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先正达集团中国 Syngenta Group China

MAP 2021

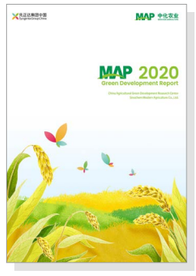
Green Development Report

China Agricultural Green Development Research Center
Sinochem Modern Agriculture Co., Ltd.

To enable every one in the food chain ecosystem to prosper

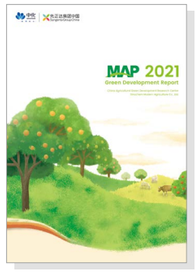
Foreword

In 2021, Sinochem Agriculture Modern Agriculture Platform (MAP) released the *MAP 2020 Green Development Report*, which is the first disclosure of MAP's sustainable development achievements through the promotion of modern agricultural services since its establishment at the end of 2017.



In the *MAP 2020 Green Development Report,* MAP has systematically developed the Agricultural Green Development Index (AGDI) by identifying green development indicators, conducting nationwide surveys of representative crops, and assessing the green development achievements of MAP services based on survey data and scientific analytical methodology. Survey results show that the average level of green development of farmers served by MAP is 33.8% higher than that of farmers not served by MAP, with significant improvements such as greater adoption rates of new agricultural technologies, improved resource efficiency of water, fertilizers and pesticide, higher crop quality, and the reduction of agricultural carbon emissions.

This year, in response to China's goals of reaching "carbon peaking" by 2030 and "carbon neutrality" by 2060, we conducted a carbon footprint audit of the rice production operations at MAP beSide farms, and released the *MAP 2021 Green Development Report* as a manifesto of MAP's active role and achievements in addressing climate change.



In this report, we have made a comprehensive upgrade of the Agricultural Green Development Index based on surveys conducted over a greater number of locations and a larger sample of farmers. The 2021 survey results show that the average level of green development of farmers served by MAP is 53.43% higher than that of farmers not served by MAP. The report also includes more in-depth interpretations of the performances of some of the indicators, allowing report readers to intuitively see how the various innovative service models and practices contribute to the sustainable development of agriculture, nature and mankind.

Finally, this report also includes some stories and moments happened during the reporting period, providing a vivid demonstration of how MAP contributes to the green and sustainable development of Chinese agriculture.

March 2022

Contents

Messages from the Management

It is our responsibility and mission to strengthen, develop and expand the agricultural business as one of our main businesses. In response to the instructions of Xi Jinping, we strive to vigorously implement the rural revitalization strategy, and promote China's agricultural development using the MAP model as an important approach, promoting the supply-side agricultural structural reform by helping farmers grow high-quality crops with higher efficiency through scientific approaches, scientific technology, scientific machinery, and scientific management.

The concept of "growing quality products, and getting good price" that put forward in the MAP strategy not only focuses on scientific growing models, but also involves teaching and helping farmers carry out ecological and environmentally friendly ways of production to reduce water consumption, manage fertilizer and pesticide use, and increase soil fertility. MAP is not only a business model, but also a great cause that benefits our nation and our people. The MAP strategy is in line with the current development of China, especially meets the needs of China's rural areas. The major transformation that currently happening in China's rural areas not only gives us the lofty mission of revitalizing Chinese agriculture and support the technological development of Chinese agriculture, but also further enhances the vitality of the MAP strategy, which is highly consistent with both the government's requirements on Sinochem Holdings, especially the requirement on strengthening and expanding the agricultural business as one of our main businesses, and China's rural revitalization strategy as well as our own development needs.

Since its launch, the MAP strategy has been playing an active role in enhancing our corporate image and showcasing our social responsibility. We will keep on improving and optimizing the MAP strategy to focus on both the economic benefits and social benefits it helps generate, so as to explore and develop a proved and replicable model that supports China's agricultural transformation and development in the New Era. By building a team that truly "understand agriculture, care for rural areas, and love farmers", we will continuously contribute to promoting the rural revitalization strategy and play a leading role in China's agricultural modernization process, creating an innovative agricultural development path that is replicable and sustainable.

