bühler equipment in their milling operations, it's the technology for premix flour production that Novelo Pérez is particularly fond of. "The premix production is the backbone of Los Pirineos. We're talking about accuracy down to the millimeter, requiring an incredible level of precision. We need to be able to count on equipment that gives us the peace of mind that there are no deviations in product quality, as this flour, in part, goes directly to end consumers. That's a high level of responsibility, and we can provide our premix flour to millions of Mexicans in good conscience," he says.

Staying ahead of the game

At the corporate level, Sergio Orozco is responsible for all production across the company's seven mills. Overseeing all these activities across multiple regions, Orozco knows the key to keeping this fine-tuned machine running all year round and to staying ahead of the game.

"Bühler has been supplying us with the most reliable milling equipment for years. What I appreciate even more is that their team goes beyond selling equipment as they always strive to improve our processes and our efficiency. For example, it would be impossible to meet the increasingly stringent food safety requirements in our field without the Sortex optical sorting technology – there simply is



"IT WOULD BE IMPOSSIBLE TO MEET THE INCREASINGLY STRINGENT FOOD SAFETY REQUIREMENTS IN OUR FIELD WITHOUT THE SORTEX OPTICAL SORTING TECHNOLOGY."

SERGIO OROZCO

Head of Milling Production at La Moderna

Millions of households in Mexico count on the quality and safety of La Moderna's flour.



VIDEO

Watch the video about how La Moderna keeps pushing to reach new heights.



Combining profound knowledge in milling with the latest technology on the market is key to La Moderna's success.

nothing on the market that matches its accuracy, and we are using the machine in all our facilities across Mexico.”

At the company's headquarters in Toluca, one hour from the country's capital Mexico City, Ing. José Antonio Monroy Carrillo studies the latest production reports from La Moderna's seven mills spread across the country. With the population of Mexico expected to reach 148 million by 2050 – an increase of 20 million from 2023 – his company's role in ensuring food security will only increase. Ing. Monroy and his teams are ready for the challenge.

The future looks bright

“The key factors are reliable processes, striving for the highest quality with every grain processed, and always looking ahead for the next innovation. It's comforting to know that with Bühler's best-in-class equipment and knowledge, we can trust in our operations. What's even more important to us is that together with the Bühler team here in Mexico, we continuously challenge each other to find new ways to improve efficiency and yield. This benefits all of us, but especially the millions of people in Central and North America relying on us to provide

safe, nutritious, and affordable foods,” he says. Staying true to its company values, Grupo La Moderna is fully focused on its next milestone project: A new pasta semolina mill, which will boast a capacity of 120 tonnes per day. The project – equipped with Bühler technology and digital solutions across the value chain from cleaning to the packaging system – will be the new milling line of La Moderna's Tamisa operations in Navojoa, the capital of one of the main durum wheat farming states in Mexico.

An engineer by trade with a profound understanding of industrial food processing, Ing. Monroy looks forward to reaping the benefits of the latest innovations in milling and pasta production. “This new line will enable us to increase our high-quality standards and boost our efficiency, traceability, and food safety, to name a few benefits. We are excited to continue our success story and providing good and affordable foods to our millions of consumers that trust in the La Moderna brand every day,” he says.

With their impressive production and distribution network across Central and North America, it's certain that Grupo La Moderna will remain a household name for generations to come.

Bakha Söhne

FIELDS OF DREAMS

IN THE VASTNESS OF KAZAKHSTAN

TEXT: STUART SPEAR
PHOTOS: SAGAR SHIRISKAR

Kazakhstan enjoys good growing conditions for oats and a strong domestic market. Yet the country has historically relied on its neighbors for oat processing. That is until the Aripov family decided to extend their business from farming and, with Bühler's help, opened the country's first high-tech oat mill. Now they are looking to serve neighboring markets too.





The mill, which has been in operation since May 2023, currently produces 2 tonnes of oat flakes per hour.

ROUGHLY THE SIZE of western Europe, Kazakhstan is the world's largest land-locked country and with a population of 19 million it is also one of the least densely populated – there are just six people per square kilometer. Once you leave the glass, steel and architectural modernity of the capital Astana and travel west on route M-36 you soon enter a vast belt of grassland known as the Kazakh Steppe. The skies are big, and the landscape is uninterrupted by buildings.

This region is called Akmola and is one of Kazakhstan's main crop-growing areas. Keep going on the M-36 for 250 kilometers west of the capital to the small village of Pokrovka in Akmola, and here you will find Kazakhstan's most high-tech oat mill. This is the new Bakha Söhne oat mill, owned by the Aripov family, built with the latest Bühler technology. It has been in operation since March 2023.

