

MAP

MAP Green and High-Quality Development Report 2024





Driving transformation for Chinese agriculture and improving the well-being of Chinese farmers

Foreword

Against the backdrop of accelerating the development of new quality productive forces and the green transformation of agriculture, Sinochem Holdings has deepened its exploration and practice of the MAP (Modern Agriculture Platform) model. Through scientific and technological innovation, MAP is advancing agricultural modernization and helping to build an efficient, green, and sustainable service system. Since 2020, MAP has published the Green and *High-Quality Development Report* annually to systematically review service outcomes and share insights, best practices, and replicable models for agricultural sustainability in China.

In 2024, MAP maintained its rigorous research methodology, combining online and offline channels with random sampling. The survey covered 10 major crops—including three staple grains and several key cash crops—spanning 2,852 farmers and 113,267 hectares (ha) of farmland. Findings show that MAP farmers achieved an average Green Development Index of 44.73, which is 23.55% higher than that of non-MAP farmers. This underscores the growing value of socialized services in elevating green agricultural development.

The report features a series of real-world case studies that illustrate how MAP leverages smart technologies, scientific planting strategies, and standardized management systems to increase production efficiency and optimize resource use. These cases reflect not only the tangible progress made by MAP farmers on the path to green transition but also highlight MAP's role as an innovation engine in modern agriculture.

Looking ahead, MAP will continue to uphold its founding aspiration—to drive transformation for Chinese agriculture and improve the well-being of Chinese farmers. Anchored in a full value-chain perspective, MAP will keep strengthening its service capacity and technology, support greener and more efficient production, and build a more professional, collaborative service system. In doing so, MAP will continue contributing to agricultural modernization, rural revitalization, and the vision of a Beautiful China.

August 2025



MAP Green Development Report 2020



MAP Green Development Report 2021



MAP Green and High-Quality Development Report 2022



MAP Green and High-Quality Development Report 2023



Message from the Top Leadership

President Xi Jinping has emphasized that a green and low-carbon economy and society are crucial to high-quality development. The *Plan to Accelerate Building up China's Strength in Agriculture for 2024-2035* further underscored the urgency of a comprehensive green transformation. Promoting green, high-quality agriculture is not only central to China's new development vision but also vital to rural modernization.

At Sinochem Holdings, we're putting this vision into practice. Guided by the belief that green productivity is true productivity, we rely on MAP service centers and demo farms across China to deliver end-to-end solutions—centered on healthy land, quality varieties, modern machinery, and good practice. We scale key technologies like dense planting, precision sowing, water-fertilizer integration, drip irrigation, and direct grain harvesting to raise yields and quality, while cutting water, fertilizer, pesticides, labor, and carbon. Together, these efforts are building a modern supporting agricultural system that enables resource conservation, environmental friendliness, agricultural efficiency and green supply.

Looking ahead, we'll continue to accelerate the application and promotion of agricultural science and technology innovations. We aim to bring modern tools and business models into the fields—supporting stable grain output and better farmer incomes. We remain committed to green development and will work closely with ecosystem partners to accelerate climate-smart and regenerative agriculture. Together, we will contribute to and strive for a more resilient, low-carbon agricultural future.

Li FanRong

Chairman of the Board, Sinochem Holdings
Chairman of the Board, Syngenta Group

In a world dealing with a growing population, unpredictable climate patterns, and mounting ecological pressure, agriculture must change. As both a CEO and fifth-generation farmer, I've seen the real impact of innovation firsthand. On my family's farm, new solutions including AI-driven tools are improving our operations. These innovations aren't extras – they're vital tools, particularly for smallholder farmers.

At Syngenta Group, our mission remains firm: to grow more while using less. MAP's innovative practices illustrate how artificial intelligence and digital technologies are revolutionizing agricultural production and sustainability. Empowered by soil sensors, precision irrigation, optimized crop varieties, and intelligent crop protection, MAP is partnering with farmers to embrace data-driven precision crop management. These digital solutions significantly cut fertilizer and pesticide use, enhance land and water efficiency, reduce labor costs, and boost yields – empowering farmers to tackle climate change while improving productivity.

What inspires me most is how MAP empowers growers – not just with tools, but with confidence. By using digital tools to optimize planting timing, pest control, and soil moisture management, growers adopt climate-smart practices, transforming reactive farming into proactive strategies.

Rural prosperity is one of the key priorities of Syngenta Group's sustainability agenda. MAP plays a crucial role in achieving this aim by becoming a testbed for scalable, environmentally friendly agriculture. Our focus is simple: deliver fertile ground, machine-level efficiency, optimized plant populations, precise nutrition, and intelligent protection – all part of a fully integrated, digitally monitored system that's both nature-positive and profit-generating.

Looking ahead, Syngenta Group will accelerate agricultural innovation, ensuring regenerative agriculture, digital technologies, and AI benefit every farmer. We aim to revitalize this traditional industry, build a more resilient and sustainable food security system, and create a better future for generations to come.

Jeff Rowe

Chief Executive Officer, Syngenta Group



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About Us

Sinochem Holdings



Sinochem Holdings Corporation Ltd. (Sinochem Holdings) was established through the joint restructuring of Sinochem Group Co., Ltd. and China National Chemical Corporation Ltd. on May 8, 2021. Sinochem Holdings is one of the leading state-owned enterprises under the supervision of the State-owned Assets Supervision and Administration Commission of the State Council (SASAC). It boasts over 210,000 employees.

Sinochem Holdings operates across eight core sectors, including life science, materials science, petrochemicals, environmental science, rubber and tire, machinery and equipment, city operation, and industrial finance. With production bases, R&D facilities in over 150 countries and regions and a global marketing network, Sinochem Holdings manages 16 listed companies worldwide, including Yangnong Chemical (600486.SH), ADAMA (000553.SZ), Adisseo (600299.SH), Sinochem International (600500.SH), Luxi Chemical (000830.SZ), Haohua Technology (600378.SH), Elkem (ELK.OL), Pirelli (PIRC.MI), and China Jinmao (00817.HK). As of the end of 2023, Sinochem's total assets reached RMB 1.6 trillion, with annual revenue exceeding RMB 1 trillion, ranking 54th on the 2024 *Fortune Global 500* list.

In the life sciences sector, Sinochem Holdings is a world leader in agrochemicals and animal nutrition business. Its agrochemicals arm Syngenta Group boasts a business scope covering seeds, crop protection, crop nutrition, modern agriculture service, and digital agriculture, making it a world-leading agri-tech innovator. The animal nutrition business, encompassing methionine, vitamins, and specialty products, provides comprehensive feed additives and nutritional solutions for livestock.

Looking ahead, Sinochem Holdings is committed to becoming a world-class comprehensive chemical enterprise, continuously enhancing sustainable development capabilities, creating greater value for society, customers, shareholders, and employees, and contributing to the development of the industry and society at large.



RMB
1,589.48 billion
Total assets

RMB
1,014.03 billion
Revenue

54th
Ranking in 2024
Fortune Global 500 list

RMB
22.9 billion
R&D investment in 2024

35
National level R&D platform

31,000+
Total valid patents

6
National manufacturing single
champion

64.8%
Proportion of overseas
income

150+
Countries and Regions
Served

Note: For the data above without a specified year, the reference date is the end of 2023.



Syngenta Group

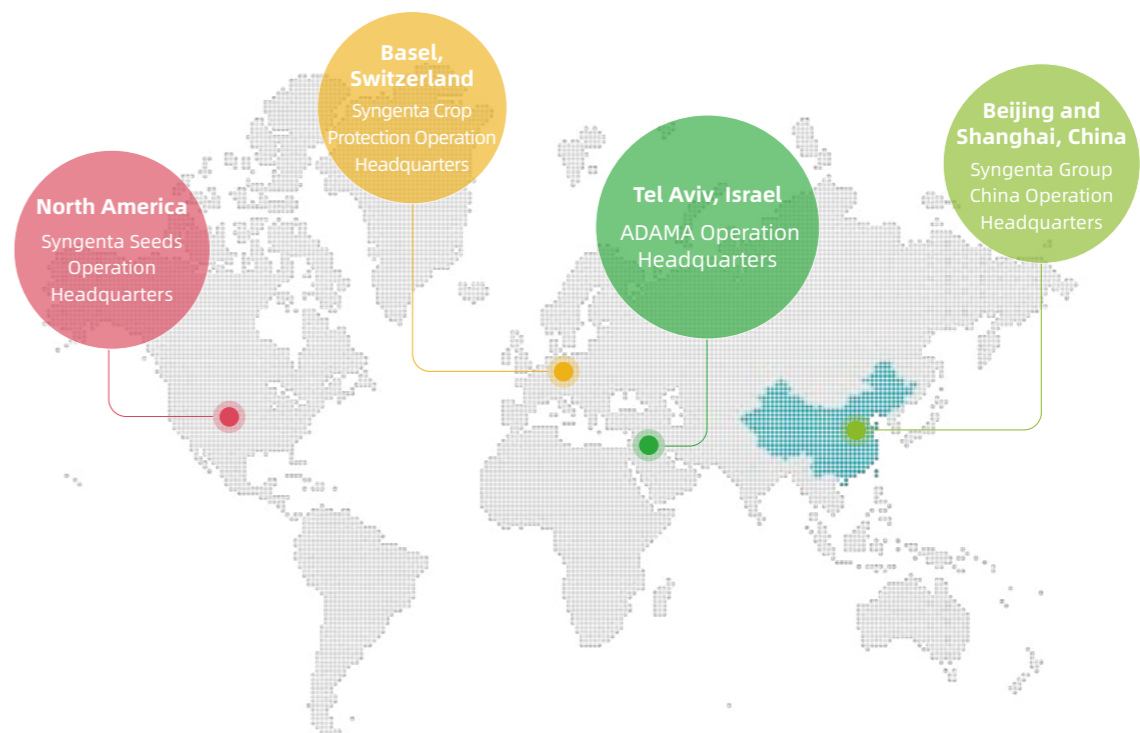


Syngenta Group is one of the world's largest agri-tech enterprises. It leads the world in crop protection and biologicals, ranks third globally in seeds, and is a leading supplier of crop nutrition and modern agricultural service in China. It serves as the core agri-chemical business platform of Sinochem Holdings.

Headquartered in Switzerland and incorporated in Shanghai, China, Syngenta Group combines the strengths of its four major business units worldwide: Syngenta Crop Protection headquartered in Switzerland, Syngenta Seeds in the United States, ADAMA in Israel, and Syngenta Group China in Beijing and Shanghai.

With a history of over 250 years, Syngenta Group employs more than 56,000 people and does business in more than 90 countries and regions. Guided by its mission to empower farmers and sustainability priorities, it is committed to making global agricultural systems more sustainable and efficient through breakthrough products and technologies, addressing the challenges of food production and climate change, and generating benefits for farmers, society and the Earth.

In recognition of its leadership, Syngenta Group has been named by *Science* as a Global Top Agriculture Employer for eight consecutive years. In 2024, it registered a revenue of USD 28.8 billion.



Syngenta Seeds is one of the world's largest developers and producers of seeds

Syngenta Crop Protection is a leader in the field of global crop protection

ADAMA is a global leader in off-patent crop protection

Syngenta Group China is the leading partner for agricultural technology and innovation in China



Syngenta Group China



As one of the four business units of Syngenta Group, Syngenta Group China is a leading global agri-tech company in the country. Its portfolio, grounded in the Chinese market, encompasses seeds, crop protection, crop nutrition, modern agricultural service, and grain production. Driven by the mission “to enable everyone in the food chain ecosystem to prosper”, the company is committed to becoming the most influential agri-tech innovator in China and beyond. Leveraging strong R&D capacity and full value-chain integration, Syngenta Group China delivers solutions centered on quality varieties, healthy land, good products, and good practice, increases crop yields per unit area, enhances the quality of agricultural products, and contributes to the modernization of China’s agricultural sector by enhancing the quality and efficiency of agricultural production, increasing yields and farmers’ income, and accelerating agricultural transformation toward greener growth in the country.