Ning Gaoning

Secretary of the Party Committee & Chairman, Sinochem Holdings
Chairman, Syngenta Group

At Syngenta Group, we are passionate about helping farmers overcome two of the greatest challenges facing the world today: feeding a growing population and addressing climate change. Growing enough healthy, affordable and sustainably produced food for everyone in China and the rest of the world cannot be taken for granted.

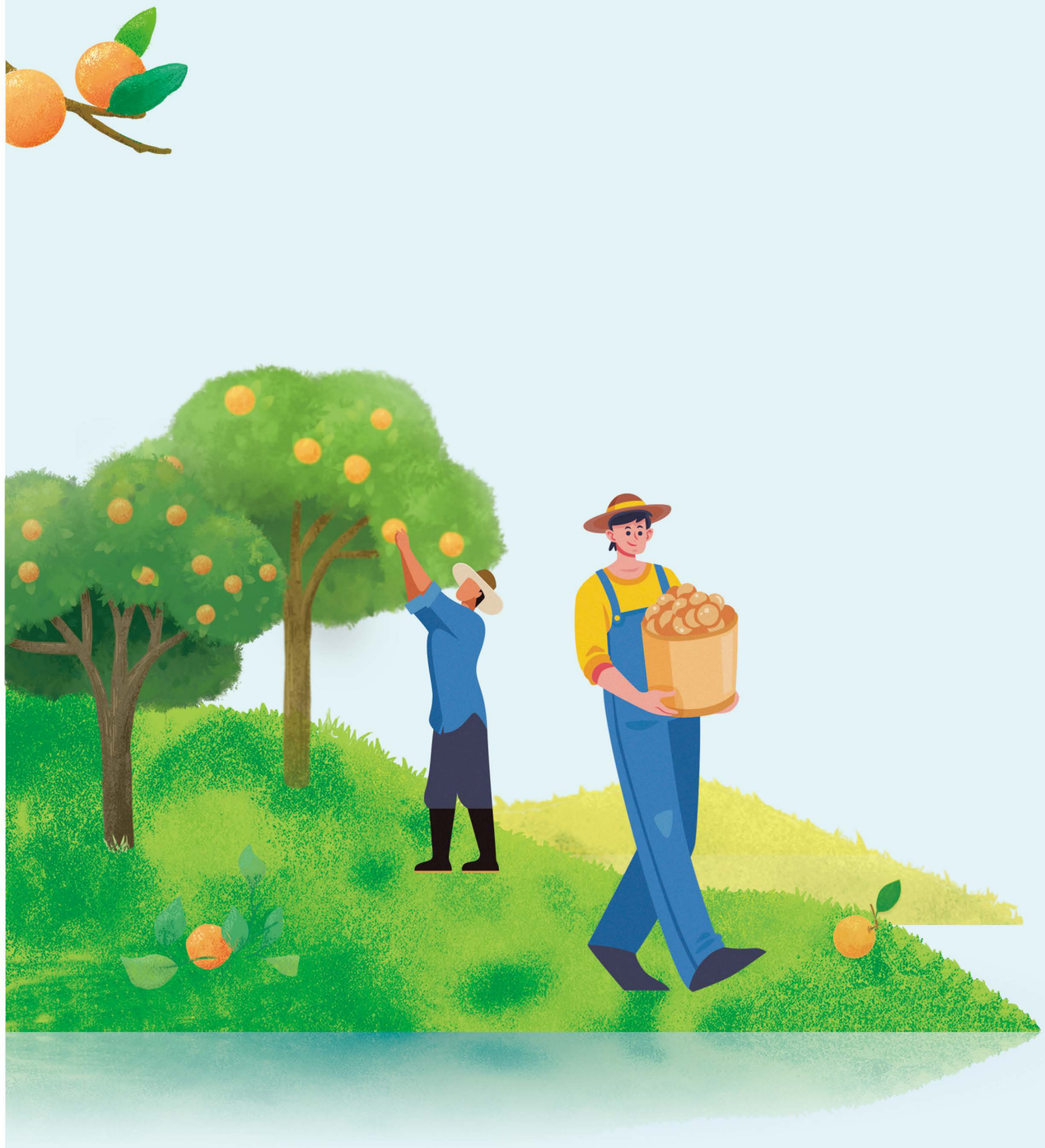
The challenge is substantial in the next 30 years, as we will need 50% more food to feed two billion more people. However, the agriculture model we have used so far is not sustainable, which is responsible for about 20% of all greenhouse gas emissions and 70% of freshwater consumption globally. Therefore, Syngenta Group places the fight against climate change at the heart of our support to farmers. Our goal is to grow more food in environmentally friendly ways.

