Interconnectivity

AgriTech's
Future Harvest

Nymark

WHAT IS NEXT?

How BioTech, AI and inclusive AgriTech solutions meet to drive equity and sustainability on the path to 2050.

‘25 ‘30 ‘50

June 2025

This report offers insights and reflections on emerging trends in technology, shared for informational purposes only. Nymark presents these perspectives to contribute to broader industry conversations and to inspire further exploration. While we aim for accuracy, the report is not exhaustive and does not replace expert consultation or tailored guidance. Readers are encouraged to interpret and apply this information thoughtfully within their unique contexts.

Written by

Anna Tamara
Writer

Andries van Oers
Strategist

Soufyan Lamdini
Strategist

Driving Positive Tech

At Nymark, we focus on bridging the gap between potential and sustainable success for technologies that matter. To sharpen this focus, we mapped the industries driving progress and try to guide ourselves in defining our take on positive tech by formulating a set of Positive Technology Principles.

Part of widening our understanding is not only being aware of what happens at the edge of innovation within specific industries, but rather trying to understand the holistic landscape these innovations are happening in and correlate.

Our latest research unpacks developments across most of these sectors. 'Interconnectivity' 2025 explores how technological innovation drives systemic change and how different industries influence each other.

Each report in this series shows how these Positive Technologies reinforce one another, forming a larger ecosystem of progress, and what's next for the decades ahead. This report focuses on AgriTech. Today's developments in AgriTech are fundamental to future-proofing our planet.

Agriculture is seeing a digital and biological transformation, as technology is offering tools to grow more food with less environmental impact and address food scarcity.

Nymark is proud to work with AgriTech innovators in the Netherlands and beyond, to help grow such essential innovation.

This report explores how innovations are converging to address the urgent need for sustainable food systems. 2025 will see farmers, scientists and policymakers striving to reimagine food production on the path to net zero by 2050.

The following chapters examine the missions driving this change, the challenges of scaling up tech for all farmers, and the cutting-edge developments in biotech, AI and software that promise to reshape agriculture for decades to come.

Enjoy reading,

The Nymark Team

Contents

The Mission

The Mission
Sustainable Food Systems for All

1-2

In recent years, agriculture has moved closer to the centre of climate policy discussions. Food systems generate between one quarter and one-third of global greenhouse gas emissions. As agriculture's role in the climate crisis becomes more pressing, so do the inequities in the global food system.

Global hunger remains alarmingly high —the numbers rose sharply from 2019 to 2021, and they're not going down. In July 2024, the UN Food and Agriculture Organisation (FAO) and other major UN food agencies reported that roughly 773 million people on the planet are facing acute hunger.

This has prompted a major agricultural overhaul. Agriculture remains a critical yet too often overlooked aspect of the climate conversation. High-level talks— from UN forums to COP29 climate negotiations in 2025—have aimed to build momentum for "food system transformation" to help farmers adapt to climate change.

Alongside this is the call for a "just transition" in agriculture, urging leaders to prioritise sustainable agricultural practices alongside energy commitments in global climate discussions, and to build toward such commitments without imposing undue strain on farmers or low-income nations.

AgriTech, also referred to as 'Smart Agriculture', will play a key role in achieving these goals. The intersection of agriculture and technology is not new, but the acceleration of digital tools, alongside advances in biotech and AI, is changing the landscape in 2025.

Technologies including drones, AI-powered decision-making, genetic editing, and farm management-platforms are now a major focus for both public and private investment. In January 2025, the European Investment Bank announced a €2 billion fund for climate-resilient agriculture, with a focus on supporting startups developing soil health diagnostics, microbial fertilisers, and water-optimising tech.

This follows similar commitments from the USDA and the Gates Foundation, each pledging increased funding for sustainable intensification.

“Calls for a ‘just transition’ in agriculture urge leaders to prioritise sustainable agriculture practices alongside energy commitments in global climate discussions.”