From farming to processing

Farms are huge here. In the past, vast tracts of land were plowed to grow cereal crops to feed the wider population of the Soviet Union. When Kazakhstan gained independence in 1991, the Aripov family saw an opportunity here, given the already good road transport links in Akmola, and they began buying land and building what would become the country's largest agricultural product supplier.

Today, the farmland owned by the Aripov family stretches beyond the horizon, covering 75,000 hectares, of which 50,000 hectares is used to grow wheat, barley, lentils, sunflowers, flax seeds, and oats. The remainder of the land is used for cattle grazing. Farming has long been part of the Aripov's way of life. But the family came to realize that while Kazakhstan was growing enough crops to feed itself, it was overly dependent on its neighbors for its food security when it came to food processing.

"My parents and I are involved in farming, and we've gradually expanded our land and decided that we want to transition into processing," explains Amanzhol Aripov, Director of Bakha Söhne LLP. "Initially, we looked into processing buckwheat and lentils, but ultimately decided on oats because, currently, Kazakhstan imports a significant amount of oat flakes. Our primary goal is first to meet the needs of our own country and, subsequently, to export our product to central Asian countries and the Chinese market."

Aripov believes there are huge opportunities for high-quality, locally produced oats as demand grows across Central Asia. Porridge became a staple food in Kazakhstan, particularly for children during the Soviet period, when it went under the brand name of Hercules. Today porridge is served in many

Dauren Kassabekov, General Manager of Bühler Kazakhstan, Amanzhol Aripov, Director of Bakha Söhne, Mathias Hannsbauer, Head of Business Segment Oats at Bühler, and Ilyas Karymsakov, Head of Technology at the Bakha Söhne oat mill.



“OUR PRIMARY GOAL IS FIRST TO MEET THE NEEDS OF OUR OWN COUNTRY AND, SUBSEQUENTLY, TO EXPORT OUR PRODUCT TO CENTRAL ASIAN COUNTRIES AND THE CHINESE MARKET.”

AMANZHOL ARIPOV
Director of Bakha Söhne LLP

restaurants and is also used widely for making cookies and cakes. Aripov believes that oats provide a bit of nostalgia for many Kazakh people because of the strong connection to childhood. “When I was young, I remember my mom preparing porridge for us. Even now, when we eat porridge for breakfast, it feels like revisiting childhood memories,” he says.

Looking to the future, Aripov sees the role of oats in people’s diets changing and expanding. This was a critical factor in the decision to go into oat processing. “We decided on oat flake production because we saw that over the last ten years there has been a trend towards improved nutrition in countries such as Kazakhstan and the Central Asian nations, especially among the younger generations,” he says.

Gathering knowledge and expertise

Once the decision to diversify into oat processing was taken, the next step was to acquire the expertise and source the technology needed to put it into action. The family had already been talking to Bühler, but it was during a fortuitous meeting when Aripov’s father, Ualikhan Aripov, met Dauren Kassabekov, General Manager of Bühler Kazakhstan, that the plan to build an oat processing mill using the latest technology was forged. “We had been speaking previously, but it was when we met on a plane in November 2017, flying from Astana to Hanover for the Agritechnica exhibition, that we discussed the idea of the oat mill,” says Kassabekov.

After discussing the pros and cons of the project, the Aripovs decided to build an oat mill engineered by Bühler and to use its plant automation system, Mercury MES (Manufacturing Execution System). The next challenge was how to acquire the necessary skills for this new business. There are no other large oat flake production plants in Kazakhstan, so Aripov turned to Bühler for advice.

“My role is to be the support on the ground and help with training,” says Kassabekov. He scheduled visits for Aripov and his team to similar Bühler oat mills in Europe and other regions. He also arranged meetings at conferences and exhibitions to help them gain expertise and understanding of the new industry. Aripov also attended training in Uzwil.

“In 2019, our technologist and I attended a two-week course at the Bühler headquarters in Uzwil, Switzerland. We witnessed the entire production process from intake and cleaning to dehulling, as well as crucial steps such as heat treatment and

flaking. It was truly an invaluable experience,” he says. “As we got to know Bühler better and saw Bühler’s approach to production, with its focus on automation and digitalization, we also realized how this simplified many aspects of manufacturing.”

Support to overcome initial challenges

While Kassabekov was supporting the new business in Kazakhstan, the business team in Uzwil provided market and technical expertise. “We have the knowledge to provide the right process for the right product for the customer’s market,” Mathias Hannsbauer, Head of Business Segment Oats at Bühler says.