This is never been more important. Climate change is causing more weather extremes. Heat waves, droughts, flooding and high winds, which are making farming increasingly difficult. We are coming out with increasing numbers of new innovations and products to help farmers deal with these situations, such as adopting new growing models, and the application of modern technologies, digital tools and products.

Today, large-scale farmers are in greater need of agricultural technical services. The MAP model is doing a better job at meeting the needs of large-scale farmers than traditional wholesale and retail channels. Sinochem Agriculture's MAP strategy has a significant role to play in promoting the concrete development and of China's modern agriculture, and the upgrading of comprehensive modern agricultural technical services. In the future, Syngenta Group is committed to providing more support and injecting greater impetus to the development of MAP.

Erik Fyrwald

Chief Executive Officer, Syngenta Group



About Us

Sinochem Holdings

Sinochem Holdings Corporation Ltd. ("Sinochem Holdings") is formed through the restructuring of Sinochem Group Co., Ltd. ("Sinochem Group") and China National Chemical Corporation Ltd. ("ChemChina") on March 31, 2021, with the approval of the State Council. It is a leading state-owned enterprise under the supervision of State-owned Assets Supervision and Administration Commission of the State Council. Sinochem Holdings has approximately 220,000 employees.

Looking ahead, Sinochem Holdings will uphold the belief "In Science We Trust", strive to build up a technology-driven innovator and a world-class chemical conglomerate, constantly upgrade technological innovation, foster core competitiveness and sustainability, so as to become a great and respectful conglomerate and contribute our bit to the development of chemical industry and social progress.

Business Units

Syngenta Group

Syngenta Group SG, registered in Pudong, Shanghai, China, and with its management headquarters in Switzerland, has four major business units, including Switzerland-based Syngenta Crop Protection, US-based Syngenta Seeds, Israel-based ADAMA, and China-based Syngenta Group China. With a diversified team and the unparalleled business strength in its four major business units, Syngenta Group strives to provide the most extensive product portfolio and services in the agricultural field.

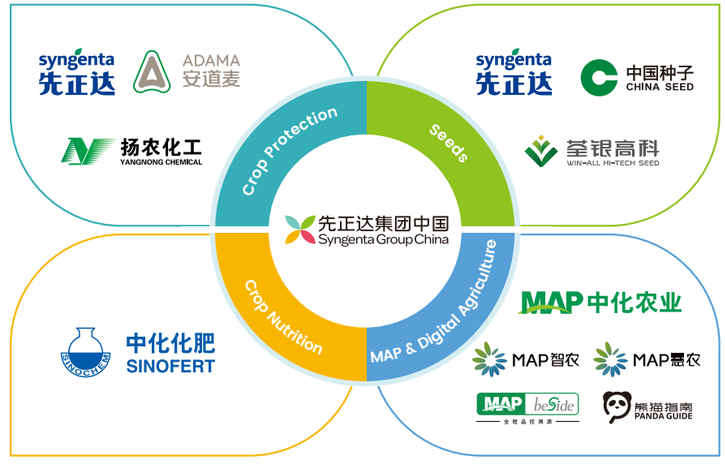
With 53,000 employees working in in more than 100 countries to transform agriculture through tailored solutions for the benefits of farmers, society and the planet, Syngenta Group is the most local agricultural technology and innovation partner in the world.