Seeds

Leading bio-breeding technologies

12%+ of integrated market share in China



Crop protection

Comprehensive portfolio of formulations

Major global supplier of key active ingredient



Crop nutrition

A leading innovator of “Biofertilizer and Soil Health”


A leading integrated provider of R&D, production, distribution, and services in crop nutrition in China



Modern agricultural service

“Grow quality crops, sell at a good price, and gather big data”


Customer-centric technical solutions for professional growers



Grain

Leveraging synergy across the Group’s industry chain

Building a grain supply chain company with differentiated strengths

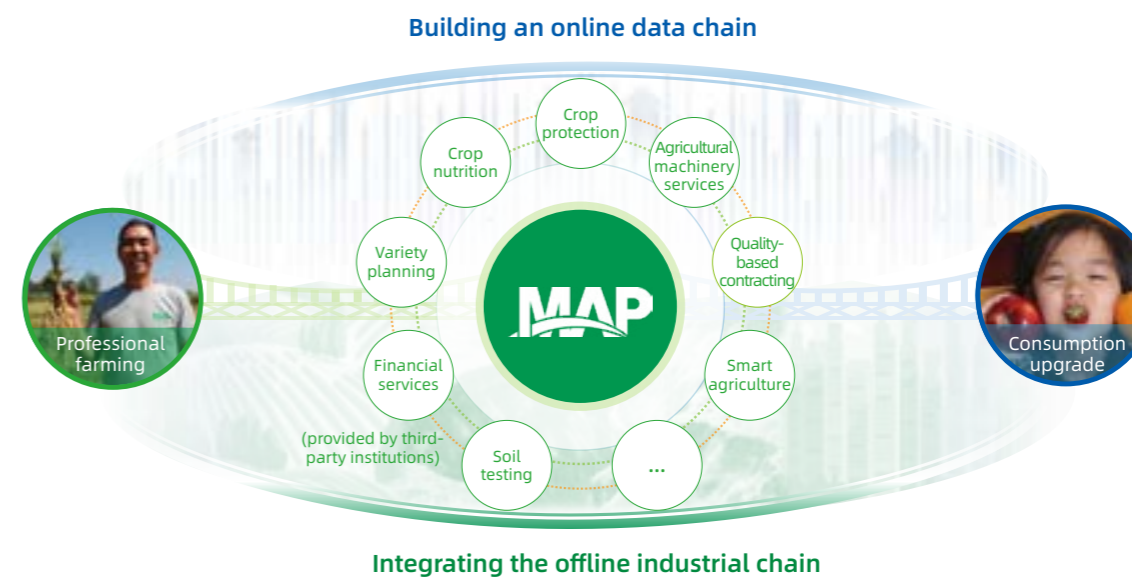




MAP Model

MAP 中化农业

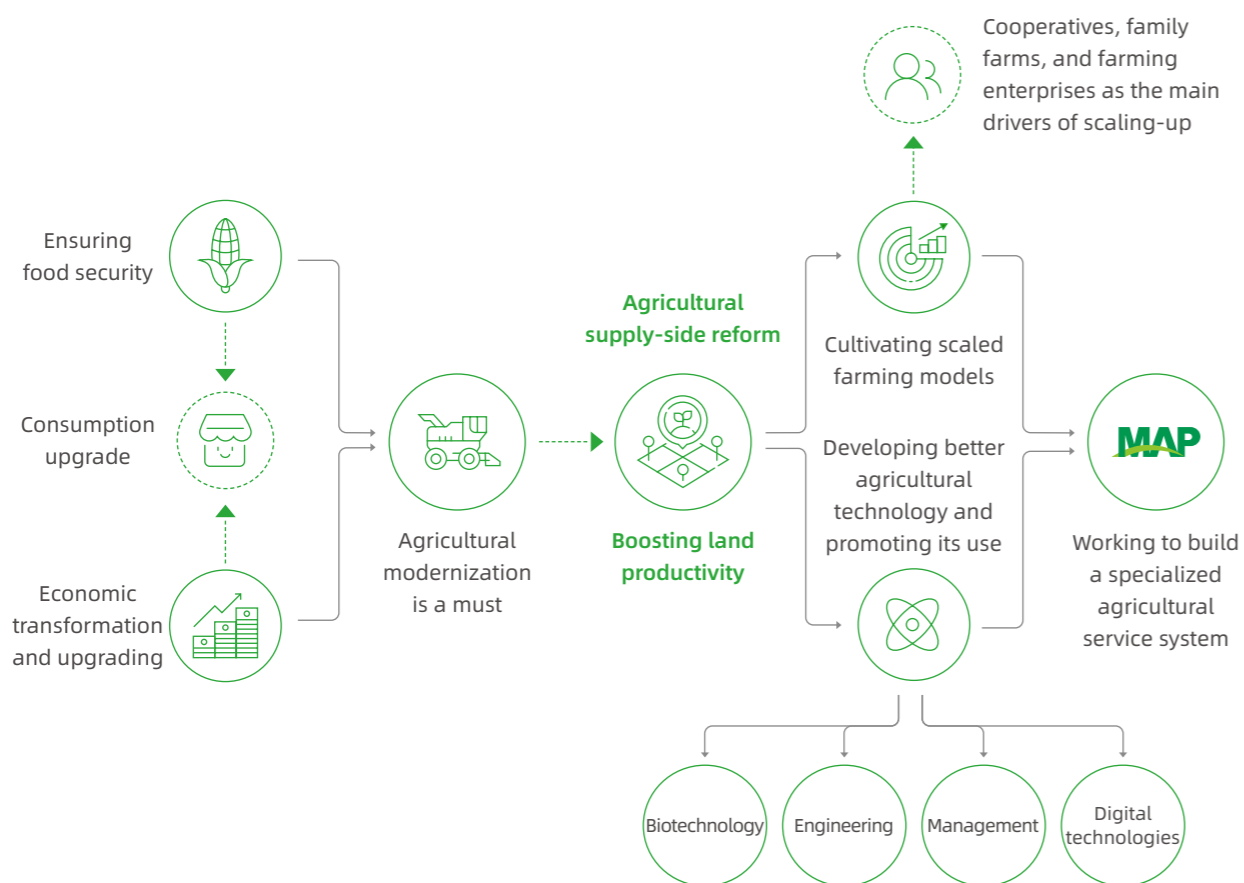
Sinochem Holdings officially launched the MAP (Modern Agriculture Platform) Model in November 2017. With the mission of “growing quality crops, selling at a good price, and gathering big data”, MAP builds an integrated service system of biotechnology, engineering, management and digital technologies, offering farmers end-to-end technical services for variety selection, crop nutrition, crop protection, precision irrigation, and agricultural machinery operations. Aligned with the food crop production strategy based on farmland management and the application of technology, MAP is committed to staying customer-centric, creating value for customers, promoting the supply-side reform, boosting land productivity and accelerating agricultural modernization, so as to contribute to the new drive to increase China’s grain production capacity by 50 million tons.



• MAP Strategy

As per national modernization criteria, China has entered the mid-to-late stage of industrialization, but agriculture remains in the early stage of modernization, with prominent pressure for social development and food security. Across the agricultural value chain, large-scale socialized production has been achieved in upstream agricultural inputs and downstream food processing, while farming remains the weakest link. China lags far behind developed countries in agricultural science and technology—both in R&D capabilities and, more strikingly, in adoption. Moderate-scale farming is a prerequisite for wider technology adoption. With strong policy support, agricultural scaling has significantly improved and continues to accelerate. Family farms, cooperatives, and farming enterprises are quickly emerging as the backbone of China’s scaled agricultural operations. The operating model of large-scale farms stimulates demand for technology, driving the rapid development of specialization and socialized services.

Against this backdrop, MAP’s core mission is to “grow quality crops, sell at a good price, and gather big data”, driven by the dual engine of large-scale farms and technological innovation, build an integrated service system, boost land productivity and help modernize China’s agricultural industry.



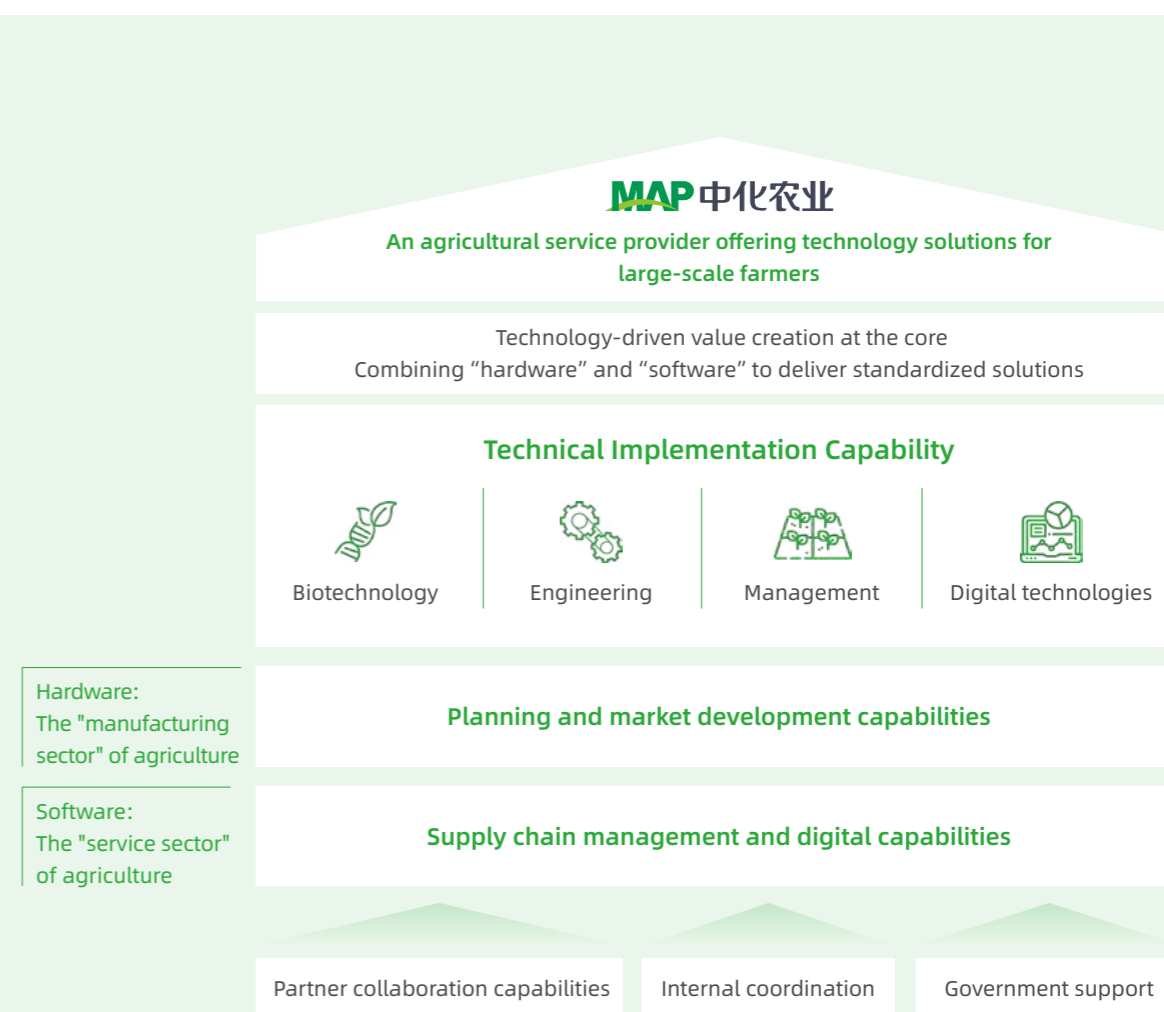
Over the past eight years, MAP has rapidly expanded its presence, delivering offline services across more than 2,333,333 ha* and cultivating professional agricultural technology teams. To better fulfill its role as a key player in agriculture and meet the demands of agricultural modernization, in May 2024, MAP officially positioned itself as “an agricultural service provider offering technology solutions for large-scale farmers”.

Being technology-driven and customer-centric, MAP closely aligns with the needs of moderate-scale farmers and integrates resources across the agricultural value chain. Focusing on core crops such as corn, wheat, rice, cotton, and potatoes, MAP builds professional technical teams to study crop growth patterns and gain insights into crop growth requirements. MAP also builds a full-cycle closed-loop service system covering tillage, sowing, management, harvesting, marketing, storage, and financing. Leveraging data from over 100 MAP experimental farms and more than 1,000 demonstration farms, MAP helps clients reduce scale-up production risks, improve overall product quality, enhance management efficiency, and lower production costs.

* one hectare is equal to 15 mu



• MAP Strategy Map





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Sustainability Priorities and Practices

Sustainability Priorities

Syngenta Group has announced its priorities for innovation-driven sustainable development, and fully incorporated sustainability into its business strategy.

• A Vital Time for Agriculture

Farmers are on the front line of climate change, needing to produce enough food to feed 8 billion people every day as the effects of global warming result in more extreme weather patterns, pest pressures and increasing crop failures.

With the global population on track to reach 9.7 billion by 2050, farmers need to grow more food while reducing their impact on the environment and safeguarding natural resources.

The food that feeds the world can also help to improve it. Working alongside farmers, Syngenta Group believes agriculture can feed people, while becoming a climate solution and regenerating soil and nature.

More than a decade ago, Syngenta Group was one of the first companies in the industry to launch a plan that served as the organization's sustainability compass.

By engaging with stakeholders, Syngenta Group has identified areas where meaningful difference can be made while capitalizing on opportunities, putting sustainability at the core of our business. Syngenta Group believes setting clear targets that guide innovation will integrate sustainability throughout the business.

To realize this ambition, Syngenta Group has set four sustainability priorities, each with a clear set of targets.

• Sustainability Priorities



Higher yields, lower impact

Accelerate crop productivity of the agricultural sector while reducing the impact on the planet through more sustainable technologies



Regenerate soil and nature

Enable the adoption of regenerative agriculture practices to help farmers improve productivity, soil health, biodiversity and climate



Improve rural prosperity

Improve the prosperity of low-income and under-served farmers by improving their access to inputs, knowledge, finance and markets



Sustainable operations

Reduce the environmental impact of our operations and supply chain, strengthen our diverse and inclusive culture and ensure the health and safety of our people

Centering on Syngenta Group's sustainability priorities, Syngenta Group China has taken active measures, producing several best practices in 2024.

Priority 1 | Higher yields, lower impact

Syngenta MIRAVis® Series Products support efficient crop protection for 100+ crops

ADEPIDYN® technology, a Syngenta trademark for the active ingredient used in the MIRAVis® product family, was selected from over 9,000 compounds over 10 years, featuring high efficiency and broad-spectrum activity. Currently marketed under brands such as Miravis Duo Meitian and Miravis Maitian, the Series has been applied to over 100 crop varieties, helping increase yield by 7.5 billion kilograms and reducing pesticide use by 20% compared to conventional products. The product has earned multiple industry accolades.