With all systems ready to go at the end of 2019, the Covid-19 pandemic hit and everything slowed down, from procurement to logistics. Head of Technology in the Bakha Söhne oat mill, Ilyas Karymsakov, was working closely with Bühler at the time.

“With the facility being on the open steppe, this presented real challenges, like setting up communications, infrastructure, and acquiring additional equipment from third parties. It wasn’t straightforward. Yet three years on, we have built this enterprise and we are eager to grow alongside Bühler,” says Karymsakov.

Now up and running, one of the roles of the Uzwil team is to support Karymsakov with the execution of the production process. “My technical team are in direct contact with Bakha Söhne’s technical team dealing with daily operational issues,” explains Hannsbauer. “And today we have the great advan-

tage of digitalization, which means we are able to use our Bühler Insights tools. When a customer gives us access, we can go through all the production data, discuss any issues, and suggest adjustments to the production parameters that will optimize efficiency and reuse of side streams as well as reduce maintenance times and energy consumption.”

A firm focus on quality

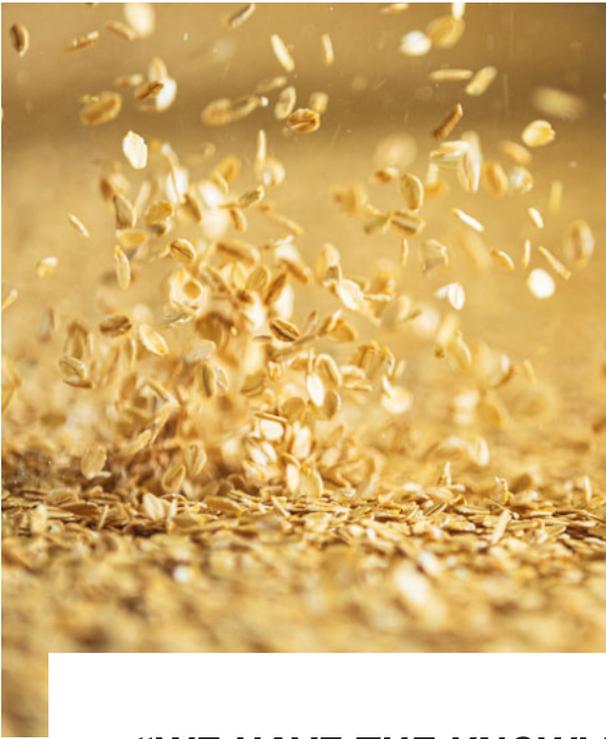
Quality has always been fundamental to the farming ethos of the Aripov family. The company has achieved elite seed farming status for its production of grains, perennial grass seeds, and cereals. The crops grown on the farm are organic. Side streams are delivered to feed producers to be turned into feed pellets.



A final quality check of the thickness of an oat flake is carried out in the laboratory.



For a clearer overview of key data, Bakha Söhne uses Mercury MES – a full factory automation system that integrates all processes to increase efficiency and traceability.



The high-quality finished oat flakes are now ready for bagging.

The nutty flavor of the oat flakes is perfected in the two-stage heat treatment kiln and flaker.



“WE HAVE THE KNOWLEDGE TO PROVIDE THE **RIGHT PROCESS FOR THE **RIGHT PRODUCT** FOR THE CUSTOMER’S MARKET.”**

MATHIAS HANNSBAUER
Head of Business Segment Oats at Bühler

VIDEO

Watch the video to learn more about the collaboration and technology behind Bakha Söhne.



Mathias Hannsbauer has been supporting Bakha Söhne with their oat processing since 2019.



This principle of excellence is something the family was keen to extend into their processing operation. “For many years, we’ve been researching this area of processing. We were more concerned with quality over quantity,” explains Aripov. “I believe that Bühler has provided us with a solution specifically for producing quality oat flakes.”

The mill, which has been in operation since May 2023, currently produces 2 tonnes of oat flakes per hour. Growing and producing oats has brought numerous advantages to Bakha Söhne’s business. Because they grow their own supply stock, Aripov believes they are in a better position to produce the desired premium product. “We can have control over the whole process from sowing the oats to the store shelves,” he says.

There are other benefits too. In Akmola, oats yield more than wheat and require less water to grow – an important factor in a semi-arid region. In addition, oats have traditionally been grown here in rotation with other cereal crops to help replenish depleted nutrients in the soil. “Oats act as a kind of healer for the soil. In our conditions, they yield very well at around 30 quintals [3 tonnes] per hectare,” explains Aripov.