Syngenta Group China

Syngenta Group China is a leading global agricultural technology company in China, and one of the four global business units of Syngenta Group. As an innovation engine for Chinese agriculture, Syngenta Group China's business areas include Crop Protection, Seeds, Crop Nutrition, and MAP (Modern Agriculture Platform) & Digital Agriculture. Combining global technologies with localized services, Syngenta Group China strives to become a leader in modern agricultural services and digital innovation by organically integrating global cutting-edge technologies, innovative ideas, and human capital with its localized services, market insights, and outstanding teams in China, playing an active role in promoting agricultural technological development and high-quality sustainable development in China, as well as the modernization of Chinese agriculture.

16,800
employees

$7.36bn
2021 sales



Green and Sustainability Strategy

The Good Growth Plan of Syngenta Group: Pillars and Targets

Syngenta launched the Good Growth Plan in 2013, which have been achieved in 2020. Based on its unwavering commitments, Syngenta Group has launched the new Good Growth Plan, setting four new pillars and relevant quantitative targets until 2025.

Accelerate innovation for farmers and nature

$2bn

- Invest $2bn in sustainable agriculture breakthroughs
- 2 new sustainable technology breakthroughs per year
- Strive for the lowest residues in crops and the environment

Strive for carbon neutral agriculture

3m ha

- Measure and enable carbon capture and mitigation in agriculture
- Enhance biodiversity and soil health on 3m ha of rural land every year
- Reduce the carbon intensity of our operations by 50% by 2030[1]

1 Currently Syngenta Crop Protection and Syngenta Seeds only.

Help people stay safe and healthy

8m

- Goal zero incidents in our operations
- Train 8m farm workers on safe use every year
- Strive for fair labor across our entire supply chain

Partnering for impact

- Build cohesive partnerships and publish their sustainability objectives
- Launch innovation dialogues for inclusive consultation on sustainability
- Board level governance of sustainability

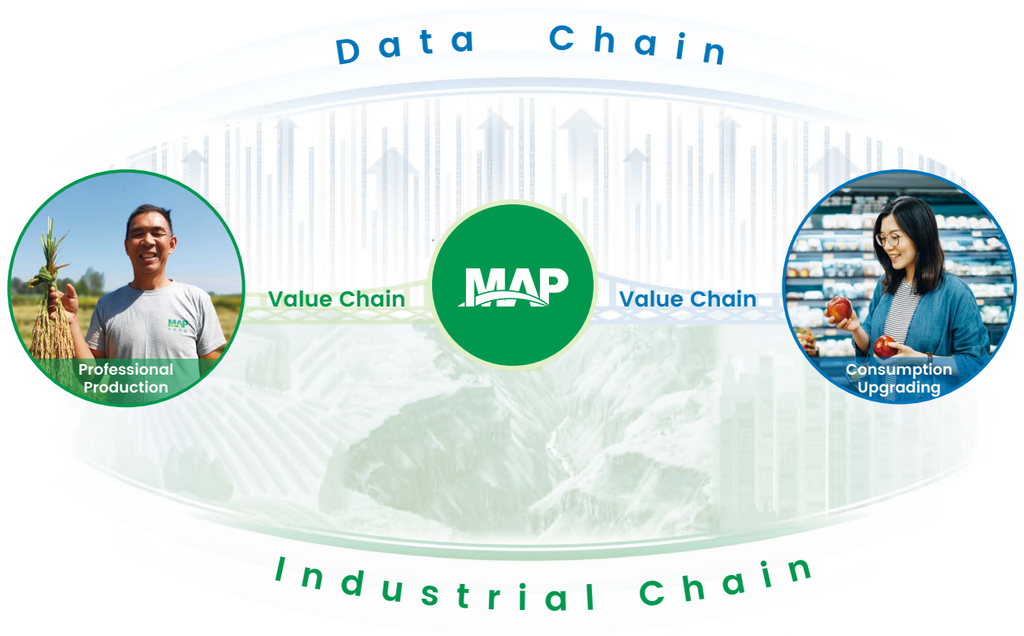
Through the Good Growth Plan, Syngenta Group supports the United Nations 2030 Agenda for Sustainable Development (SDGs), which echo its own relevance and significance. The Good Grow Plan contributes directly to Goal 2 (Zero Hunger) and significantly to other 9 goals.