Priority 2 | Regenerate soil and nature

The Run Tian Initiative Phase II: From innovative cultivation to regenerative agriculture

The Run Tian Initiative was launched by Syngenta Group China in 2020, together with UNDP, the Rural Energy and Environment Agency under the Ministry of Agriculture and Rural Affairs, The Nature Conservancy, and China Agricultural University, to promote scientific straw return and conservation tillage techniques in Northeast China and the North China Plain. In 2024, Phase II of the Run Tian Initiative was launched to explore business models integrating regenerative agriculture technologies with commercial operations and natural alternatives to plastic mulch. Meanwhile, training for soil health practitioners and the Forum on Soil Health and Regenerative Agriculture were organized.



Priority 3 | Improve rural prosperity

From technology empowerment to contract farming, innovative MAP mechanisms help farmers increase income

MAP explores linking farmers' interests through various forms such as land equity and production management, and has established collective management models to help farmers better understand and apply advanced agricultural technologies. Meanwhile, MAP promotes contract farming to enhance farmers' incomes.



Priority 4 | Sustainable operations

Syngenta Kunshan Factory upgrades wastewater treatment equipment to achieve zero discharge

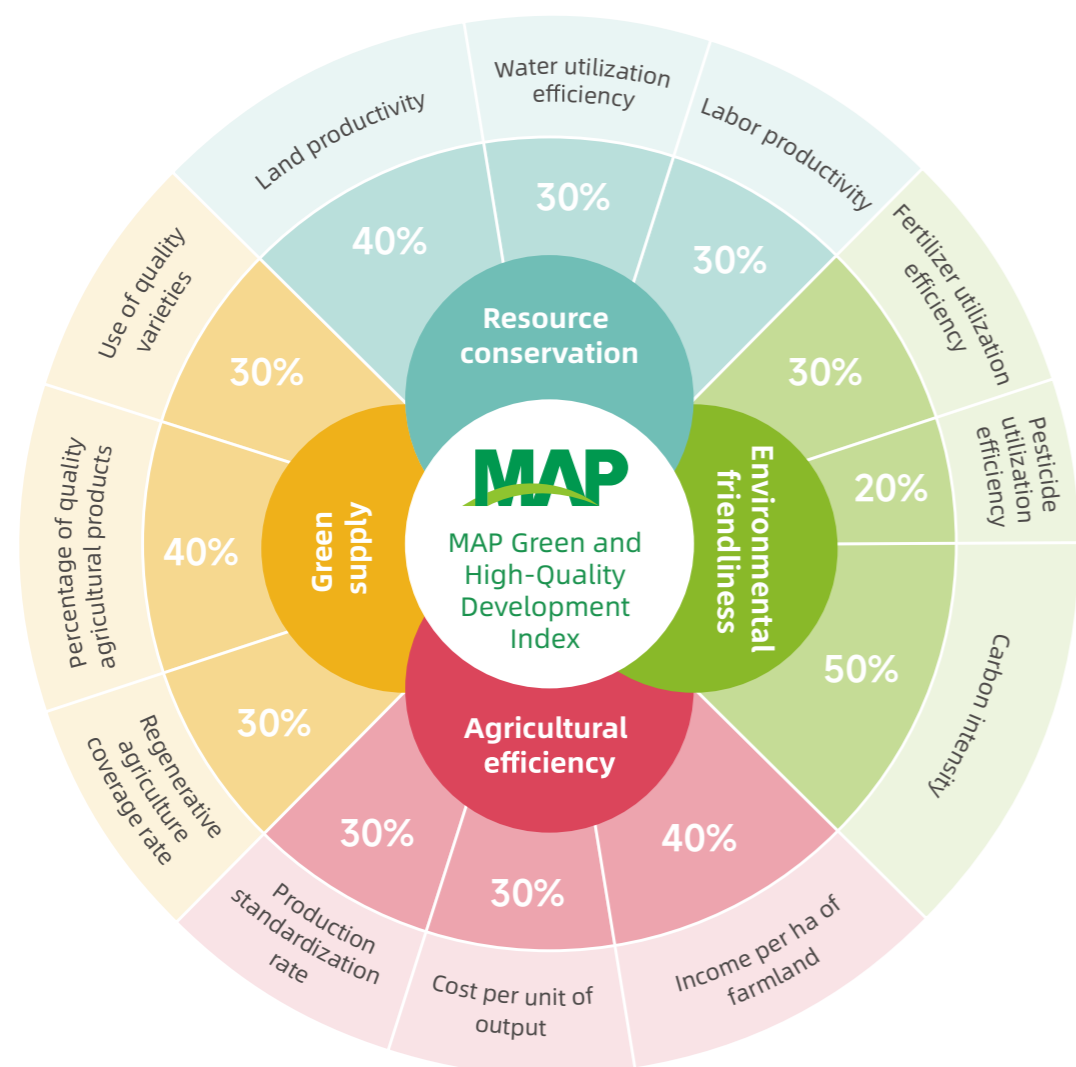
Syngenta Kunshan Factory upgraded its wastewater treatment equipment, replaced conventional biochemical treatment with MVR technology, and combined UP, RO, Fenton oxidation, and UV sterilization technologies. With a wastewater reuse rate of 100% and its treatment capacity increased by 200%, Syngenta Kunshan Factory becomes the first chemical enterprise under Syngenta Group China to achieve zero industrial wastewater discharge.



MAP Green and High-quality Development Index

Committed to the R&D and promotion of green and low-carbon technologies, MAP facilitates the implementation of sustainable agronomic operations through socialized services and raises farmers' sustainability awareness, to create an environment conducive to long-term agricultural development.

Leveraging its full-chain services, MAP actively supports the implementation of the United Nations Sustainable Development Goals (SDGs). While making substantive progress toward Goal 2 (Zero Hunger), it also contributes to the achievement of Goal 1 (No Poverty), Goal 6 (Clean Water and Sanitation), Goal 12 (Responsible Consumption and Production), Goal 13 (Climate Action), and Goal 15 (Life on Land).



Based on the core philosophy of sustainable agricultural development and regenerative agriculture and in response to China's carbon peaking and carbon neutrality strategy, the *No.1 Central Documents for 2023 and the 14th Five-Year Plan for National Agricultural Green Development*, MAP developed the MAP Green and High-Quality Development Index ("the Green Index") to align sustainable development with the supply of agricultural products. In line with the principles of materiality, systematicness, independence, and applicability, the Green Index develops four primary indicators—Resource Conservation, Environmental Friendliness, Agricultural Efficiency, and Green Supply—and 12 secondary indicators to measure the green agricultural production with comprehensive quantitative evaluation. Based on their weights and the research methodology, scores of these indicators are calculated to reach a Green Index score (in a hundred-mark system).


Weight determination of indicators

The weights of the indicators are determined by the expert scoring method. Following the Delphi methodology and recommendations of agricultural experts, independent form filling is adopted to select the weights. Then data is sorted and analyzed to calculate the weights of each indicator.

Calculation of the green index score


Based on the survey data and the definition of indicators, we obtained the scale values of the secondary indicators, which are processed with the entropy weighting method to get the score of the secondary indicators. By weighting the scores of the secondary indicators according to the assigned weights in the indicator system, the scores of the primary indicators can be calculated, leading to the Green Index score eventually.

Calculation Method of the Green Index Score and the Primary Indicators



Please scan the QR code to see the calculation methodology

Calculation Method of the Secondary Indicators



Please scan the QR code to see the calculation methodology

2024 MAP Green and High-quality Development Survey

In 2024, through the random sampling method, MAP conducted online and offline surveys on the agricultural production of 10 crops, including corn, rice, wheat, soybean, cotton, silage corn, alfalfa, potato, citrus, apple, covering three major grain crops and most common cash crops. The survey covered both farmers who had MAP services ("MAP farmers") and those had no MAP services ("non-MAP farmers").



Survey results

2024 Green Index

Based on the analysis of four primary indicators calculated from nationwide survey data, the average Green Index score of MAP farmers in 2024 is 44.73, which is 23.55% higher than that of non-MAP farmers surveyed.



Analysis of survey results

2024 Primary Indicators Score



21

provinces covered



2,852

valid questionnaires received, including 1,761 from MAP farmers and 1,091 from non-MAP farmers

113,267^{ha}

of farmland surveyed, including 70,494 ha of MAP farms and 42,773 ha of non-MAP farms

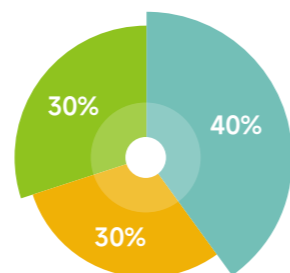
Resource Conservation

Efficient and intensive use of agricultural resources is central to ensuring ecological security and the harmonious coexistence between humanity and nature. Via MAP, we drive technological innovation to upgrade resource utilization systems, with a focus on such key factors of production as land, water, and labor, and develop systematic solutions. Through soil health management and precision dense planting, we unlock higher yields. Our smart irrigation and water-fertilizer coupling technology enables us to supply water when and where it is needed. Intelligent machinery and digital platforms reduce labor input. Built on standardized production management, MAP is transforming agriculture from resource consumption to resource regeneration, providing systematic technical support for higher land efficiency, the closed-end loop of water conservation, and improved labor productivity.



Indicators

Resource conservation



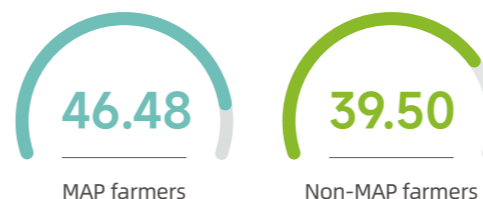
- Land productivity**
Total yield / Total area of land (kg/ha)
- Water utilization efficiency**
Total yield / Total water used (kg/ton)
- Labor productivity**
Total yield / Total cost of labor (kg/RMB)

Indicator definitions

- Land productivity**
It means the crop yield per unit of farmland during a single production cycle, reflecting the efficiency of land resource utilization.
- Water utilization efficiency**
It refers to the ratio of total crop yield to net irrigation water use, reflecting regional water efficiency as well as the level of irrigation technology and management.
- Labor productivity**
It means the crop yield per unit of labor cost, including wages, machinery rental, and operating expenses, during a single production cycle, measuring the cost effectiveness of labor and machinery input in agricultural production. The lower the production cost per unit of output, the higher the labor productivity.

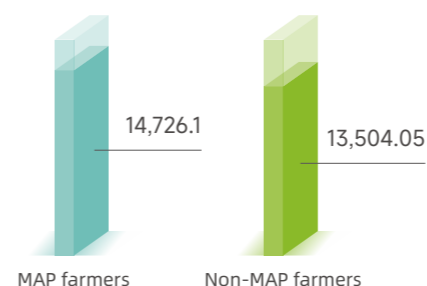
Survey findings

Resource conservation



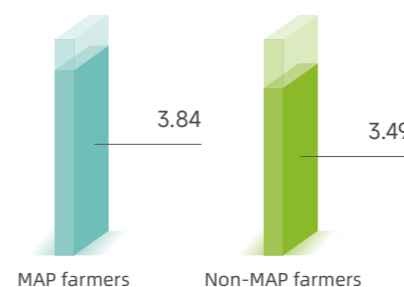
Land productivity (kg/ha)

9.05% average improvement with MAP services



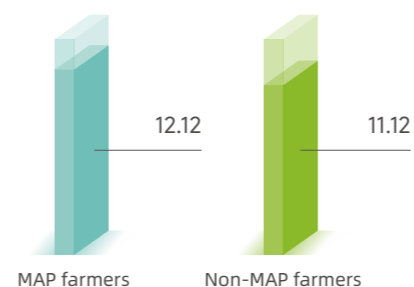
Water utilization efficiency (kg/ton)

9.98% average improvement with MAP services



Labor productivity (kg/RMB)

8.97% average improvement with MAP services

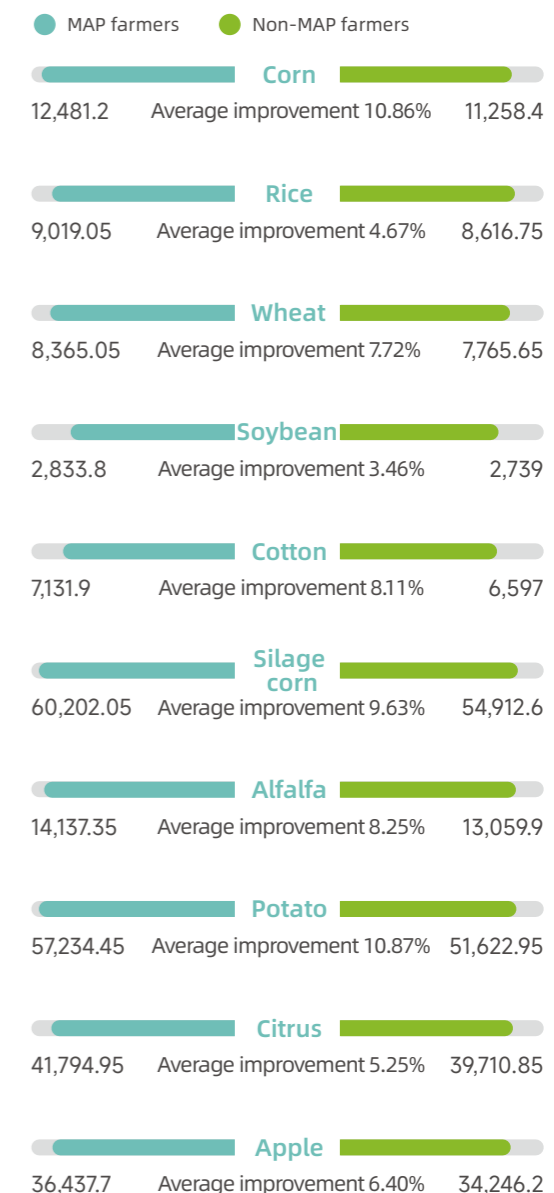


Indicator interpretations

Land productivity

Guided by the action plan to boost grain production capacity by 50 million tons and the project to increase the crop yield per unit area, MAP, as a major supplier of agricultural socialized services, employs modern agricultural technologies to unlock higher yields. Through systematic solutions integrating quality varieties, good practice, modern machinery, and advanced technology, MAP has built a precision agricultural technology service system that supports higher yields of higher-quality grains and the high-quality development of grain production, contributing to food security.