Giving back and improving livelihoods

For the Aripov family, running a successful business goes hand in hand with investing in the local community. In the town of Pokrovka they have built housing, a school, a bakery, and other infrastructure. The family also supports social causes and charities. “One of the reasons we want to expand the business is that we also want to bring necessary jobs to the residents of Pokrovka and we hope to be able to improve the village of Pokrovka through the factory,” says Aripov.

While Bakha Söhne oat mill is now beginning to expand its business into fresh markets in Central Asian states and in China, the family’s ambition is to continue to improve Kazakhstan’s food security by going beyond oat processing.

“In the future we want to expand our product, with Bühler’s help, to produce wheat and barley flakes and flour. We would also like to produce products like granola and muesli that are made of three or four different grains,” Aripov explains. “Through our collaboration with Bühler I believe we’ve built one of the most modern food factories in this part of the world.”

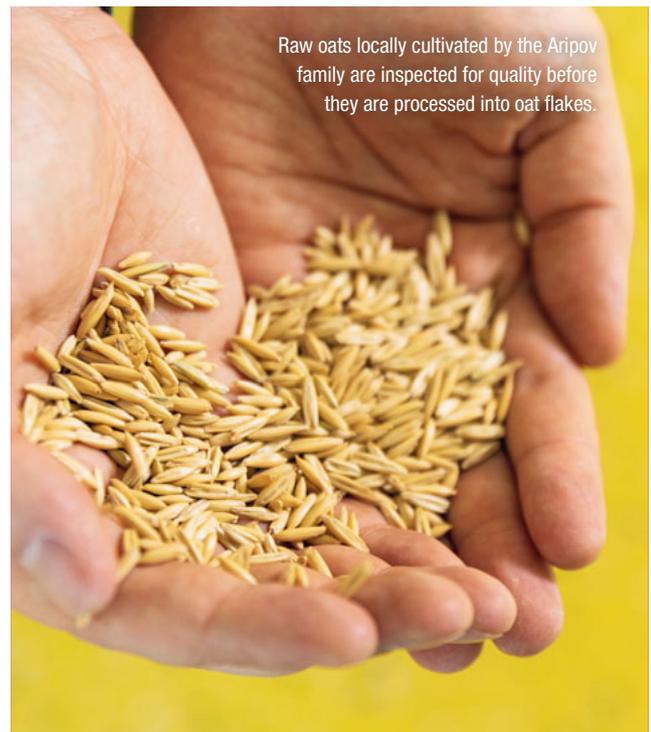
INFO



Bakha Söhne LLP

Pokrovka, Akmola region, Kazakhstan

-  In operation since May 2023.
-  Bakha Söhne processes oats grown by the family business.
-  Bakha Söhne supplies customers in Kazakhstan, Central Asia, and China.
-  The Bakha Söhne oat mill is built with the latest Bühler technology, including the MHSA huller, the Twitor BSOA table separator, the MBDA steamer, the Granotherm DNGB kiln, the MDFA flaking mill, the Mercury MES plant automation system, and Bühler Insights.



Raw oats locally cultivated by the Aripov family are inspected for quality before they are processed into oat flakes.



Cristal Alimentos

SHINING

ON THE PLATES OF MILLIONS OF BRAZILIANS

TEXT: DALEN JACOMINO
PHOTOS: PEDRO FELIX

Over the last 60 years, Cristal Alimentos, a family-owned business in Brazil, has won the hearts of Brazilian consumers with a key component of the country's basic food basket: rice. Now, the company, which also processes beans, sugar, and flour, has reached new heights and made its debut in the pasta market with a state-of-the-art plant in Goiás with a capacity of 10 tonnes per hour.



In 2000, Cristal Alimentos moved to a new and bigger facility, spanning an area of 250,000 square meters.

Entrepreneurial spirit in the family: Marcelo Madalena, Managing Director of Cristal Alimentos, and his father Walterdan Fernandes Madalena, who founded the company.

THE CELEBRATED Brazilian composer and musician Tom Jobim once said: “Brazil is not for beginners.” This is a complex market with its own nuances, uncertainties, and ambiguities. But it is also a continental country, vibrant with its unique mix of cultures and flavors, and a land full of opportunities. That is where this story takes place. Almost 60 years ago, the Brazilian Walterdan Fernandes Madalena, who was already helping his family at their grocery store in Tesouro, a small city in the state of Mato Grosso in central-west Brazil, decided to start a new venture. With little financial resources available, the young entrepreneur bought a rice milling machine – a manually operated piece of equipment with a capacity to process 60 kilograms of the commodity per day. His dream was to produce high-quality, safe, crystal-clear rice to feed Brazilian consumers.