MAP Business Model

Syngenta Group China's MAP and Digital Agriculture business unit is based on the Modern Agriculture Platform(MAP) model using the Sinochem Modern Agriculture Co., Ltd. as the operating platform for implementation.

With a value proposition of becoming a leading "organizing and service platform of whole agricultural industrial chain" in China, MAP builds a platform that reorganize, optimize and empower the different links of the industrial chain to jointly create and share values with value chain partners.

From MAP Technical Service Centers and MAP Farms across China, MAP promotes the adoption of advanced technologies, and provides production planning and support services. MAP has developed the MAP Digital Agriculture system, and launched the MAP beSide whole-process quality control and traceability system to promote the development of high-quality agricultural product brands. MAP strives to lead China's agricultural modernization and digital innovation by investing in and developing the MAP+ ecosystem to achieve "high-quality for consumers, good prices for growers, and big data for the industrial chain", generating higher incomes for farmers, greater productivity for the agricultural sector, and more benefits for Chinese consumers.



MAP Story of the Year

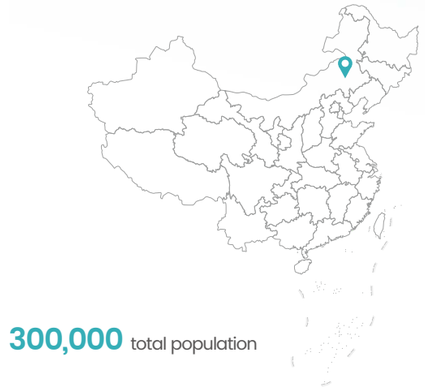
MAP Supports Poverty Alleviation

Ar Horqin Banner, situationed in Chifeng, Inner Mongolia, has an economy dominated by the animal husbandry industry. Based on local conditions, MAP innovatively implemented the "One Core, One Belt & Multiple Points" poverty alleviation model initiated by Sinochem Holdings with intensified support, and achieved a series of fruitful results.

△ A MAP agronomist provides field technical services.

△ The Sinochem Holdings MAP Poverty Alleviation Team was awarded the title of "National Outstanding Organization for Poverty Alleviation" by the central government of China.

△ MAP Technical Service Center was on display at the Chinese Communist Party History Exhibition Hall.