Land productivity (kg/ha)





#Higher Yields#

Land Productivity
MAP Drives up the Corn Yield per Unit Area

→ **Building an integrated technology model for higher yields to ensure food security**

In the *No. 1 Central Document for 2023*, the central government proposed the project to increase the corn yield per unit area, which was implemented by the Ministry of Agriculture and Rural Affairs in 19 pilot counties across major production areas in Northeast China, Huang-Huai-Hai region, and Northwest China, with a total area of 200,000 ha. In 2024, the project received RMB 4.5 billion in funding from the central government, covering 1 million ha in 12 provincial regions. Efforts focus on four key measures, including high-density planting, high-quality sowing, efficient water-fertilizer management, and low-loss disaster mitigation, while advancing three collaborative upgrades: deeper plough layers, integrated water-fertilizer use, and full mechanization. Together, these initiatives aim to increase the yield per unit area.

Since 2022, MAP has established a full-cycle corn cultivation service system in Dalad Banner, Ordos, Inner Mongolia, covering the six stages of soil testing, seed selection and sowing, precision irrigation, efficient water-fertilizer application, integrated mechanized harvesting, and digital management. We have developed agricultural engineering design, dense planting and fertilizer-water regulation, and standardized machinery services. By developing high-quality farmland, in 2023, MAP delivered an average yield increase of over 1,500 kg per ha, raising farmer income by RMB 4,500 per ha, while cutting water use by 35% and fertilizer use by 18%. The project has become a benchmark for technology-enabled yield and efficiency gains.

→ **Pioneering in quality improvement and yield increase driven by technological innovation**

As a key supplier of agricultural socialized services, MAP has shifted its focus to large-scale growers to increase the yields since 2024. The technology to increase the corn yield per unit area by combining dense planting and integrated, precision water-fertilizer application has opened the door to higher output and resource efficiency and improved the corn's resilience. This technology's effectiveness is backed up by field data from multiple pilot areas.

Runyu Planting Cooperative in Northwest China

On 200 ha of corn, the cooperative adopted MAP's customized full-cycle service, ranging from variety screening, soil testing, precision sowing, precision water-fertilizer application, precision crop protection, and digital management to direct grain harvesting. On September 25, 2024, a team of 13 experts from the Chinese Academy of Agricultural Sciences, Shandong Agricultural University, Henan Agricultural University, and other institutions included in the national technology system for the corn industry measured actual yields from 66.7 ha. The recorded average was 23,252.25 kg per ha (14% moisture dry grain), 1,837.35 kg higher than the previous record and about 5,250 kg higher than local averages, setting a new large-field corn yield record for MAP's whole-process technical services to increase the corn yield per unit area.

Jiangjiayingzi MAP demonstration farm, Yuquan District, Hohhot

Adopting an EPC+O model, the farm undertakes a government project to develop 287 ha of high-quality farmland. It has integrated technologies for dense planting, precision water-fertilizer regulation, film-free shallow-buried drip irrigation, clean production, and direct grain harvesting. Besides choosing the dense-tolerant variety DK 159, and implementing secondary seed coating, the farm is planted at a high density of 97,500-105,000 plants/ha, about 30% above the local norm. It adopts shallow-buried drip irrigation and remote fertilizer control via solenoid valves, leading to less water and fertilizer consumption and plastic use. It also employs UAVs for crop protection and safe, precise, and efficient pesticide application. On October 10, 2024, measured yields reached 18,803.93 kg/ha (14% moisture dry grain), around 5,250 kg higher than last year, demonstrating significant efficiency gains from intensive production.



▶ Jiangjiayingzi MAP demonstration farm, Yuquan District, Hohhot

Huantai MAP demonstration farm in Shandong

In 2024, the 73-ha farm introduced MAP's dense-planting precision-control solution package. Dense-tolerant varieties were selected, given secondary coating, and further sorted, with the planting density raised from 67,500-75,000 to 96,000 plants/ha. A "40+80 cm" wide-narrow row configuration made installing the drip-irrigation system easier and improved ventilation and light penetration. The use of the pneumatic precision seeder ensured planting quality and fertilizer application and drip line setup were completed at one go. The multi-effect foliar spray approach enhanced disaster prevention and pest control. The mobile drip irrigation system, with fertilizer integrated, enabled one person to irrigate 66.7 ha. Direct grain harvesting reduced the loss of grains compared with mechanized harvesting. On October 7, 2024, experts sampled 0.21 ha, on which the yield per unit area reached 14,599 kg/ha (14% moisture dry grain), 4,695 kg higher than that of the previous year when the conventional planting method was adopted, increasing net income by over RMB 7,500 per ha.



▶ Huantai MAP demonstration farm in Shandong

Funan MAP demonstration farm in Anhui

In 2024, the farm adopted a model featuring water-fertilizer integration and optimal dense planting suited to small plots. Dense-tolerant varieties were planted at 97,500 seeds/ha, with 87,000-90,000 plants maintained. The use of the pneumatic precision seeder and integrated drip-line installation improved the precision of sowing. Combined with low-flow drip irrigation, precise water-fertilizer regulation, and multi-effect foliar spray, the farm withstood adverse weather conditions, including drought in the early stage, waterlogging in the middle stage, and high-temperature drought in the late stage of corn growth. On September 29, 2024, 0.067 ha was harvested for testing, yielding 11,669 kg/ha (14% moisture dry grain), 3,600-5,850 kg higher than nearby farms.

→ **Introducing new service models to advance agricultural sustainability**

In 2024, MAP's technology to increase the corn yield per unit area was applied to more than 26,700 ha across Inner Mongolia, other northwestern regions, Jilin, Shandong, Henan, and Hebei, reducing water use by over 20% and fertilizer use by more than 10%, with an estimated total yield increase of over 40 million kg. Staying true to Syngenta's mission and driven by technological innovation, MAP commits itself to rural revitalization and green development. Enabled by the integrated package of dense planting and water-fertilizer integration technologies, MAP has developed a modern agricultural service model that matches quality varieties with good practice, integrates the use of machinery with the application of agronomy knowledge, and coordinates agricultural production with ecological conservation. This approach addresses the dilemma of increasing the grain output under resource constraints, fosters the growth of new agricultural business entities and sets a green development model that increases yields without consuming more water, improves the quality of output while reducing inputs, and is sustainable. Going forward, MAP will continue to advance technological innovation and reform the service model, accelerate the rollout of replicable modern agricultural solutions, strengthen food security, and contribute to China's efforts to build a strong agriculture and promote rural revitalization and agricultural sustainability.

Land Productivity

Driving Full-Chain Grain Conservation and Loss Reduction through Technology Integration to Minimize Loss

#Less Loss#



Grain conservation and loss reduction are central for food security. MAP always believes that a reduction in loss means an increase in yields. With a focus on staple crops such as corn, wheat, and rice, MAP has developed a full-chain loss reduction solution covering stages before, during and after harvesting through technological innovation and resource integration. This solution has significantly improved the efficiency of grain harvesting, storage, and transportation.

In the pre-harvest stage, MAP sought integrated innovation to enhance crops' stress resistance and stabilize the yield. Taking corn as an example, through precision water and fertilizer regulation, intelligent early warning of diseases and pests, and lean and efficient management, the per-ha loss was reduced by 307.5 kg in 2024, with the total loss reduction exceeding 25.5 million kg for the 83,333 ha of farmland covered. In wheat-growing areas, precision seeding and targeted prevention and control of Fusarium head blight (FHB) have been promoted, effectively reducing seeding waste and the risk of yield reduction caused by diseases.

In the harvest stage, MAP promotes direct grain harvesting and standardized mechanized harvesting. Compared with the 3.5% corn ear loss rate of traditional corn harvesters, the corn grain loss rate is kept within 0.9%. The grains harvested are then immediately dried and stored. Compared with conventional corn harvesting and on-the-ground grain storage methods, this approach reduced the mold-caused

loss by about 1% of the total output. So far, it has been promoted across 24,000 ha of farmland in Inner Mongolia, and the harvesting loss rate has been reduced by more than 1% in Northwest China and Heilongjiang. In 2024, MAP provided mechanized services to more than 508,667 ha of farmland nationwide, including 61,333 ha of harvested areas, and developed six mechanized operation standards to reduce harvesting loss, promoting the loss reduction technologies in 14 provincial regions across the country.

For the post-harvest stage, MAP is building warehouses of origin and smart warehouses. In 2024, it built and consolidated potato warehouses of origin with a total capacity of 300,000 tons in Inner Mongolia, reducing the loss rate by more than 5%. Through intelligent means such as remote electronic temperature measurement and near-infrared online grain condition monitoring, it can monitor the grain quantity and quality in real time, further reducing waste in storage and transportation. In addition, MAP has optimized the dust removal and temperature control processes in the rice drying stage to increase the head rice rate and reduce the cracking rate. MAP has also formulated grain drying guidelines and organized nationwide training for post-harvest service teams to enhance drying management capabilities.

Through the promotion of technology, equipment and organization, MAP has explored a green, efficient and replicable path for grain loss reduction, offering valuable practices and experience for sustainable agricultural development.



▶ Standardized mechanized harvesting speeds up the summer harvest

Labor Productivity

Solving the Challenges of Conventional Potato Growing Methods with Small Whole Potatoes

#More Simplified#



Inner Mongolia Autonomous Region, as the largest potato grower in China, produces nearly 20% of the country's total potato output per year. The conventional potato planting model has long suffered from inefficient manual seed cutting, the degradation of seed potatoes caused by disease transmission through cutting tools, the mismatch between agricultural machinery and agronomic techniques, and the difficulty of scaling up.

To address the pain points in potato planting in Inner Mongolia, the local division of MAP has developed the small-whole-potato sowing technology and established three core modules. Regarding agronomic techniques, a cultivation model of narrow row spacing and high density is introduced, producing two types of high-quality seed potatoes with stable yields: half of the yields are small whole potatoes with a short diameter (25-55 mm) that can meet the needs of non-cut sowing; the other half are miniaturized seed potatoes, which are suitable for one-pass mechanized seed cutting. On the agricultural machinery front, MAP builds a full-chain mechanized technology system covering harvesting, coating, storage, delivery, sowing, field management and mechanized harvesting, truly transforming potato production from the conventional extensive planting model to the modern efficient model. Whole-potato sowing completely eliminates the risk of seed potato cut surface infection, reducing the incidence

of soil-borne diseases by more than 30%. Meanwhile, this technology saves RMB 600-750 per ha in costs by skipping the seed cutting process. The seed potato specifications are optimized to better match the sowing equipment, which increases the sowing efficiency by more than 50%. Three years of field tests have shown that small-whole-potato seeding is far superior to the conventional seeding method that requires cutting: the seeds sprout 5-7 days earlier, with sprouts more evenly distributed, the seedlings are robust, and the average yield increases by 10%-20%. This production model not only provides a new solution for cost reduction and efficiency improvement in the potato industry, but also promotes the standardized, mechanized, and efficient development of Inner Mongolia's potato industry.

In 2024, the MAP Inner Mongolia division completed foundation seed breeding in 53 ha of fields, registered seed production in 170 ha of fields, and promoted major cultivars such as Vilas, Atlantic, and Innovator in 104 ha of demonstration fields. Looking ahead to 2025, MAP will continue to promote quality varieties, scientific agronomy and modern machinery across the production chain and promote mechanized sowing of small whole potatoes on over 333 ha of land. This will further increase the labor productivity, injecting new impetus into seizing the spring farming period, lightening farmers' burdens, and improving economic benefits in arid and cool areas.



▶ Small whole potatoes that can be directly used for sowing

Water Utilization Efficiency

MAP Smart Irrigation: Targeted Measures for Water Resource Dilemmas

#More Efficient#



Water is the source of life, and even more so for crops. In the smart irrigation demonstration field in Xiangjia Village, Tongliao, MAP has laid drip irrigation pipes in the shallow soil layer like capillaries. Underground sensors monitor humidity and temperature in real time, and smart valves release water and fertilizer on demand. Since its introduction in 2018, this shallow-buried drip irrigation model has effectively eased the pressure from over-exploiting groundwater.

Precision design stems from careful assessment. The MAP team uses the aerial drone survey technology to obtain high-precision terrain and soil data. These data are then imported into the specialized software to optimize the pipe network layout. Pipe spacing is decreased in sandy soil, while widened in clay soil, to ensure even water infiltration. Such customized solutions have significantly improved irrigation efficiency.

Quality equipment is key to the success of this method. MAP has established a stable partnership with Netafim, a world-class supplier, to secure the supply of water storage tanks, mobile pump stations, flexible pipelines, and automatic control valves. For long-term demonstration fields, MAP provides integrated pump stations and remote fertilizer control systems, while for tenant farmers or small-scale farmers, MAP offers a flexible solution of mobile irrigation headworks to meet diverse needs.