Brazil, today a country of 215 million people, is a rice-and-beans nation. Rice is part of the daily meal of almost every Brazilian family. Recent estimates indicate that Brazilians consume approximately 12 million tonnes of rice annually. Therefore, good quality, safe, and affordable rice has always been in demand across the world’s fifth largest country by size. With that in mind, Walterdan Fernandes Madalena kept chasing his dream.

Step by step to industrial production

He started small, selling his product to local retailers and street market traders in the region. In 1957, his father decided to leave Tesouro and move to Goiânia, a bigger city and the capital of the state of

Goiás, still in the central-west of the country. Walterdan Fernandes Madalena moved with his family but stuck to his plans. He was able to buy new machines and increase production. In 1965, his small company was processing eight bags, each weighing 60 kilograms, per hour. Ten years later, production jumped to 15 bags per hour. The rice looked so pure that consumers described it as crystal, a pure product with no chemical additives or preservatives and a high standard of quality. In fact, “purity in the form of grains” (in Portuguese, ‘pureza em forma de grãos’) became the slogan of Cristal’s rice.

In tune with customer demands, the company kept expanding its portfolio by processing new types of rice. In 2000, with the transfer to a new and bigger facility, spanning an area of 250,000 square meters, production quadrupled. “It has been an amazing journey. Step by step we were able to position our rice in the daily lives of so many families. Because we prioritize quality, safety, and affordability, we were able to connect to consumers and build a trusted relationship,” explains Marcelo Madalena, Managing Director of Cristal Alimentos and son of Walterdan Fernandes Madalena. Walterdan is 79 years old and still very actively involved in the



“BECAUSE WE PRIORITIZE QUALITY, SAFETY, AND AFFORDABILITY, WE WERE ABLE TO CONNECT TO CONSUMERS AND BUILD A TRUST RELATIONSHIP.”

MARCELO MADALENA

Managing Director of Cristal Alimentos

company's day-to-day business. Today, consumers associate the Cristal Alimentos brand with attributes such as tradition, solidity, and stability.

Feeding a nation in times of crisis

In fact, the rice was just the beginning of Cristal's path to success. In recent years, the company has expanded its portfolio of products and kept its eyes on Brazil's staple foods, which include beans, pasta, sugar, oils, and flour. “This is our business. This is our focus. We put all our energy, expertise, and investments in producing high-quality, safe, and affordable food that makes up the major part of a population's diet,” explains Lana Rubia Silva Barbosa, Industrial Manager at Cristal Alimentos. With that kind of

mindset, Cristal, with its 1,100 employees, does everything possible to ensure that the food reaches the consumer's table. “In 2020, during the Covid-19 pandemic, we decided to keep up production – in the safest way possible for all employees. We knew how important our role was to keep feeding our customers in such a critical and uncertain time,” says Marcelo Madalena. “Very aware of the economic pressures, we also decided in some cases to not pass on increased costs of raw materials, energy, and supplies to the customer.”

Fighting food insecurity in Brazil

Although the escalation of hunger in Brazil, and globally, was exacerbated by the Covid-19 pandemic and recent geopolitical crises, food insecurity in the country is the result of a sum of factors involving previous economic, social, and geographic aspects. According a 2023 a survey by the Food and Agriculture Organization, more than 15 million Brazilians face serious food insecurity – and a total of 70.3 million Brazilians face some degree of food insecurity, characterized as moderate or severe. From

2014, Brazil had been considered to have eradicated hunger.

In 2013, the rate of moderate and severe food insecurity was at 7.8 percent, compared to 16.8 percent approximately one decade earlier, in 2003. Some of the factors impacting the capacity of families to have access to sufficient, safe, and healthy food in the country include the rise in unemployment, a decrease in income, inflation, and the weakening of social programs and public policies focused on protecting and promoting food and nutritional security.

Food insecurity is not limited to hunger and is not only defined by a reduction of the amount of food ingested. There are cases, for example, where families experience food insecurity when they need to replace healthy foods with cheaper, less nutritious ones.

One of the multiple solutions in addressing food security, which should be part of an extensive and systemic approach, is guaranteeing good quality, safe, nutritious, and affordable food to everyone, experts recommend. Brazil is the world's fourth-largest food exporter and has sufficient production capacities to meet its internal and external demand.