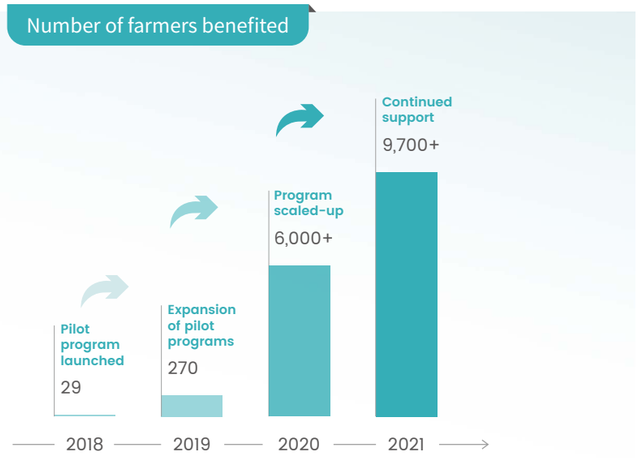


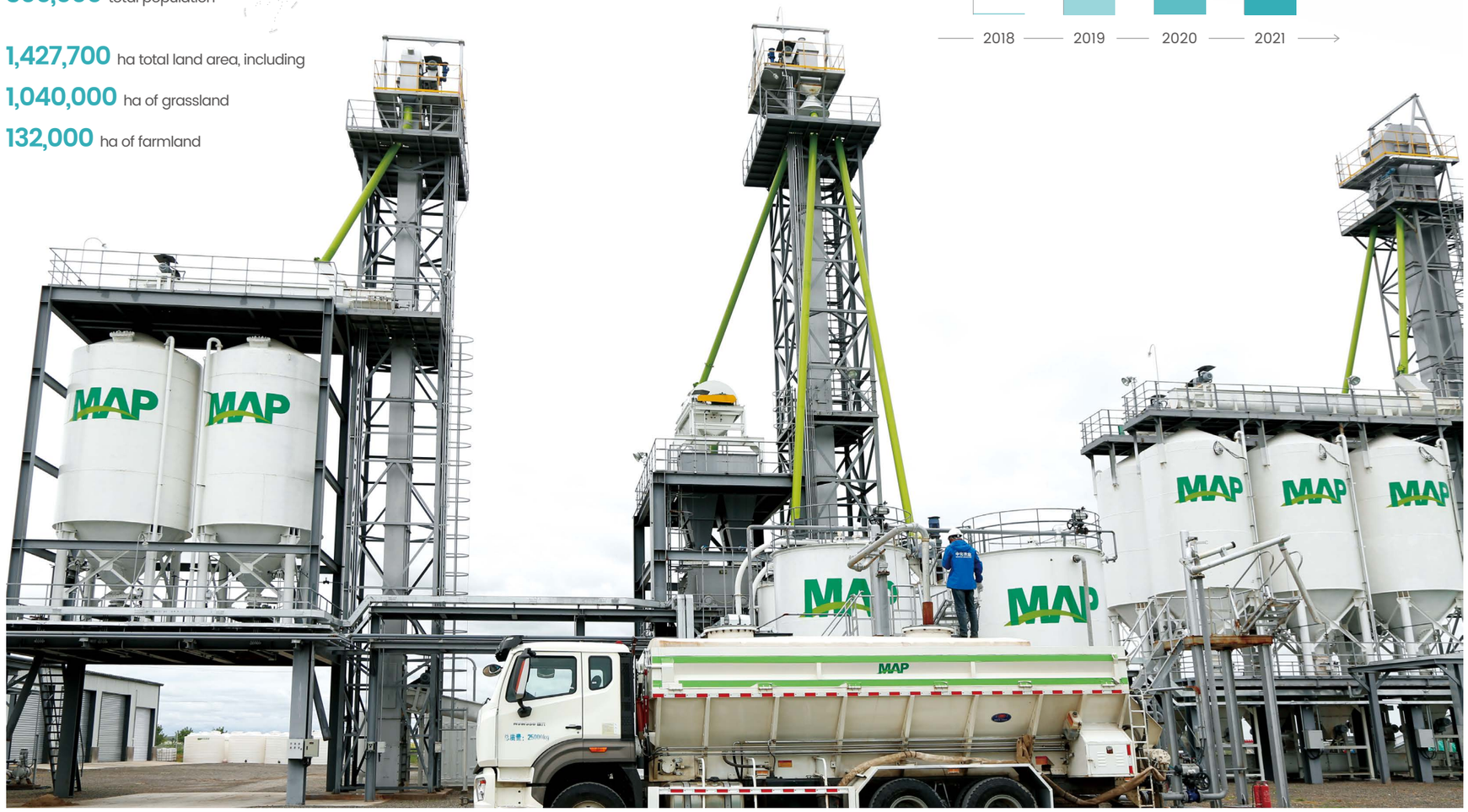
300,000 total population

1,427,700 ha total land area, including

1,040,000 ha of grassland

132,000 ha of farmland





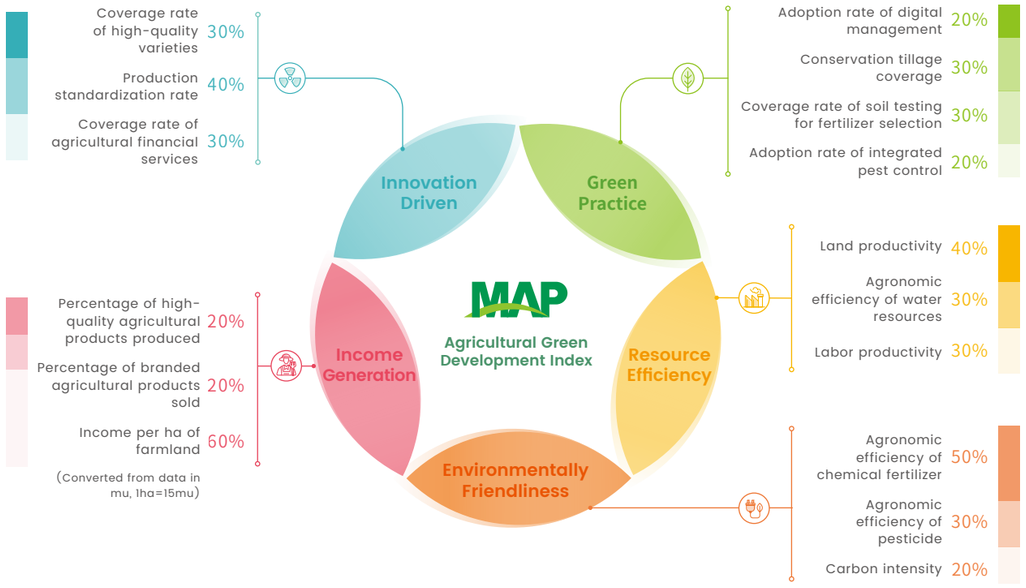
△ Ar Horqin Banner MAP Technical Service Center

MAP Green Development

MAP Agricultural Green Development Index

Agricultural green development refers to a modernized agricultural development model that enables high output, product safety, resource efficiency, and environmental friendliness.

MAP strives to support agricultural green development by promoting various sustainable agricultural practices and cultivate farmers to establish a sustainable way of thinking, so as to create an agricultural environment that is conducive to the long-term development of society.



This year, based on the core concepts of green development, and in accordance with the principles of materiality, systematic, independence and applicability, we worked together with the expert team and developed the 2021 MAP Agricultural Green Development Index through reaching a balance between achieving sustainable development and ensuring agricultural supply with multiple