The Mission
Sustainable Food Systems for All

2-2

The market valuation for 'Smart Agriculture' technologies reached USD 25.36 billion in 2024, and forecasted growth estimates project it will expand to USD 54.71 billion by 2030. Today, adoption of agricultural technology is highest in North America, where large-scale farms utilise advanced infra-structure.

The Asia-Pacific region is expected to experience the most rapid growth due to rising food demand, supportive governmental policies, and fast-paced technological adoption.

Meanwhile, Brazil's AgriTech sector surpassed $1.2 billion in venture capital investment in the first half of 2025, reflecting growing confidence in Latin America's potential for sustainable intensification.

The mission is clear: harness AgriTech innovation to reduce food scarcity while regenerating the planet's soil, water, and biodiversity. Achieving this vision means closing yield gaps in regions like sub-Saharan Africa, boosting output without expanding farmland, and drastically cutting farming's carbon and nitrogen footprint in Europe and beyond, so agriculture becomes a climate solution rather than a culprit.

It also must empower farmers of all scales to thrive, from high-tech Dutch greenhouses to smallholder plots in Asia and Africa. Critics argue that technological transformation must not sideline the agroecological knowledge of small-scale producers or exacerbate power imbalances in global supply chains.

In response, there is a growing emphasis on co-creation, new models of cooperative farming and parti-cipatory innovation needed to guide sustainable food systems for all.

What's coming next

FOOD SYSTEM REFORM

Agriculture is now central to global climate and food security agendas, with accelerated AgriTech innovation and strategic investments driving a transition toward sustainable, resilient food systems.

'25 Policy momentum builds globally for food system transformation, yet implementation varies widely. Major development banks and donors increase funding for climate-smart agriculture. Digital tools and co-creation models gain traction to ensure equitable access.

'30 Sustainability principles integrated into food policies. Regenerative agriculture and agroecological practices become standard across the EU, OECD, and emerging economies. Nature-positive incentives reshape land use and diversify production systems.

'50 By 2050, agriculture could achieve net-zero emissions through circular nutrient management, widespread agroforestry, and AI-driven precision land use. Protein sources diversify and more food systems are localised, coordinated globally via digital platforms.

The Mission

The Challenge
Scaling Technology to Support Farmers

1-2

For agricultural technology to deliver on its promise, the system around it must adapt. As with other positive technology sectors, regulatory frameworks are lagging behind the pace of technological innovation. For instance, the rapid growth of biological crop protection products, now accounting for nearly 18% of new crop input launches in 2025, has outstripped the development of clear regulatory guidelines, creating uncertainty for both developers and adopters.

Scaling new technologies remains a persistent challenge. Despite a record $8.2 billion in global AgriTech investment in the first half of 2025, many startups still struggle to achieve commercial viability. Increased government intervention could help bridge this gap by providing stable revenue streams that enable emerging solutions to gain market traction.

Calculating a clear return on investment (ROI) for farmers continues to be a significant hurdle. In 2025, nearly 62% of surveyed farmers cited uncer-tainty about ROI as the main reason for hesitating to adopt new AgriTech tools.

This uncertainty contributes to "technology fatigue" on farms, where repeated exposure to overhyped solutions that fail to deliver has led to skepticism and slower adoption rates.

Adopting a measured, evidence-based approach is crucial to building trust and fostering sustainable adoption of AgriTech innovations. While some farmers are willing to experiment, most are looking for proven, reliable solutions that deliver value from day one.

A recent COP29 issue brief on Just Transitions, published by the CGIAR Climate Impact Platform, outlines the need for greater research and development, policy coherence and government support. Robust support systems for farmers would include social safety nets, training programs, and financial resources to navigate changes in farming practices. The CGIAR report stresses not only the need to develop climate-smart solutions, such as drought-resistant crops and sustainable farming techniques, but addresses the imbalance of implementation. They report only 1.7% of global climate finance reaches smallholder farmers.