Working towards offering safe, nutritious, and affordable food can make a huge difference. Because of its entrepreneurial background, grounded and

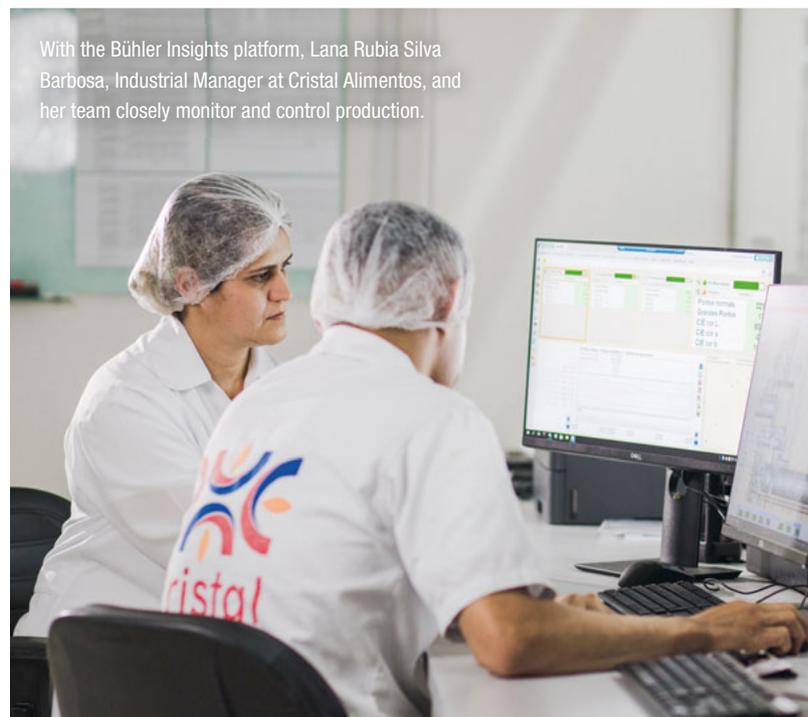
solid management of resources, and investment in innovation, Cristal Alimentos is in a position to contribute to addressing these challenges, in particular in the regions where its core business focus lies. Currently, Cristal sells its products to retailers and mid-sized shops in several states in the northern, central, and southern parts of Brazil such as Pará, Maranhão, Bahia, Tocantins, Amazonas, Goiás, Brasília, Mato Grosso, and Minas Gerais with a combined population of about 100 million people.

“Our priority is to be always there for our customers. This means, for example, being able to respond to new orders in 24 hours,” says Marcelo Madalena. “We have been investing heavily in logistics, which is very challenging in Brazil. We take care of and train our people, so we can ensure that the customers are not only served well when buying our products, but also in the after-sales period.”

Adding pasta to the menu

Bühler has been collaborating with Cristal Alimentos for more than 30 years. In the first stage, the company invested in Bühler’s equipment for cleaning and sorting rice – today, Cristal has 20 Sortex machines. A few years ago, Cristal decided to take a brave step forward and start to produce pasta. As it was a completely new market for Cristal, the company needed a trusted partner. Bühler was ready to support with its technical and engineering know-how. “We started to manufacture pasta due to our partnership with Bühler. The relationship of trust and constant support at all stages of the project has made a huge difference for us. The combination of experience, expertise, and project management was outstanding,” explains Marcelo Madalena.

Cristal purchased three modern C-Line pasta lines. The first two automated lines – to produce long and short pasta and with a capacity of 2,750 kilograms per hour (kg/h) and 2,000 kg/h, respectively – were bought in 2018. In the first year, Cristal reached 100 percent production capacity with around 5,000 kg/h. With such a promising debut, Marcelo Madalena and his team decided to invest more – the only way to cater to the growing demand. In 2020, the company acquired the third pasta line, a long-cut pasta solution, with a capacity of 5,000 kg/h. Today, with three lines, the installed capacity of Cristal is around 10 tonnes per hour, contributing to keeping Brazil among the top five leading countries in pasta production as of 2021, according to the International Pasta Organization.



With the Bühler Insights platform, Lana Rubia Silva Barbosa, Industrial Manager at Cristal Alimentos, and her team closely monitor and control production.

VIDEO

Watch the video about Cristal Alimentos to learn how they are leading the way in pasta production.



“WE STARTED TO MANUFACTURE PASTA DUE TO OUR PARTNERSHIP WITH BÜHLER. THE RELATIONSHIP OF TRUST AND CONSTANT SUPPORT AT ALL STAGES OF THE PROJECT HAS MADE A HUGE DIFFERENCE FOR US.”

MARCELO MADALENA

Managing Director of Cristal Alimentos

With three pasta lines, the installed capacity of Cristal Alimentos is around 10 tonnes per hour.