rounds of consultation and discussions. The Index has 5 primary indicators and 16 secondary indicators, categorized into two groups, "behavioral indicators" and "performance indicators". We optimized the quantitative evaluation method of the primary indicators to ensure better representation of the level of green development of farmers. The value of the Agricultural Green Development Index, with a total score of 100 points, is calculated from indicators based on regions, crops, and farmers/farms.

The behavioral indicators provide farmers with specific farming practice guidance, and the performance indicators quantitatively measure the actual results of these practices. The intrinsic relationship between "behavior" and "performance" allows the 2021 MAP Agricultural Green Development Index to cover more dimensions and produce visualized results, revealing how modern agricultural services can contribute to and inspire sustainable agricultural development by promoting sustainable agricultural practices in real production scenarios.

Behavior-Performance Correlations of Sustainable Agricultural Practices

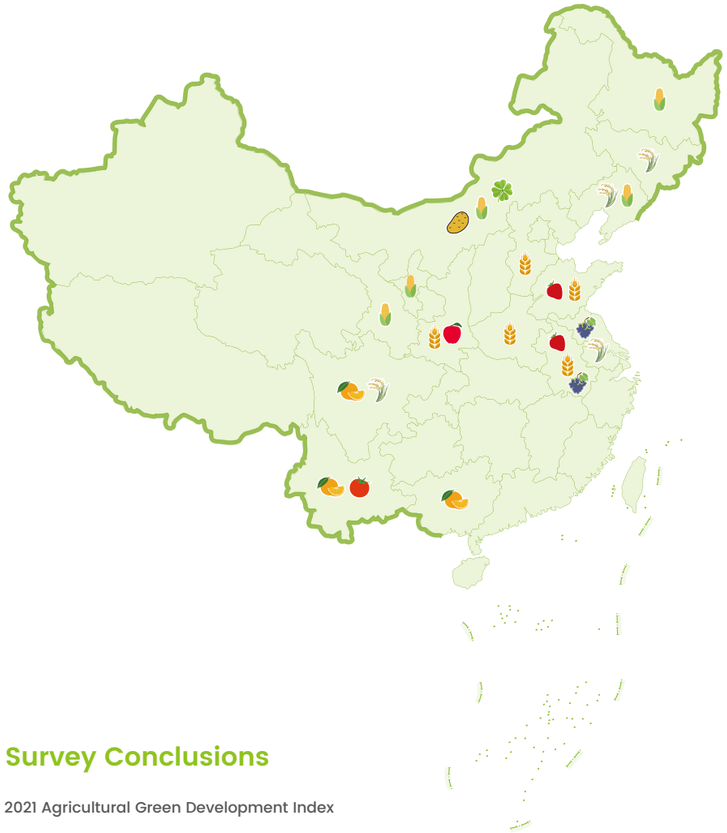
The Agricultural Green Development Survey