“Many small-scale farmers still struggle to access basic innovations. Only 1.7% of global climate finance reaches smallholder farmers.”

The Challenge
Scaling Technology to Support Farmers

2-2

Access to basic innovations remains a challenge for many small-scale farmers. This digital divide is also driven by affordability, skills and policy support. Smallholders often face barriers from high upfront costs to patchy rural internet and limited training. In parts of Africa and Asia, most small farms remain "low-to-no tech", with fertiliser use only a tenth of levels seen in Asia's commercial farms.

In sub-Saharan Africa, where smallholders produce nearly 80% of food consumed, only 28% of rural households have access to mobile internet. (In early 2025, the African Union launched a regional initiative to address this, aiming to bring 4G access to 70% of farming regions by 2028.)

Yet infrastructure is just one part of the problem. Even where the technology is available, adoption remains low without the right training, financing and cultural context. Even in wealthier nations, the uptake of new technology can be slow without appropriate incentives. In England, farmers warn that cuts to green funding could stall the adoption of sustainable methods.

In 2025, the World Bank launched a $500 million initiative to expand digital infrastructure and training for smallholder farmers across Africa and Asia, aiming to increase technology adoption by 40% by 2030. And in February, the International Fund for Agricultural Development announced a $300m loan facility to support climate-smart tools for smallholders, but warned that more private sector collaboration would be needed to close the gap.

Governments and companies are also experimenting with innovative solutions such as low-cost smartphone apps providing agronomy advice, solar-powered cold storage for villages, and micro-loans to facilitate equipment purchases. Such increased financial and technical support will be crucial in scaling precision tools and climate-friendly practices.

What's coming next

THE JUST TRANSITION

Unlocking AgriTech's full potential requires policy, finance, and infrastructure to both keep pace with innovation and prioritise equity.

'25

Regulatory adaptation is underway, but uncertainty remains for biologicals and digital tools. Major initiatives like the World Bank's $500 million digital push target rural connectivity and smallholder inclusion, while farmer-focused models gain ground.

'30

Broader access to climate-smart and digital tools is achieved through targeted investment, improved extension services, and locally adapted platforms. Regulatory clarity and inclusive innovation empower smallholders in developing regions.

'50

Universal connectivity and smart infrastructure support precision farming at all scales. AI-driven advice and open platforms empower farmers, with technology adoption measured by gains in resilience, equity, and sustainability.

Biotech

Biotech
Reimagining Food Production

1-2

Biotechnology is fundamentally reshaping the global food system, from the genetic code of seeds to the proteins on our plates. The latest wave of innovation is focused on climate resilience, environmental regeneration, and leveraging advanced science for sustainable agriculture.

In 2025, advanced biofertilisers and soil enhancers are gaining traction as sustainable alternatives to chemical fertilisers. Companies like Food2Soil are converting commercial food waste into biofertiliser, while ICL is developing products that enhance plant nutrient uptake by "hacking" into natural plant communication systems. These innovations are improving soil health, boosting yields, and reducing agriculture's carbon footprint.

Groundbreaking research on plant microbiomes was recognised in March 2025, when Professor Julia Vorholt of ETH Zurich received the Novonesis Biotechnology Prize. Her work has demonstrated how beneficial microbial communities can strengthen plant disease resistance and resilience, paving the way for biosolutions that reduce reliance on synthetic pesticides and fertilisers.

Genome editing is also accelerating agricultural progress. Gene editing technologies like CRISPR-Cas9 are enabling plant breeders to make precise DNA changes in crops much faster than conventional breeding.

In 2025, Pairwise, a US-based company, became the first to bring a CRISPR-edited leafy green to market, offering improved taste and nutrition.

A UCLA-led study published in April 2025 introduced a miniature CRISPR system delivered by a plant virus, allowing for heritable, transgene-free genome editing in plants.