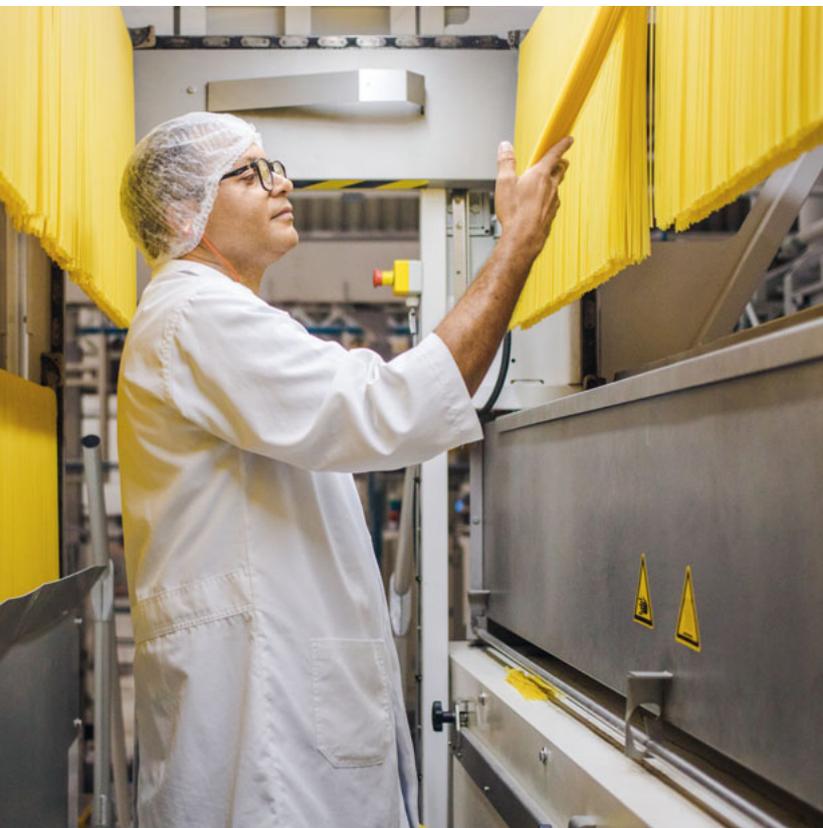


“We consider it one of the most modern and high-tech pasta lines in South America,” explains Fátima Morais, Sales Manager at Bühler. Bühler provided the complete solution for Cristal Alimentos’ pasta lines, covering all stages of the production process.

As an example, the mill and mixer with gravimetric dosers provide maximum precision in the dosing of ingredients, guaranteeing controlled conditions of the pasta, constant humidity, and consistent drying. The pressing system operates without granulometry limitation, offering perfect hydration and pasta development, with excellent access to components for maintenance and cleaning. And finally, the pasta dryer guarantees a high level of thermal insulation, free from deformation and problems with condensation, as well as energy efficiency.

A first in South America

In addition, Cristal opted for Bühler’s digital solution PastaSense. It is an integrated sensor system that monitors and ensures the quality of the pasta, allowing production to be regulated at any time for the necessary corrections in real time, while ensuring the maintenance of the desired quality parameters for the final product. By continuously monitoring the production, PastaSense also minimizes waste in the process.



Such a strong combination takes quality, safety, and efficiency to the next level. In fact, Cristal Alimentos is the first company in South America to employ such technology.

“We delegated to Bühler the planning of the entire implementation of our pasta factory from scratch, including the preparation of recipes for our market objectives. And today we couldn’t be happier to see where we have managed to get,” Marcelo Madalena explains. With a state-of-the-art pasta plant and a highly motivated team, Cristal has all the ingredients to keep shining on the plates of millions of Brazilians.

INFO



Cristal Alimentos

Goiânia (Goiás), Brazil



Founded in 1956.



Cristal Alimentos is a processor of rice, beans, flour, sugar, and pasta in Brazil.



Cristal Alimentos sells its products to retailers and mid-sized shops in several states in the northern, central, and southern parts of Brazil.



Cristal Alimentos initially invested in Bühler’s equipment for cleaning and sorting rice. A few years ago, it started to produce pasta using three modern C-Line pasta solutions from Bühler.

ENORMOUS POTENTIAL FOR NEW TECHNOLOGIES IN AFRICA



Heiko Feuring, Head of Region Middle East Africa & India at Bühler

AFRICA SUFFERS from significant food security challenges. According to the United Nations Food and Agriculture Organization (FAO), nearly 25 percent of the population in Africa is affected by hunger, compared to 8.5 percent in Asia and 6.5 percent in Latin America.

Addressing food losses plays a critical role in the path to food security in Africa. Currently, 30 to 55 percent of cereals in Africa are lost due to inadequate storage conditions. Only about 10 percent of grain is stored in silos, while more than 50 percent is improperly stored in bags, usually directly exposed to the elements. The remaining 40 percent of the grain is also kept in bags, which at least are stored in warehouses.