▶ Uniform irrigation for corn emergence reduces uneven seedling growth

In the 167-ha corn demonstration field in Xiangjia Village, Qianjiadian Town, Horqin, MAP has adopted a mobile headworks irrigation system combined with 0.75 L/h low-flow drip tapes. The demonstration field used to need 18 wells to meet irrigation demands, but now it needs only 8, leading to a remarkable drop in water consumption.

In Huantai, Shandong, MAP's integrated water and fertilizer service has enabled precision nutrient and water supply during critical stages of corn growth, including seedling, tasseling, silking, and grain filling, significantly boosting the yield of per unit area. In small plots in Funan, Anhui, the model of integrated water and fertilizer plus optimal dense planting is adopted, helping farmers withstand drought and heat waves, with yields far exceeding the local average.

Digital tools make irrigation smarter. MAP integrates remote sensing, precision meteorology, and Internet of Things (IoT) technologies to collect real-time data on weather, soil, and crop growth conditions. These data are then fed into the online expert system to assist with decision making. The decisions thus made are then automatically executed by intelligent controllers. Hence, a closed-loop management process from sensing to executing is formed.

MAP's smart irrigation solution has fundamentally solved the water constraint in water-scarce areas like Tongliao and has been promoted in several other provincial regions. It has improved the water and fertilizer utilization efficiency and achieved the green goals of water conservation, film reduction, yield increase, and efficiency improvement. Smart irrigation is becoming a strong support for the sustainable development of modern agriculture, enabling arid farmland to regain new vitality.



▶ MAP Mobile Headworks Irrigation System

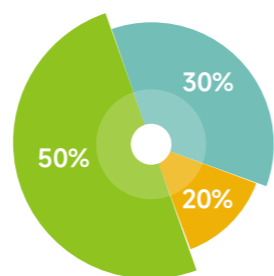
Environmental Friendliness

As President Xi Jinping pointed out, "To protect the environment is to protect our productivity, and to improve the environment is to boost productivity". Placing green, high-quality agricultural development at its core, MAP has built a sustainable development system that integrates resource conservation, ecological protection, and low-carbon circular economy, driving deep integration of agricultural production and natural ecosystems. Through systematic solutions that integrate soil health management and eco-friendly pest prevention and control, MAP reduces the use of chemical fertilizers and pesticides while enhancing efficiency, thereby lowering the risk of non-point source pollution. By innovatively applying low-carbon agronomic techniques, MAP optimizes the carbon sink capacity of farmland ecosystems and reduces greenhouse gas emissions. Across the entire agricultural production chain, MAP replaces extensive inputs with precise application, and end-of-pipe treatment with ecological regulation, coordinating the efforts to improve farmland quality and conserve biodiversity, and providing a replicable pathway for the green transformation of agriculture.



Indicators

Environmental friendliness

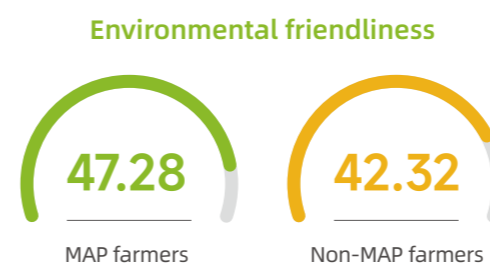


- Fertilizer utilization efficiency**
 Total yield of crop / Total fertilizers used (kg of crop yield / kg of chemical fertilizer used)
- Pesticide utilization efficiency**
 Total yield of crop / Total pesticide used (kg of crop yield / ml of pesticide used)
- Carbon intensity**
 Total carbon emissions from farmland / Total yield of crop (kg of CO₂e / ton of crop yield)

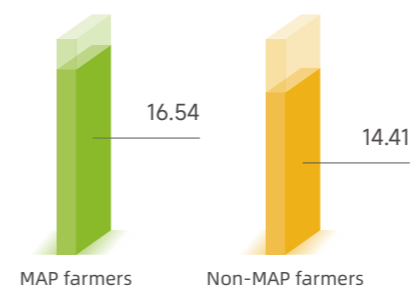
Indicator definitions

- Fertilizer utilization efficiency**
 It means the ratio of crop yield to fertilizer application volume, reflecting the output efficiency per unit of fertilizer input. Its value varies with factors such as crop varieties, soil conditions, field management, and fertilization techniques.
- Pesticide utilization efficiency**
 It means the ratio of crop yield to pesticide application volume, reflecting the output efficiency per unit of pesticide input. Its value is influenced by factors including timing of application, precision of application equipment, and pest control strategies.
- Carbon intensity**
 It refers to the total greenhouse gas (GHG) emissions generated during the planting stage of the lifecycle of an agricultural product, including production inputs, mechanized operation, and field management. The accounting scope covers direct and indirect emission sources such as seeds, fertilizers, pesticides, plastic films, agricultural machinery fuel, and irrigation.

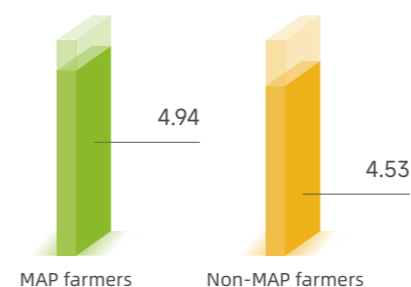
Survey findings



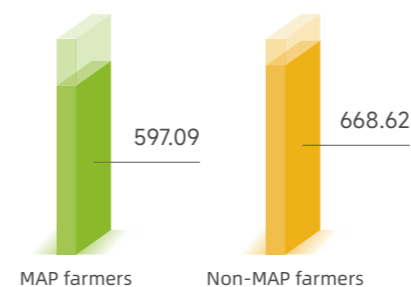
Fertilizer utilization efficiency
(kg of crop yield / kg of chemical fertilizer used)
14.82% average improvement with MAP services



Pesticide utilization efficiency
(kg of crop yield / ml of pesticide used)
8.84% average improvement with MAP services



Carbon intensity
(kg of CO₂e/ton of crop yield)
10.70% average decrease with MAP services

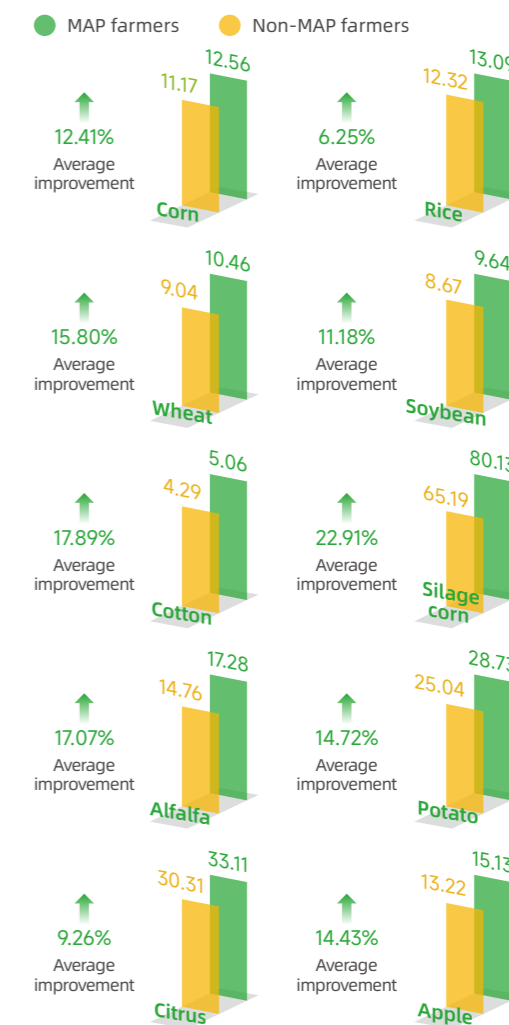


Indicator interpretations

Fertilizer utilization efficiency

Driven by technological innovation, MAP has developed a "diagnosis-regulation-efficiency enhancement" integrated nutrient management solution. MAP systematically improves the precision of nutrient release and root absorption efficiency by combining precise soil nutrient diagnostics with dynamic matching of crop demand, and integrating technologies such as nutrient enhancement, bioactivation, and intelligent fertilizer blending. Through the synergy of soil testing-based fertilizer application and microbial regulation, MAP optimizes soil micro-ecological functions, and enhances nutrient cycling capacity, leading to reduced fertilizer usage and improved soil fertility at the same time. By replacing extensive inputs with refined management, MAP promotes resource conservation in agricultural production, laying a solid foundation for green and low-carbon agricultural development.

Fertilizer utilization efficiency
(kg of crop yield / kg of chemical fertilizer used)



Fertilizer Utilization Efficiency

A Bountiful Harvest on Fertile Soil: MAP's Plant Nutrition Services Unlock the Key to Quality and Efficiency Enhancement

#Precision Nutrient Management#



Raising yields per unit area on a large scale is essential to enhancing grain production capacity, and plant nutrition is the material foundation for agricultural output and quality. In Weijun Village, Tumed Right Banner, Baotou, Inner Mongolia, the MAP team helped farmers increase corn yields to 16,552.5 kg per ha through standardized soil testing and customized fertilizer blending. This showcases the core value of the "Central Kitchen" model: over seven years, more than 7,000 crop nutrition formulas have been developed. Through an end-to-end service chain of "data diagnosis–dynamic fertilizer blending–intelligent application", every granule of fertilizer is placed precisely where it is needed.

→ Scientific diagnosis and dynamic regulation

MAP's plant nutrition services begin with soil testing, using the S-shaped sampling method to analyze key soil indicators and formulate tailored solutions. At the MAP demonstration farm in Huantai, Shandong, corn is grown with soil testing-based fertilizer formulation technology, with integrated water-fertilizer application enabled by the 0.75 L/h drip irrigation system. It takes only six days and one worker to remotely irrigate 73.3 ha. In Henan's wheat-growing regions, the nutrient supply is adjusted dynamically through phased fertilization to precisely match crop needs; agronomists use petiole testing data and follow-up soil testing data to revise the fertilization plan in real time, forming a closed loop of "testing–optimization–verification".



▶ A lab technician of the MAP Service Center is testing the soil.

→ Technology integration and efficient delivery

MAP service centers nationwide are equipped with quick test laboratories, so that the test reports can be produced 24 hours after the soil samples are collected and technical solutions be immediately shared with farmers. After agronomists submit requests on the "MAP Master" app, the MES system precisely matches their requests with formulas in the back office. Then liquid fertilizer is transported directly to the field in dedicated tanker trucks. This "testing–formulation–production–application" chain makes scientific fertilization a reality.

MAP continuously advances integrated plant nutrition technologies from R&D to delivery, shifting from standalone techniques to integrated measures. Based on new fertilization technologies, it employs the latest fertilizer products and fertilization equipment, and strengthens the integration of machinery and agronomic techniques, technology and materials, and the compatibility of materials and equipment. Full-process plant nutrition solutions have been applied to potatoes, corn, sugar beets, cotton, and sunflowers, ensuring high-quality, efficient fertilizer utilization, laying a solid ground for bounty harvests and the sustainable development of modern agriculture.



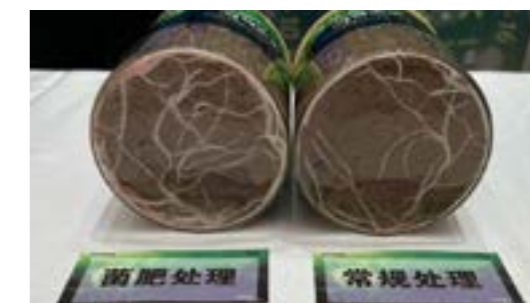
▶ A MAP agronomist is operating the intelligent water-fertilizer integrated system.

"Endos"

Drawing on years of experience and trial validation, MAP introduced the Endos endophytic microbial fertilizer in partnership with BiOWiSH Technologies (USA). Endos is efficient, eco-friendly, and can improve soil conditions, increase crop yields, and enhance the nutrient utilization rate. It also can optimize soil-crop interactions to improve crop quality, ultimately increasing yields and farmers' income.



▶ Endos product enriched with BiOWiSH endophytic microbes



▶ Corn seedling roots treated with Endos (left) and conventional treatment (right)

Pesticide Utilization Efficiency

#End-to-End Crop Protection for Higher Efficiency#

Protecting the Environment in Cotton Fields: MAP's Precision Crop Protection System Reduces Pesticide Use

In northwest China, MAP has introduced an end-to-end crop protection service model to address persistent challenges in traditional pesticide application. Tackling issues such as low precision in pesticide mixing and plastic package pollution, MAP introduced the large-scale crop protection approach and independently developed an "in-station premixing plus vehicle-mounted mixing" four-tier technology system (covering in-station mixing, and simplified, semi-automatic, and fully automatic vehicle-mounted equipment), to enable precision pesticide mixing and efficient application.

Driven by technological innovation, the system advances green transformation through:

Precision control

The mixing system maintains an error margin of $\pm 2\%$, ensuring accurate formulation of active ingredients.

Operational efficiency

Manual preparation is completely replaced by the use of fully-automated mixing equipment, increasing sprayer efficiency by 30% while reducing operator exposure risks.

Pollution elimination

In-station centralized premixing allows for centralized recycling of packaging materials, eradicating the problem of pesticide packaging litter in fields.

In the cotton fields served by the Huyanghe Service Center, the MAP agronomy team prioritizes pest prevention and takes targeted interventions. Based on pest occurrence patterns, machinery and operational parameters were dynamically adjusted from sowing to defoliation stage. Through nine targeted sprays—three to five fewer than local conventional practice—the team achieved full-season control of major pests such as aphids and cotton bollworms, preventing their outbreaks. Data show that pesticide usage was reduced by 30%, pesticide costs fell by 20%, and mechanized operation costs by 35%, significantly lowering agricultural non-point source pollution while maintaining effective pest control.