This innovation promises to streamline crop improvement and avoid the regulatory hurdles associated with traditional GMOs. Improvements in delivery systems, such as lipid nanoparticles, are also making gene-editing tools safer and more accurate, broadening their potential applications in agriculture.

“2025 has been a landmark year for protein production, welcoming a new generation of cultivated meat products”

Biotech
Reimagining Food Production

2-2

2025 has been a landmark year for protein production, welcoming a new generation of cultivated meat products. Israel became the first country in the world to grant regulatory approval for cultivated beef in January 2024. But while Aleph Farms has regulatory approval, commercial sales to the public are expected to begin later in 2025, pending completion of manufacturing licensing and other bureaucratic steps.

Meanwhile, the UK is moving forward after Meatly, a London-based startup, received regulatory clearance in July 2024 to sell cultivated meat for pet food in the UK. In March 2025, the UK's Food Standards Agency launched a two-year research programme to pave the way for the approval of cell-based meat products, collaborating with leading companies like Hoxton Farms and Mosa Meat.

The European alternative protein sector is experiencing tremendous growth, with a 32% year-on-year increase in published patents and a 960% increase since 2015.

Switzerland leads in patent output, while Germany has the highest number of individual assignees. Plant-based proteins dominate, but there is growing momentum in cultivated meat and precision fermentation.

Despite these advances, challenges remain. Scaling foundational research and ensuring equitable access to biotech innovations are priorities for 2025, as highlighted by the need for more foundational research and regional disparities in patent activity across Europe. Ethical, ecological, and regulatory questions continue to shape the debate around gene editing, synthetic biology, and alternative proteins.

As climate pressures mount and the global population grows, the breakthroughs of 2025 are setting the stage for a more resilient, sustainable, and equitable food system. Where biotechnology plays a central role in feeding the world while regenerating the planet.

What's coming next

LAB GROWN INNOVATION

Biotechnology is accelerating the shift to climate-resilient, sustainable agriculture, with rapid advances in gene editing, biofertilisers, and alternative proteins reshaping global food systems.

'25

Commercialisation of CRISPR-edited crops and next-generation biofertilisers expands, while regulatory approvals for cultivated meat advance. Microbiome research and precision fermentation drive new solutions for crop health and protein diversification.

'30

Biotech adoption becomes mainstream, with gene-edited crops and biosolutions used to boost yields and reduce chemical inputs. Cultivated proteins could gain significant market share, if supported by clear regulatory pathways and growing consumer acceptance.

'50

By 2050, food systems could be transformed by advanced biotechnology: gene editing, synthetic biology, and cellular agriculture enhancing resilient, low-impact, and nutrient-rich food production.

Artificial Intelligence

Artificial Intelligence Behind the Precision Agriculture Surge

1-2

Experience and instinct served as the foundation of traditional farming practices. Now, today's precision agriculture provides farmers with live data analysis capabilities to precisely manage crop health monitoring, soil condition assessment, and pest risk detection. These digital tools enable farms to function as intelligent ecosystems capable of dynamic responses to environmental shifts.

The precision agriculture sector is under constant transformation because of ongoing innovative developments. These are driven largely by emerging applications of AI as well as edge computing, which processes data right where it's collected, reducing delays, minimising reliance on cloud services, and ensuring reliable operation even in areas with limited connectivity.

The integration of IoT, edge computing, and AI systems enables unprecedented granular and action-able insights in real time. Many new tools are incredibly sophisticated, focusing on precision delivery of resources, soil surveillance, pathogen contact tracing to improve food safety, and robotics that can help with harvesting.

North American farmers have made significant strides in adopting such innovation. A 2024 survey by McKinsey revealed that more than 60% of North American farmers were using some form of digital agronomy tool, and about half had invested in precision hardware.

Expansion picks up pace in 2025: In May 2025, Cooperative Ventures – a joint initiative of farmer-owned cooperatives CHS and GROWMARK – announced a major investment in Precision AI, a North American leader in artificial intelligence-driven agricultural practices.