The key to the solution lies in optimizing the entire agricultural process itself and in professional storage. Traditional agricultural processing methods, where harvesting often takes place very late and manual cleaning and drying are done on site, favor losses due to rotting, birds, insects, rodents, theft, and product wear on the farm.

Timely harvesting allows for possibly two harvests in the same time period instead of one. At the same time, this minimizes losses in the field because

the grain is harvested in its green state. Important steps such as cleaning and drying should ideally take place directly in the warehouse, which increases efficiency and prevents inefficient manual cleaning processes. Drying in the warehouse does not take up land on the farm, which can instead be used to grow more grain. The controlled storage conditions in the silo in optimized ratios also ensure a longer shelf life for the grain.

Our advanced technology provides processes and systems that greatly improve post-harvest management and storage. For example, the use of advanced storage facilities such as controlled atmosphere and hermetic storage minimizes spoilage due to pests and fungal growth. In addition, innovative drying techniques and cleaning methods extend the shelf life of produce. By using the right technology, we can take each step in the right place at the right time, resulting in an increase in harvest of approximately 30 percent and a reduction in storage losses of more than 40 percent.

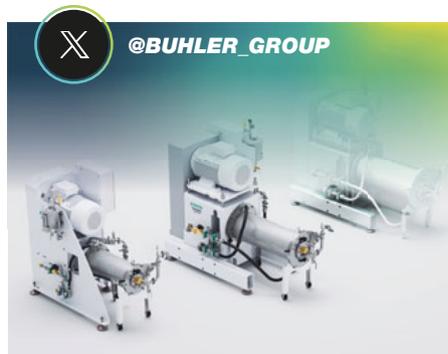
To implement these new processes and technologies, Bühler is cooperating closely with various partners in the countries concerned. This includes identifying specific challenges and obstacles in the respective regions in cooperation with the African Continental Free Trade Area (AfCFTA).

We assess existing storage facilities and the needs of operators and local agro-processors and develop innovative solutions to minimize losses and maximize yield. We also facilitate reference visits to similar projects and work closely with AfCFTA and national implementing organizations to incorporate local infrastructure and leverage its full potential.

We are on a journey to increase food security and reduce post-harvest losses together with our partners. And as we look to the future, it is not just about developing a vision, but actively participating in shaping Africa into a continent where no one must go to sleep hungry, where post-harvest losses are minimized, and where everyone has access to sufficient and safe staple foods.

LET'S GET SOCIAL!

Stay up-to-date with the latest trends, innovations, and customer success stories from the Bühler world by following us on our social media channels. You are also welcome to tag us in your posts about how you work with our solutions.



BÜHLER ON LINKEDIN
Check out our company page and our **showcase pages** on LinkedIn such as Bühler Group Milling Solutions, Die Casting, Battery Solutions, and many more.

THE BÜHLER INSPIRATION HUB

Would you like to know more about the key trends impacting your industry? Visit our Inspiration Hub, where you will also find features and videos highlighting the inspiring work of our customers and partners around the world.



WHAT'S NEXT? Diagram #188

In the next issue we will focus on the benefits of retrofitting and remanufacturing, exploring how it extends asset lifetime, boosts productivity, adds functionality, and increases uptime. Learn how we give your plant a second lease on life!

PODCAST

Harvard Business School Professor Ranjan Gulati interviews Stefan Scheiber in his "Deep Purpose" podcast: "Making global sustainability personal at Bühler".



YOUR OPINION MATTERS TO US

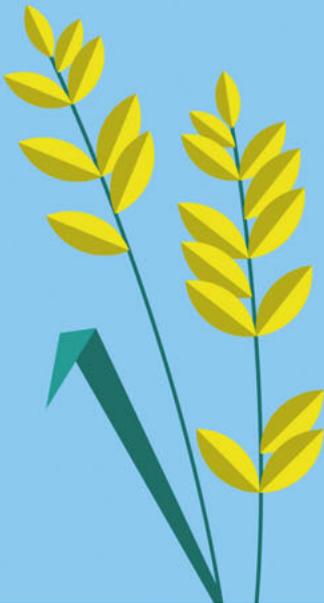
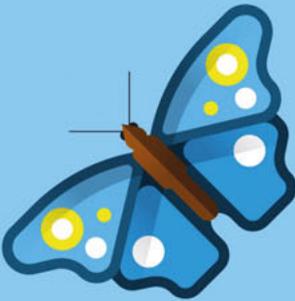
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