This "precision mixing—efficient application—closed-loop management" chain tightly integrates improved pesticide utilization efficiency with pollution prevention and control, setting a technological benchmark for large-scale green agricultural operations.



A cotton field undergoing crop protection operations



Sinochem Agriculture Holdings awarded the title of "Model Enterprise" in the 2023–2024 Best Practices in Fertilizer and Pesticide Reduction and Efficiency Enhancement.

From October 23 to 25, 2024, at the 25th National Fertilizer Information Exchange and Product Fair in Wuhan, Hubei, Sinochem Agriculture Holdings was awarded the title of "Model Enterprise" in Fertilizer and Pesticide Reduction and Efficiency Enhancement for its outstanding innovation capability in reducing the use of and improving the efficiency of fertilizer and pesticide, as well as its exceptional contributions to the industry.

Carbon Intensity

#Green Agronomy for Carbon Sequestration#

Conservation Tillage of Wheat Fields: MAP Maibaofeng Safeguards Farmland's Ecological Value

In August 2024, the Winter Wheat Conservation Tillage Technology Exchange for the Huang-Huai-Hai region was held in Hengshui, Hebei, showcasing MAP's innovative practices in driving green agricultural development. In particular, through the Maibaofeng conservation tillage technology, MAP can reduce tillage operations and optimize resource utilization, generating both economic and environmental benefits.

In Shenzhou, Hebei, the benefits of this technology are demonstrated in the large-scale field of Mei Jibin. By adopting no-till seeding, Mei saves the trouble of traditional rotary tillage and fertilizer spreading, which is conducive to maintaining soil moisture and improving fertilizer use efficiency. As a result, the wheat yields increased significantly. This technology also resolves the long-standing timing conflict between late corn harvest and winter wheat sowing, giving farmers greater flexibility.

The environmental benefits of this technology are equally notable. Compared with conventional tillage, the MAP Maibaofeng approach reduces the trips

of agricultural machinery, directly lowering diesel consumption and carbon emissions. By minimizing soil disturbance and soil respiration, the approach enhances the content of soil organic matter and strengthens farmland's carbon sink capacity. Data of monitored fields show that the application of this technology has significantly improved soil health, laying a solid foundation for sustainable agriculture.

MAP's conservation tillage technology has delivered remarkable results since trials began in Xingtai, Hebei, in 2018. In 2023, the pilot area in North China doubled, and in the 2024 winter wheat season, it exceeded 2,000 ha. Practice shows that the technology can increase farmers' net income by about RMB 1,582 per ha while delivering ecological benefits such as emissions reduction and carbon sink. Experts from China Agricultural University describe it as an upgraded version of the "Lishu Model", integrating factors of production in modern agriculture to enhance both soil health and operational efficiency.



Experts explaining conservation tillage techniques to farmers



Comparison of wheat growth at the green-up stage in South China (left: conventional tillage; right: conservation tillage)

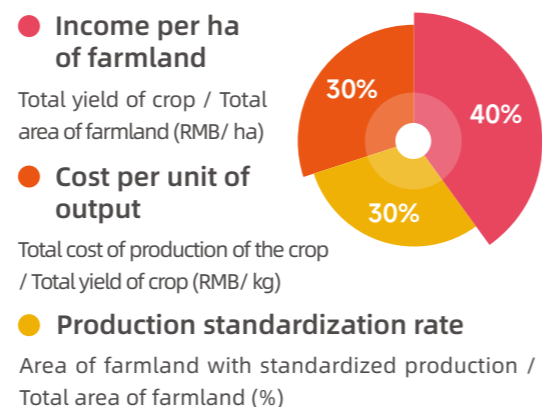
Agricultural Efficiency

Adhering to the strategic direction outlined in the *Plan to Accelerate Building up China's Strength in Agriculture for 2024-2035* to strengthen agricultural science and technology and build a modern agricultural production system, MAP harnesses new quality productive forces to drive a systemic leap in agricultural efficiency. Through innovative end-to-end technical solutions and a standardized service system, MAP integrates biotechnology, engineering, management, and digital technologies to significantly boost land productivity and resource conversion efficiency. At the same time, it optimizes the allocation of production factors, lowers operating costs across the entire chain, and explores the pathway of "increasing yields per unit area, reducing costs and improving efficiency, and extending the value chain" to upgrade the agricultural sector. With digital management and large-scale services as the foundation, MAP is accelerating the transformation of agricultural production from traditional extensive methods to the precision, intensive model, leveraging scientific and technological advancement to power the building of a strong agriculture, and strengthening the foundations of quality, efficiency, and global competitiveness.



Indicators

Agricultural efficiency



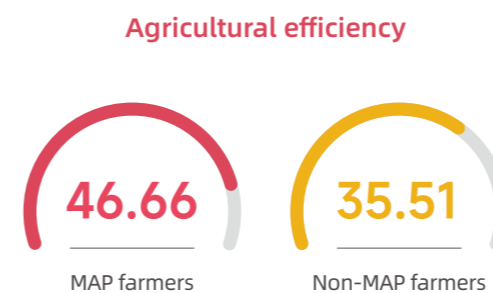
Indicator definitions

Income per ha of farmland
It refers to the total income per unit area (ha) of farmland generated through the sale of primary crops (excluding by-products). This indicator measures the direct economic benefits of planting activities and reflects the economic return capacity of agricultural production.

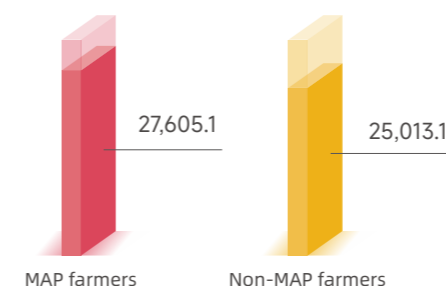
Cost per unit of output
It refers to the ratio of total production costs (excluding land rent, and including agricultural inputs, labor, machinery, irrigation, etc.) to total yield within a single crop production cycle. The lower the value, the higher the level of resource-use efficiency and economic performance.

Production standardization rate
It measures the ability to establish and implement standards across the agricultural industry chain (covering environmental conditions, inputs, operating procedures, and product quality control), and thereby ensure consistent regulation of key processes. The calculation logic is as follows:
Standardized production area: For any stage (such as sowing, fertilization, or crop protection) that meets enterprise-level, industry-level, or national standards, the area is counted as standardized.
Statistical rule: The largest standardized area among all stages is used as the numerator (to avoid double-counting).
Formula: Production standardization rate = (Max standardized area across stages / Total cultivated area) × 100%
This indicator quantifies the standardized coverage of the agricultural production process. A higher value indicates a higher level of standardization across the entire chain, reduced production volatility and lower quality risks.

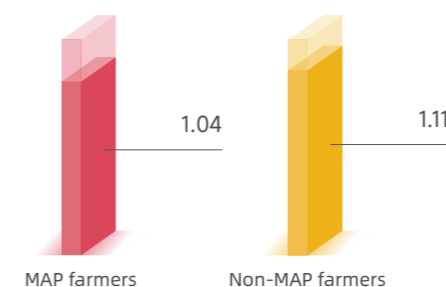
Survey findings



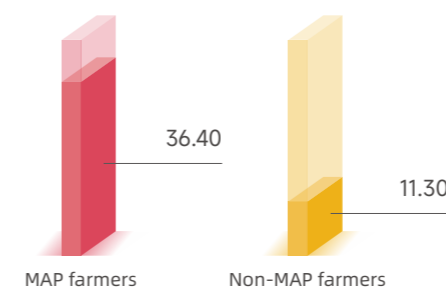
Income per ha of farmland (RMB/ ha)
10.36% average improvement with MAP services



Cost per unit of output (RMB/ kg)
5.98% average decrease with MAP services



Production standardization rate (%)
25.09 percentage points average improvement with MAP services



Indicator interpretations

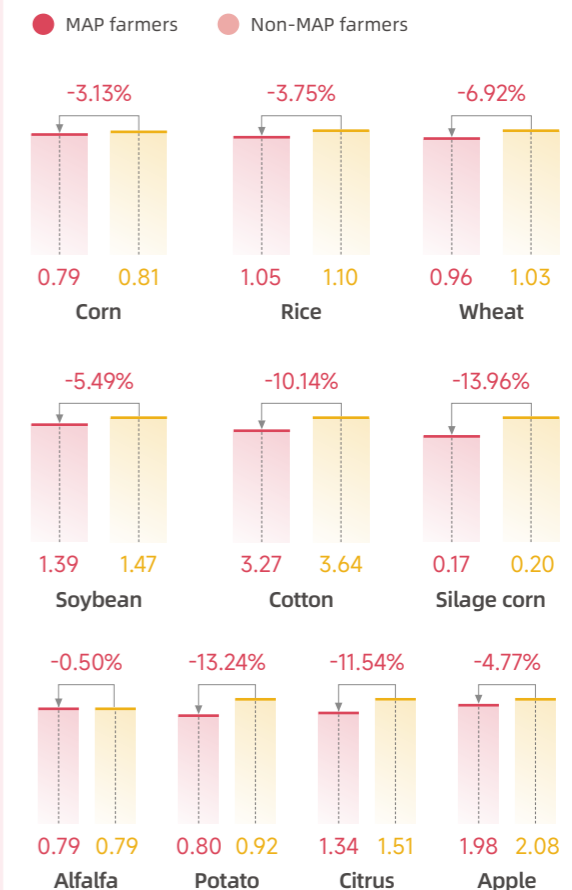
Cost per unit of output

Lowering the cost per unit of output is central to achieving green, high-quality and more efficient agricultural development. To this end, MAP employs a "refined management plus simplified technology" dual-engine model:

- **Technology intensification:** Developing and promoting streamlined, high-efficiency methods in sowing, fertilization, and crop protection to reduce redundant inputs;
- **Full-cycle precision control:** Using digital tools to dynamically optimize the allocation of inputs, machinery, and labor, minimizing losses at each stage;
- **Standardized service integration:** Delivering end-to-end socialized services from plowing, planting, management, to harvesting to ensure efficient coordination of resource factors and maximize economies of scale.

MAP replaces extensive and manual farming with intelligent technologies, driving agricultural production to shift from "high-input dependence" to "low-cost, lean operations". This transformation lowers unit costs while improving the quality and yield of agricultural products, boosting efficiency across the entire industry.

Cost per unit of output (RMB/kg)



Income per ha of Farmland

Improving Farmland and Promoting Rural Revitalization: MAP Turns Dalad Banner into a Model in Modern Agriculture



Located in the core agricultural production area of the Yellow River's "J-shaped bend," Dalad Banner in Inner Mongolia is a nationally significant commercial grain production base. However, it has long faced challenges such as extensive farming practices and backward agricultural technology. MAP has played a deep role in modernizing local agriculture since 2019. It has leveraged integrated modern agricultural technologies and full-process services to create a rural revitalization benchmark. Its practice in Dalad Banner was voted a Best Practice of Rural Revitalization 2024 by Xinhuanet, highlighting the core value of modern agricultural service in resource integration and technology accessibility.

Focusing on crops like corn and oats, the MAP Dalad Center employs precision technologies to tackle production bottlenecks. Scientific planting plans are developed based on soil testing, precision fertilization, and density-tolerant variety selection. Low-volume drip irrigation technology coupled with Yellow River water storage facilities upgrades traditional "flood irrigation" to precision irrigation, significantly enhancing water and fertilizer efficiency. During the project to increase the corn yield of 667 ha of fields in Bainijing Town, Dalad Banner, wide-narrow row planting and smart agricultural machinery are integrated to conserve water, increase yields, and reduce energy consumption, setting a benchmark for scale production. Via the MAP Zhinong app developed by MAP, farmers can access real-time digital services such as remote field monitoring and pest/disease alerts, significantly lowering field management costs. To address critical issues like fragmented farmland and dispersed resources, MAP, in collaboration with the local government, established a cooperation mechanism that brings together leading enterprises, village collectives, cooperatives, and farmers. This mechanism guides farmers to consolidate fragmented plots through land shareholding, thus turning "scattered small fields into contiguous farmland". Through

contract farming and full-process farm management services, farmers can earn land rentals and dividends, in addition to labor income from large-scale farming, thus diversifying their source of income. Idle lands are cultivated again, village collective economies gain vitality, and modern agricultural factors are delivered directly to the fields via MAP Technology Service Centers, positioning them as core hubs for developing rural industries.

The pursuit of green development is embedded throughout the entire service chain. Intelligent fertilization and precision irrigation reduce resource waste, while standardized production enhances agricultural product quality and market competitiveness. MAP also extends industrial chains for specialty crops like alfalfa and potatoes, elevating their added value through technological empowerment and brand building. Supported by the local government and driven by technological innovation and new models, MAP has empowered Dalad Banner to overcome the traditional agriculture constraints, forging an "efficient, eco-friendly, and sustainable" agricultural system.



▶ MAP's practice of building a modern, efficient, and green agriculture in Dalad Banner was voted by Xinhuanet as a Rural Revitalization Practice of 2024.



▶ MAP Dalad Banner Technology Service Center

Cost per Unit of Output

Optimizing Full-Process Services: MAP Solutions Help Farming Reduce Costs and Boost Efficiency



In Funan, Anhui, Shao Qinglang, a post-80s large-scale grain grower, has personally witnessed the promising new chapter that "grain farming has a bright future". In the past, he and fellow villagers often struggled with low-quality seed varieties, outdated techniques, and high costs. But everything changed after they partnered with MAP in 2019.