Precision AI employs autono-mous aerial systems to collect plant-level data, enabling real-time, plant-by-plant input decisions that help farmers reduce costs, improve crop health, and boost profitability. This partnership is expected to accelerate the adoption of AI-powered tools across the continent.

Meanwhile, AI's role in agriculture has quickly advanced from simple digital assistants to sophisticated agents powered by large language models (LLMs).

“New AI systems can operate with autonomy, fundamentally changing how farm data is analysed and how decisions are made on the ground.”

Artificial Intelligence Behind the Precision Agriculture Surge

2-2

These new AI systems can converse, execute complex tasks, and operate with a degree of autonomy, fundamentally changing how farm data is analysed and how decisions are made on the ground. Generative AI, in particular, is now pivotal, with its ability to turn massive, disparate datasets into actionable insights that help farmers, agronomists, and researchers maximise both productivity and sustainability.

In 2024, Cropin Technology introduced Sage, an agri-intelligence platform powered by Google Gemini. Sage uses generative AI and advanced models to deliver high-resolution, real-time mapping and predictive insights for key crops worldwide, supporting climate-smart agriculture and supply chain optimisation.

Other players are racing to scale their AI solutions. In May 2025, Gardin Agritech, backed by Navus Ventures, raised $4.5 million to expand its AI-powered photosynthesis sensor platform, which provides real-time insights into greenhouse crop health across Europe.

Amsterdam-based Agurotech is also scaling its suite of smart agriculture tools, supporting European farms with AI-driven water management, frost protection, and fertigation.

As AI drives necessary efficiencies in agriculture over the next decades, the sector must also navigate tensions between scale and access, precision and resilience, data ownership and transparency.

Models of transparency are emerging in the use of farm-level data, to avoid bias and over-automation, driving a wave of open-source and locally governed AI projects. For example, The Open Farm Intelligence Initiative, launched this year with support from the African Development Bank and CGIAR, is working to create regionally tailored AI models that prioritise food security, rather than export-oriented yield maximisation. Initiatives like this will be essential to prioritise systems-level innovation over siloed tools.

What's coming next

GROUND LEVEL CHANGE

Artificial intelligence, robotics, and edge computing are transforming farms into dynamic, data-driven ecosystems, enabling smarter, more sustainable decisions at every level.

'25

AI-driven tools and autonomous systems become mainstream, with major investments accelerating innovation. Real-time crop insights, predictive analytics, and robotics drive measurable gains in yield, efficiency, and resource use.

'30

Widespread adoption of AI, IoT, and automation delivers precision agriculture benefits across diverse regions and farm sizes. Modular, user-friendly platforms support smallholders and large operations alike, while open-source AI initiatives expand globally.

'50

Fully integrated, AI-optimised farms become the norm, with autonomous equipment, digital twins, and real-time supply chain coordination. Precision agriculture enables more resilient food systems that balance productivity with ecosystem health.

Software Solutions

Software Solutions Sustainable and Inclusive Growth

1-2

Looking ahead, the challenge is to ensure that digital innovation bridges, rather than widens, the gap between large-scale and smallholder farmers. Scaling agricultural technology requires inclusive infrastructure. Context-sensitive solutions, reflecting the realities of small and medium sized producers, are essential to ensure innovation reaches farmers who need them most.

A 2025 survey by AgFunder revealed that 45% of AgriTech startups globally are now focusing on solutions tailored specifically for smallholder farmers, reflecting a growing market shift towards inclusivity. Where farmers are seen as more than end users, instead embedded into the DNA of emerging solutions.

In India, for example, mobile-based FMS and advisory services have contributed to a surge in digital adoption. The Indian AgriTech market is projected to grow at a CAGR of 13.5% to 32% through 2025, driven by increased smartphone penetration and government support. Over 1,300 AgriTech startups are now active in the country, many focused on smallholder needs.

Farm Management Software (FMS) is a critical lever here, as its driving adoption of greener practices by simplifying complex data into clear, actionable recommendations. These platforms increasingly link farmers to knowledge, markets, and incentives for sustainability.

In Europe, digital tools are helping farmers navigate new environmental schemes as the EU shifts farm subsidies toward sustainability. In January 2025, the European Commission updated guidelines for its Farm Sustainability Tool for Nutrients (FaST), now required for all 10 million EU farms receiving CAP payments.

This tool helps assess soil fertility and nutrient management, accelerating the shift to precision fertiliser use and supporting compliance with new biodiversity and climate targets.

Beyond compliance, demand is growing for platforms that facilitate voluntary climate action. The rise of carbon farming has driven the development of software to verify emission reductions and improvements in soil health.

“The AgriTech transformation isn’t inherently equitable. The greatest impact will come from democratising high-quality tools and farmer-friendly platforms.”

Software Solutions Sustainable and Inclusive Growth

2-2

In February 2025, US-based Regrow launched a suite of apps enabling mid-sized growers to quantify soil carbon and participate in regenerative offset markets, with adoption by major food companies seeking to decarbonise their supply chains.

Policy support and public-private partnerships are also crucial. The UK's Department for Environment, Food and Rural Affairs is trialling a national agro-ecological decision support system, co-designed with farmers and universities, to provide free, open-source tools for crop planning and biodiversity tracking, removing barriers posed by commercial software costs.

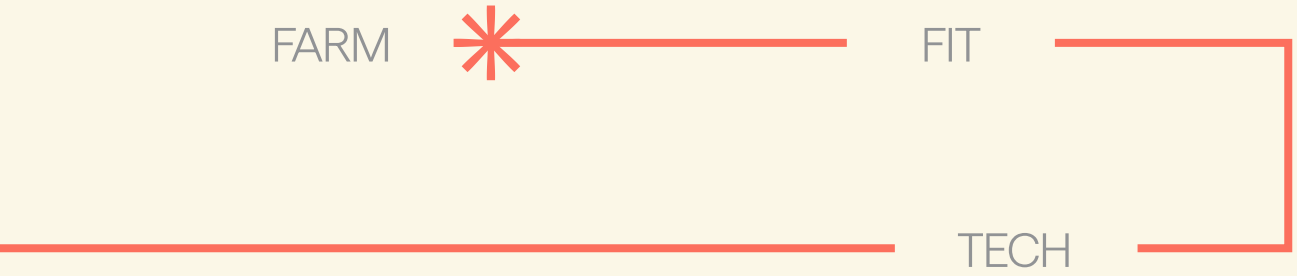
Co-creation is now seen as essential for overcoming barriers to adoption, such as unclear ROI and lack of trust in new technologies. By involving farmers directly, AgriTech companies can personalise solutions, streamline integration, and build the trust needed for widespread adoption.

The FarmSmarter AI app, developed by Louisiana State University and released in 2025, exemplifies this approach, offering AI-powered, farmer-informed recommendations and already gaining traction in the US.

Startups like AgriCarm are making precision agriculture accessible to all scales of farmers, with modular, mobile-first apps available in multiple languages and a free basic version.

However, the AgriTech transformation is not inherently equitable: the greatest impact will come from democratising access to high-quality tools and building interoperable, farmer-friendly platforms.

What's coming next



AgriTech is shifting toward inclusivity, with new tools and business models designed to meet the needs of small and medium-sized farms worldwide.

'25

Farmers increasingly use digital platforms to manage sustainability metrics, apply for subsidies, and participate in carbon schemes. However, fragmentation across tools and concerns over data ownership persist.

'30

Digital platforms and farm management software reach more smallholders and mid-sized farms across Asia, Africa, and Latin America. Co-created solutions and modular apps drive adoption, while public-private partnerships aid equitable access to climate-smart technologies.