MAP first meticulously selected premium wheat varieties for Shao Qinglang and customized a full-process planting plan, strictly controlling every step, including pre-sowing preparation, precision drilling, split-application of fertilizer and integrated pest management. The smart farming app "MAP Zhinong", with its GIS remote sensing, precision weather forecasts, and pest/disease early-warning functions, allows Shao to monitor field conditions in real-time from home, thus proactively responding to risks such as late frost or disease outbreaks, truly realizing "smart farming".

For fertilization, MAP's Endos endophytic microbial inoculant is applied to the rhizosphere. It stimulates denser fine root growth and extends fertilizer efficacy duration while saving Shao tens of thousands of yuan in a single season. Combined with customized solutions like "Jinyushou" and "Jinsuishou", more targeted pest and disease control measures are taken, leading to less chemical pesticide usage. Agricultural

machinery also plays a key role: pneumatic precision seeders can complete seeding, fertilizing, and drip-tape laying in a single pass, saving time and improving seedling uniformity. Similarly, the use of high-efficiency sprayers has boosted both application efficiency and pest/disease control efficacy.

While farmers' production costs keep declining steadily, crop yields and quality are on the steady rise. Shao Qinglang has higher wheat yields which are sold at higher prices under the contract farming model, eliminating worries about both production and marketing. The MAP beSide full-process quality control and traceability system endorses every grain of wheat harvested and discloses transparent information on cultivation, drying, storage, and logistics to win the trust of downstream businesses and end consumers.

Reflecting on the cooperation, MAP, with modern agricultural technology at its core, leverages digital platforms and modern machinery to continuously help large-scale grain growers reduce costs and increase productivity. In the future, MAP will keep optimizing its full-process technical solutions, and strengthen the model that combines quality varieties, scientific agronomy, modern machinery and advanced technology, to generate more green benefits to more farmers.



▶ MAP agronomist and farmer Shao Qinglang (right) are checking on the growing corn in the field.

Production Standardization Rate

Standardized Production Leading the Way: Efficiently Boosting the Yields of Qian'an Corn through "Three Precisions and One Standardization"



Though located in Jilin's "Golden Belt for Corn Farming", Qian'an County has long suffered from soil salinization and drought, resulting in an average yield of only over 9,000 kg per ha. In 2024, the local government collaborated with MAP to deploy the water-fertilizer integration system across 13,333 ha of high-standard farmland and introduce MAP's "Three Precisions and One Standardization" technical system. MAP provides local farmers with full-process services, including refined cultivation management, precision seeding, precision water-fertilizer application, and standardized management services, truly achieving a leap from yield increase to productivity enhancement.

Before planting, the MAP team employed subsoiling equipment and land levelers to break up the plow pan and level the field, laying the foundation for high-density planting and installing the drip irrigation system. During seeding, GNSS-guided precision planters ensured centimeter-level accuracy in seed placement and simultaneous fertilizer application. During the growth period, based on IoT soil moisture monitoring and intelligent water-fertilizer networks, the system facilitated on-demand split application of water and fertilizer, significantly enhancing resource utilization efficiency. Throughout the process, MAP monitored in real time the operational quality and crop growth status, and then issued alerts and making adjustments whenever needed, to maintain strict quality control at every stage.

Zhang Zhaojun from Baolin Family Farm is a beneficiary of this model. He commissioned half of his 20-ha land to MAP and adopted high-density planting and integrated water-fertilizer technology, increasing the planting density from 57,000 to 72,000 plants per ha. Consequently, his yield surged from over 9,000 kg to nearly 15,000 kg per ha, an increase of nearly 3,750 kg compared to the previous year. Similarly, after consolidating 280 ha of land, Fuyu Village Cooperative in Yuze Township also significantly boosted productivity thanks to the one-stop service provided by MAP. MAP's high-density planting and precision irrigation techniques have increased the measured yield to 13,620 kg per ha and the annual income from over RMB 200,000 to exceeding RMB 1 million, along with increased collective dividends and improved infrastructure, truly realizing intensive resource utilization, efficiency gains, and income growth.

MAP has demonstrated and promoted its services and techniques beyond Qian'an to major production areas like Jiutai, Changchun. On average, demonstration plots achieved a 20% yield increase while reducing fertilizer use by 45 kg and water use of 1,500 tons per ha. This not only enhances production standardization rate but also promotes green development. In the future, MAP will continue to optimize the "Three Precisions and One Standardization" system, strengthen digitalization and agricultural machinery compatibility, and extend storage and service chains to drive large-scale, substantial, and balanced yield growth for corn in Northeast China, thereby contributing to food security and rural revitalization.



▶ MAP Qian'an Farm

Production Standardization Rate

Putting Agricultural Machinery to Good Use: Harnessing the "Key Engine" of Agricultural Socialized Services



Agricultural machinery is a key driver for ensuring food security and advancing agricultural modernization. As an organizer of agricultural socialized services, MAP is building a nationwide collaborative machinery network to enhance overall production efficiency.

To address seasonal idleness of machinery and regional differences in farming schedules, MAP has pioneered a cross-regional dispatching mechanism. During the 2024 winter wheat sowing season, MAP partnered with Hulun Buir State Farm's Yakeshi Agricultural & Pastoral Company to send idle machinery after the autumn harvest southward to Nanpi County, Cangzhou, Hebei, 1,800 kilometers away, and helped sow about 267 ha of winter wheat with the BeiDou Navigation Satellite System. This move not just put the idle farm machinery into good use, but also met the critical operational needs in the North China Plain, improving both the machinery utilization rate and crop planting efficiency.

In machinery management, MAP has established a dual-track system of joint operation and self-operation. By collaborating with leading domestic and international service providers, MAP has developed a nationwide high-quality agricultural machinery service network. It has also built a modern machinery fleet of more than 1,000 units, equipped with a smart navigation system and IoT terminals, capable of real-time tracking of operation routes and online monitoring of operational quality, significantly improving efficiency and performance.

In integrating agricultural machinery and agronomic techniques, MAP technicians have adapted agricultural machinery and introduced electronic precision seeding technology to precisely regulate seed spacing and depth, ensuring uniform seedling emergence and advancing intelligent and precision farming. Furthermore, MAP has promoted the water-fertilizer integration system, which once laid down can serve both winter wheat and summer corn. Combined with advanced compound seeding technology and MAP's self-developed drip tape laying devices, this approach synchronizes seeding machinery with the integrated water-fertilizer system, boosting planting efficiency and resource utilization.

Through nationwide machinery allocation, standardized service delivery, and smart and digital empowerment, MAP is promoting intensive and precision farming. In 2024, MAP's machinery services covered over 507,000 ha, and the figure is expected to exceed 667,000 ha in 2025, providing solid support for food security and agricultural modernization.



▶ A large agricultural machine in operation

Production Standardization Rate

Digital Empowerment for New Quality Productive Forces: Driving Green Growth Together with Farmers via the Smart Farming Platform



On March 7, 2024, MAP won the 2023 Wu Wenjun AI Science & Technology Award—Progress Award for its MAP Zhinong app, becoming the only agricultural enterprise to receive this distinction. The award recognized MAP's outstanding achievements in applying digital technologies to agriculture.

MAP Zhinong app integrates GIS remote sensing, soil monitoring, precision weather forecasting, and pest/disease early warning functions, putting a "farm manager" directly in farmers' hands for full-process visualized management. Farmland boundaries are automatically mapped with accurate area measurement; multispectral imaging detects crop growth variations, enabling early identification of weeds, phytotoxicity, or water stress; the weather module provides short-term rainfall forecasts, helping farmers schedule spraying and harvesting accordingly. The App helps farmers better schedule operations, reduce redundant labor, and enhance efficiency. Based on soil moisture data and crop growth models, it also recommends zone-specific fertilization strategies to prevent excessive fertilizer application and irrigation waste. By connecting drones with smart boom sprayers, it can spray pesticide precisely where needed, thus significantly reducing pesticide use. Such digital applications not only lower costs and boost efficiency but also reduce agricultural non-point source pollution and contribute to farmland carbon reduction.

MAP combines online digital tools with offline technical services through its nationwide network of agronomists. These frontline experts interpret data for farmers and provide in-field guidance. During spring plowing, agronomists design targeted crop protection and fertilization plans based on crop models, ensuring scientifically sound

operations at key stages. Ahead of the autumn harvest, MAP will estimate the yield and help farmers schedule machinery and storage spaces, minimizing losses in harvesting and logistics. At the grain storage and trade stage, the MAP Zhinong app monitors in real time the warehouse environment, and promptly issues alerts against temperature and humidity changes, to help reduce storage losses. In addition, it matches suppliers with the contract farming demand, ensures the field-to-table traceability of crops such as wheat, builds consumer trust, and helps farmers increase income.

Looking ahead, MAP will continue to refine the MAP Zhinong app, explore the application of AI in agriculture and advance rural digitization. Leveraging open and collaborative ecosystems, MAP aims to make digital technology a core accelerator of green growth, so that more farmers can share the benefits of agricultural modernization through cost reduction and efficiency gains.



MAP awarded the 13th Wu Wenjun AI Science & Technology Progress Award.



Agronomist using the MAP Zhinong app to assess corn growth in service fields

Production Standardization Rate

AI Empowering the Upgrade to Digital, Intelligent Agriculture: MAP's "AI Plus Agriculture" Achievements



At a critical stage when traditional agriculture is accelerating to embrace AI, MAP is seizing the opportunity and vigorously advancing the "AI Plus Agriculture" demonstration program. In partnership with China Mobile, China Electronics Corporation, China Agricultural University, and other institutions, MAP is exploring the innovative application of AI technologies in agricultural production, and has developed an integrated digital agriculture solution featuring "perception, decision-making, diagnosis, and execution", injecting digital, intelligent momentum into agricultural production.

The "AI Plus Agriculture" application demonstration project aims to meet the demand in real-world agricultural scenarios, based on a combination of general large models and crop growth models. Focusing on two typical scenarios—digital production decision-making and crop growth monitoring & early warning—the project provides AI-assisted guidance across four critical stages: pre-sowing planning, planting plan recommendations, field management, and harvesting. MAP Zhinong app enables farmers in Inner Mongolia, Northeast China, Northwest China, and the Huang-Huai-Hai region to achieve precision planting and refined field management, resulting in higher yields per unit area and greater efficiency. In grain storage, MAP has deployed intelligent temperature and humidity monitoring models, which are put into use in the warehousing system of Sinochem Grain, with breakthroughs in early-warning accuracy and response efficiency.

Internally, MAP consolidates weather, plot, and crop growth datasets. Externally, it collaborates with China Rural Technology Development Center under the Ministry of Agriculture and Rural Affairs, Chinese Academy of Agricultural Sciences, China Agricultural University, and other institutions to build an agricultural data ecosystem open to businesses, universities and research institutes. Key datasets, including remote sensing imagery, pest and disease images, field operation logs, and soil data, have been integrated to form an initial high-quality multi-modal agricultural dataset, providing a solid foundation for training agricultural large models.

MAP is working with the China National Institute of Standardization to draft the national standard *Smart Agriculture—Terms and Terminology*, unifying technical definitions for AI and machine learning in agriculture. At the same time, MAP is actively promoting the development of evaluation standards for agricultural large models and industry standards for high-quality agricultural datasets, providing an authoritative framework for AI-empowered agricultural development.



The "AI Plus Agriculture" application demonstration project aims to meet the demand in real-world agricultural scenarios, based on a combination of general large models and crop growth models. Focusing on two typical scenarios—digital production decision-making and crop growth monitoring & early warning—the project provides AI-assisted guidance across four critical stages: pre-sowing planning, planting plan recommendations, field management, and harvesting. MAP Zhinong app enables farmers in Inner Mongolia, Northeast China, Northwest China, and the Huang-Huai-Hai region to achieve precision planting and refined field management, resulting in higher yields per unit area and greater efficiency. In grain storage, MAP has deployed intelligent temperature and humidity monitoring models, which are put into use in the warehousing system of Sinochem Grain, with breakthroughs in early-warning accuracy and response efficiency.



Crop lifecycle monitoring and early-warning function in the MAP Zhinong app

Green Supply

Aligned with the strategic direction of “deepening agricultural supply-side structural reform and building a diversified food supply system” in the No.1 Central Document for 2025, MAP is reforming the green and high-quality agricultural product supply system with a focus on end-to-end quality upgrading. By integrating regenerative agriculture technology, MAP systematically enhances environmental governance of the origin of crops, and strengthens standardized production management and traceability capabilities, to produce greener and higher-quality agricultural products. Driven by both technology and contract farming, MAP leverages the beSide quality control and traceability system, improves the quality while lowering the price via the contract farming mechanism, and precisely meets the needs of producers and consumers. By empowering brands and reshaping value across the entire industry chain, MAP translates its superior product quality into market competitiveness, thereby providing strong support for building a resilient and sustainable modern food industry system.



Indicator definitions

Green Supply

- Regenerative agriculture coverage rate**
Area of farmland applying regenerative practices / Total planting area (%)
- Percentage of quality agricultural products**
Output value of high-quality agricultural products / Total output value of all agricultural products (%)
- Use of quality varieties**
Area of farmland planted with quality crop varieties / Total planting area (%)

Indicator definitions

- Regenerative agriculture coverage rate**
It refers to the percentage of farmland where at least one regenerative agriculture practice, such as conservation tillage, soil testing and fertilizer formulation, or green crop protection, is applied, in total planted area. It reflects the breadth of ecological transformation in agricultural production systems. Statistical rule: Whatever stage the regenerative agriculture practice is adopted counts. To avoid double counting, the maximum single-practice coverage area is used as the numerator; Formula: Coverage Rate = (Maximum single-practice coverage area / Total planted area) × 100%.
- Percentage of quality agricultural products**
It refers to the ratio of the total output value of high-quality agricultural products (including Green Food, Organic Products, Geographical Indication (GI) products, and distinctive premium products) to the total output value of all agricultural products. It reflects the quality and efficiency of agriculture, as well as the branding level.
- Use of quality varieties**
It refers to the percentage of farmland area planted with currently valid main promoted varieties listed by the Ministry of Agriculture and Rural Affairs in the 2022–2024 catalog in total crop planting area. It reflects the effectiveness of quality variety adoption and industry adaptation.

Survey findings

Green Supply

Regenerative agriculture coverage rate (%)
16.83 percentage points average improvement with MAP services

Percentage of quality agricultural products (%)
7.08 percentage points average improvement with MAP services

Use of quality varieties (%)
7.44 percentage points average improvement with MAP services

Indicator interpretations

Percentage of quality agricultural products

MAP enhances agricultural product quality through end-to-end refined management, building a dual system featuring standardized production and digitalized quality control. Leveraging blockchain and big data, the MAP beSide full-process traceability system ensures transparent management from planting, processing, to distribution:

- Advance standards setting: Establishing norms for environmental requirements, input usage, and operational protocols, etc.
- Growth monitoring: Collecting key data on farming operations and environmental parameters in real time, and dynamically optimizing quality control.
- Post-harvest traceability: Providing a QR code for consumers to scan to access the lifecycle information of agricultural products, thus building trust.

This system ensures quality consistency through process management and enables high quality and high price via traceability certification, creating a virtuous cycle of improved producer profitability, consumer trust, and industry value, and providing lasting momentum for the high-quality development of agriculture.

Percentage of quality agricultural products (%)

Product	MAP farmers (%)	Non-MAP farmers (%)	Average improvement (percentage points)
Corn	8.20%	3.79%	4.41
Rice	14.90%	7.17%	7.73
Wheat	8.67%	4.20%	4.47
Soybean	3.05%	1.71%	1.34
Cotton	3.84%	0.00%	3.84
Silage corn	40.82%	21.78%	19.04
Alfalfa	33.03%	9.39%	23.65
Potato	43.76%	10.07%	33.69
Citrus	17.42%	8.32%	9.10
Apple	10.71%	6.39%	4.32

Regenerative Agriculture Coverage Rate

The Eco-Corridor of Pollinator-Attracting Flowers: MAP Contributes to the Beautiful Countryside Initiative Through Regenerative Agriculture



In July 2024, the MAP Cangzhou Technology Service Center launched an innovative regenerative agriculture practice in Zhaozhuangzi Village, Mengcun Hui Autonomous County, Hebei Province. Addressing issues such as weak ecological functions of farmland margins and excessive usage of chemical pesticides, the team selected a 0.67 ha maize field and a 0.27-ha county-level beautiful courtyards as pilot sites. Along the border between farmland and roads, strips of pollinator-attracting flowers such as cosmos and zinnias were sown, creating ecological buffer zones. This initiative strengthens farmland's ecological services and explores pathways for coordinating agricultural production and ecological protection efforts, providing a replicable model for sustainable rural development.

The flower corridor employs nature to reshape the farmland ecosystem. The root systems of cosmos and zinnias help reduce soil erosion, while their secondary metabolites suppress weed growth, partly replacing chemical herbicides. The flowers attract beneficial insects such as ladybirds and hoverflies, forming a natural biocontrol system that reduces the incidence of

pests like maize aphids. At the same time, the density of pollinators, such as bees and butterflies, increased significantly, thereby enhancing maize pollination efficiency, kernel filling, and yield. The floral corridor connects farmland buffer zones and rural courtyards, and the cosmos field has become a popular spot in the village, attracting a large crowd especially at dusk, adding vibrant public spaces to the village.

MAP's practice in Zhaozhuangzi Village demonstrates that ecological restoration of farmland margins can generate multiple benefits at low cost. While maintaining stable corn yields with reduced pesticide use, it has improved the look of the village and strengthened villagers' sense of gains. This model provides resource-constrained areas with a replicable green development pathway: unlocking the ecological potential of marginal land to improve agricultural efficiency, ecological environment, and the rural living environment. This further highlights the transformative role of regenerative agriculture in rural revitalization.



▶ Pollinator-attracting flowers in Zhaozhuangzi Village provide a habitat for bees and other beneficial insects.

Percentage of Quality Agricultural Products

Full-Process Quality Control Enhances the Supply of Premium Wuchang Rice



Heilongjiang Province is China's largest grain producer, producing one-tenth of the national total a year. In Wuchang City, its core premium rice production area, MAP and Yihai Kerry Arawana Holdings Co., Ltd. have jointly developed a farm supported by the MAP beSide full-process quality control and traceability system. Tailored planting service solutions were implemented for Wuchang rice varieties, integrating remote sensing, precision weather forecasts, early warnings against pests and diseases, and advanced IoT devices. Full-process traceability was embedded from seeding and transplanting to harvest and processing, ensuring quality control "from seed to rice, from field to table". By scanning a QR code on the package, consumers can access transparent and reliable supply chain

information, with guaranteed premium quality and food safety for every grain of rice. Scientific crop management has not only increased the yield but also improved the rice flavor. At the 16th Annual Meeting & Symposium of the Japan Society for Rice Quality and Palatability in 2024, the Wuchang Xiang Rice produced at the Yihai Kerry-MAP base won the "Most Outstanding Award" ("最优秀赏"), the highest honor of the event.

Since 2019, MAP and Yihai Kerry Arawana have worked closely across the rice value chain, achieving significant results. Going forward, MAP will continue to strengthen its partnerships across the food supply chain to deliver more safe, premium, and green agricultural products to consumers.



▶ Rice grown at the MAP beSide full-process traceability farm in Wuchang



▶ Wuchang Rice from the MAP beSide base wins the "Most Outstanding Award" in Japan

At the 2nd China International Supply Chain Expo, MAP brought with it the Dingyou Zhenxuan Rice, a collaboration between MAP and Sinochem Oil Dingyou Business, another subsidiary of Sinochem Holdings. As a product of MAP's agricultural supply chain innovation, this rice benefits from MAP's quality control and traceability system and supply chain optimization, ensuring rigorous management from field to table. Since its launch in October 2024, more than 160,000 bags of rice have been sold, demonstrating outstanding quality, strong market competitiveness, and the commercial value of MAP's agricultural supply chain solutions.



▶ Dingyou Zhenxuan Rice and other MAP beSide products on display at the 2nd China International Supply Chain Expo

Use of Quality Varieties

From Quality Varieties to Higher Yields: MAP's Variety Screening Unlocks the "Code" of High Productivity



Quality varieties are the foundation of abundant harvests and increased farmer income.

In the autumn of 2024, Zhou Ming from Donggou Village, Zhongjiang County, Sichuan Province was honored with the title of "Grain King" of MAP South China Region 2024 with an outstanding yield of 8,958.9 kg/ha. Behind this achievement lies MAP's constant quality variety screening effort. With the scientifically selected Mianmai 902 wheat variety and MAP's end-to-end technical guidance, Zhou significantly outperformed local average yields.



▶ Zhou Ming (left) showcasing his wheat yield testing sheet

MAP has built a comprehensive variety evaluation system, with 120 "1+5" functional demonstration farms across major crop production regions. MAP ensures science-based and objective screening using a dual evaluation mechanism of internal and external controls, coupled with standardized cultivation and refined management. For example, in North China, MAP recommends Mairui No.1 (cold- and disease-resistant) for Hebei, while in Henan it promotes Jinli Shenhua 608 (high-yielding), ensuring optimal regional variety selection.



▶ Variety screening plots at a MAP demonstration farm

To maximize the advantages of quality varieties, MAP has established a full process from variety collection to demonstration planting, data evaluation, and report publication. Leveraging its Smart Service Database's extensive trial data, MAP precisely matches varieties with regional characteristics and employs advanced technologies such as pneumatic precision seeding and water-fertilizer integrated systems, to ensure uniform, robust, and complete crop stands.

At the downstream, MAP collaborates with enterprises to establish a unified quality control system. MAP's beSide full-process traceability system ensures the quality of agricultural products from field to table, generating a stable source of premium income for farmers. Looking ahead, MAP will continue to refine variety screening and optimize key agronomic technologies such as seed coating for disease prevention and intelligent irrigation. These efforts aim to narrow the yield gap between demonstration plots and large-scale fields, and provide solid, high-quality varieties for green agricultural development.

Use of Quality Varieties

Introducing High-Quality Potato Varieties for Processing to Address Industry Bottlenecks



China's fried potato chip market has been expanding rapidly, reaching RMB 19.3 billion in 2023, with an expected compound annual growth rate of 3%. However, the industry has long relied on the "Atlantic" variety introduced in 1978. Over time, this variety has degraded, with declining yields, weak resistance, and issues such as hollowing, constraining the sustainable growth of this sector. Demand from processors for varieties with low reducing sugars and high dry matter content has become increasingly urgent.

To address this challenge, Sinochem Modern Agriculture (Inner Mongolia) Co., Ltd. introduced the Sunrise potato variety in 2020, bred by Sunrise Potato Storage Ltd. in Canada, and transliterated it for the Chinese market. Developed from a cross between Dakota Diamond (North Dakota, USA) as the female parent and NY115 (Cornell University, USA) as the male parent, the variety was selected over multiple generations of breeding.

Between 2021 and 2023, MAP conducted extensive field trials at bases in Shandian River, Guyuan County, Zhangjiakou, Hebei Province, and Ulagai Administrative District, Hologol, Inner Mongolia. Results show that Sunrise consistently demonstrated excellent agronomic traits, stable internal and external quality, disease resistance, low reducing sugars, and high dry matter content. The tubers are round in shape, with no observed issues of cracking or hollowing.

The introduction and promotion of Sunrise not only provides a new, high-quality potato variety for processing but also alleviates the risk associated with the lack of varieties. This reflects MAP's active role in introducing high-quality varieties and advancing green agriculture. By introducing and promoting Sunrise, MAP is helping to build an efficient, green, and sustainable potato industry and driving the high-quality development of China's fried potato processing sector.



▶ Comparison of fried chips: Sunrise (left) vs. Atlantic (right)

Summary and Outlook

In 2024, MAP made solid progress in green and high-quality agricultural development, achieving positive results in resource conservation, environmental friendliness, agricultural efficiency, and green supply. The Green Development Index of MAP farmers reached 44.73–23.55% higher than non-MAP farmers—solidifying MAP’s advantage in green agricultural services.

For resource conservation, MAP significantly improved land, water, and labor productivity. Land productivity rose by 9.05% and water-use efficiency by 9.98% compared to non-MAP farmers. For environmental friendliness, fertilizer and pesticide utilization efficiency increased by 14.82% and 8.84%, respectively. Carbon emission intensity per unit of yield dropped by 10.70%, reflecting stronger environmental performance. For agricultural efficiency, MAP helped raise the production standardization rate by 25.09 percentage points and reduced the cost per unit of output by 5.98%, resulting in a 10.36% increase in per-ha income. For green supply, the coverage of green production models reached 78.86%. High-quality output and quality varieties adoption rates were 7.08 and 7.44 percentage points higher than non-MAP counterparts.

Different crops showed varying degrees of performance. Potatoes, cotton, and alfalfa stood out with Green Index scores above 50. Potatoes excelled in labor productivity and green supply; cotton led in fertilizer and pesticide efficiency; and alfalfa outperformed in standardization, profitability, and emission reduction. Major grains such as corn, rice, and wheat recorded steady improvements in green indices, along with increased standardization and industrialization levels. Cash crops like citrus showed progress in green development but still have room to grow in standardization and high-quality supply.

Overall, while MAP has laid a strong foundation for green development, some crops still fall within the mid-range of the green index. Moving forward, MAP will continue to integrate advanced technologies, upgrade service offerings, and expand its region-specific solutions. These efforts will deepen the breadth and depth of its service system—supporting China’s agricultural green transformation in a more targeted, scalable, and high-impact manner.

About This Report

Reporting Period

The survey data in the report was collected from September 2024 to February 2025, mainly covering the full growth period of crops in 2024. All other data cited was as of the end of December 31, 2024 unless otherwise noted.

Source of Data

The Surveyed Areas by Crops

Corn	Gansu, Hebei, Henan, Heilongjiang, Jilin, Liaoning, Inner Mongolia, Ningxia, Shandong, Shanxi, Shaanxi
Rice	Anhui, Chongqing(municipality), Heilongjiang, Hubei, Hunan, Jilin, Jiangsu, Jiangxi, Liaoning, Sichuan, Zhejiang
Wheat	Anhui, Hebei, Henan, Jiangsu, Shandong, Shanxi, Shaanxi, Zhejiang
Soybean	Anhui, Heilongjiang
Cotton	Northwest
Silage Corn	Inner Mongolia
Alfalfa	Inner Mongolia
Potato	Inner Mongolia
Citrus	Guangxi, Chongqing(municipality), and Sichuan
Apple	Gansu, Shandong, and Shaanxi

Number of Valid Questionnaires

Crop	Valid questionnaires	MAP farmers	Non-MAP farmers
Corn	1073	623	450
Rice	692	445	247
Wheat	475	339	136
Soybean	141	78	63
Cotton	101	51	50
Silage corn	45	33	12
Alfalfa	37	24	13
Potato	51	29	22
Citrus	99	62	37
Apple	138	77	61
Total	2852	1761	1091

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