'50

Interoperable digital ecosystems empower farmers of all scales. AI-driven, farmer-informed platforms support sustainable production, climate resilience, and market access, bridging the gap between smallholders and large commercial farms worldwide.

Case Study

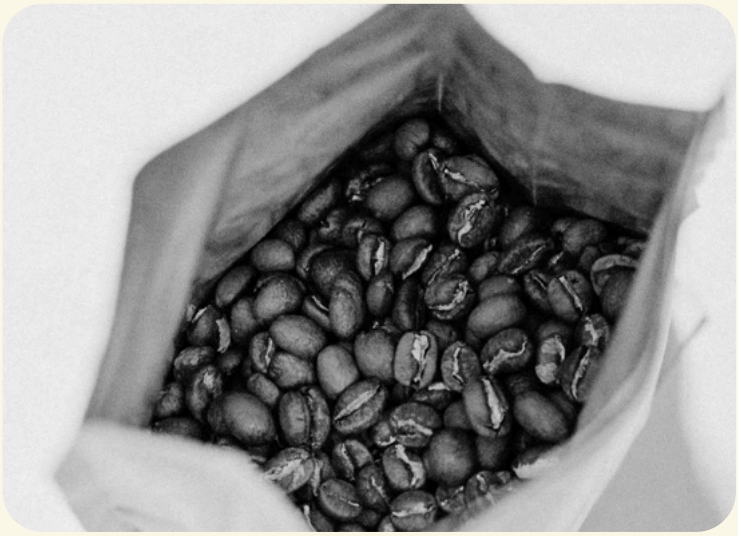
Case Study
Agiboo

Agiboo is a Netherlands-based AgriTech company, operating on the global market, addressing a critical aspect of food system transformation: the infrastructure behind commodity trade and risk management.

Founded in 2009, Agiboo's offerings make commodity trade clearer and more manageable.

Through their Agiblocks platform, they provide a highly specialised Commodity Trade and Risk Management (CTRM) software designed specifically for the agrifood sector.

They specialise in trading staples like cocoa, coffee, sugar, grains and oilseeds, commodities that can be vulnerable to volatility, opacity, and inefficiencies.



“The integration of sustainability into the core of trading operations is a subtle but significant shift, as sustainability becomes a business function.”

Lisa Mulder
Nymark Project Manager
for Agiboo

Case Study
Agiboo

agiboo

Agiblocks offers real-time data on pricing, inventory, contracts, and sustainability metrics, helping companies of all sizes, from multinational traders to regional SMEs, navigate risk and make strategically informed decisions.

Agiboo's tools automate operational workflows and bring clarity to regulatory compliance and supply chain transparency. Enabling agribusinesses to be more resilient, ethical, and competitive in a complex global marketplace.

The integration of sustainability into the core of trading operations is a subtle but significant shift, as sustainability becomes a business function. Agiboo also represents the drive to democratise access to future-fit AgriTech tools.

Agiblocks is scalable and accessible to SMEs, ensuring that smaller agri-food players aren't left behind in the transition to a more digital, transparent trading environment.

By equipping agrifood traders with the tools to act on sustainability and manage risk in real time, Agiboo contributes to a more robust, equitable and future-fit global food economy.

Nymark has been proud to support Agiboo in communicating their vision and refining their position in a rapidly evolving agrifood landscape.

Since 2020, we've facilitated a full rebrand and renewed their digital architecture using our Five Stage method.

Today, our ongoing marketing strategy and execution centres Agiboo's commitment to knowledge sharing and generates leads. By 2024, this has helped secure 8x Agiboo's initial goal for sales qualified leads, helping secure Agiboo's long-term success by making their organisation ready for growth and exponential scalability, while also bettering ways of attracting new clients across the globe.

Thank you

Sustainable Growth For AgriTech

Nymark solves growth complexities for technologies that matter. Through digital transformation and new ways of working, we pave the way for sustainable success.

Nymark

Nymark