In 2021, MAP invited the research team of China Agricultural Green Development Research Center to conducted field surveys on the agricultural production conditions of ten crops, including three grain crops and the most common cash crops in China, namely rice, corn, wheat, apple, citrus, grape, strawberry, cherry tomato, potato and alfalfa. The survey covered both farmers who had used MAP services (MAP farmers) and those had not (non-MAP farmers).

15 provinces covered

15,720 ha of farmland surveyed, including **9,076** ha of MAP farms and **6,644** ha of non-MAP farms

818 valid questionnaires received, including **422** questionnaires from MAP farmers and **396** questionnaires from non-MAP farmers



43.13

Agricultural Green Development Index score of MAP farmers

53.43%

higher than that of non-MAP farmers

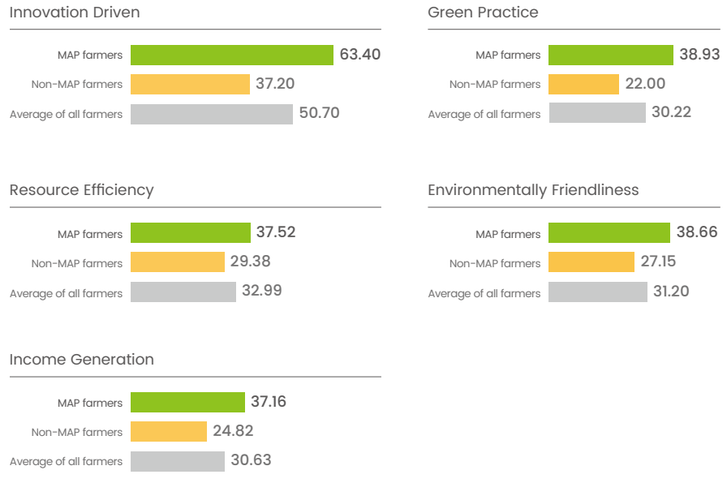
Survey Conclusions

2021 Agricultural Green Development Index

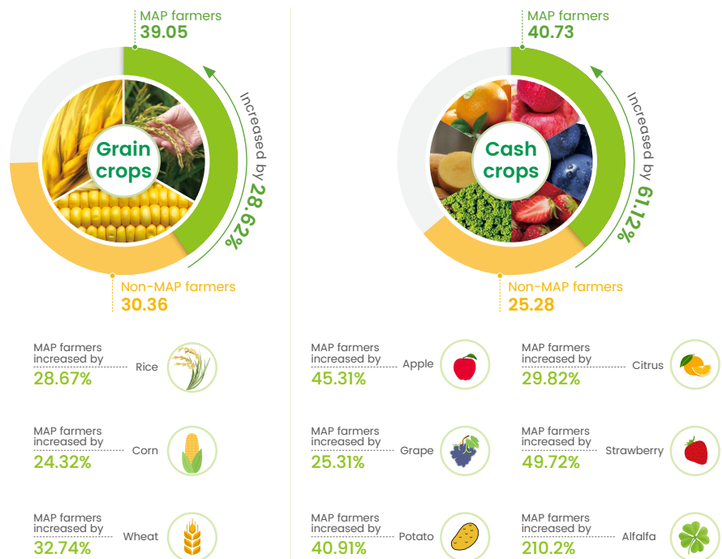
Based on the analysis of 5 primary indicators calculated from nation-wide survey data, the average Agricultural Green Development Index score of MAP farmers in 2021 is 43.13, which is 53.43% higher than that of non-MAP farmers and 22.70% higher than the average of all farmers surveyed.

Result Analysis

2021 Agricultural Green Development Index Primary Indicators



2021 Agricultural Green Development Index by Crop

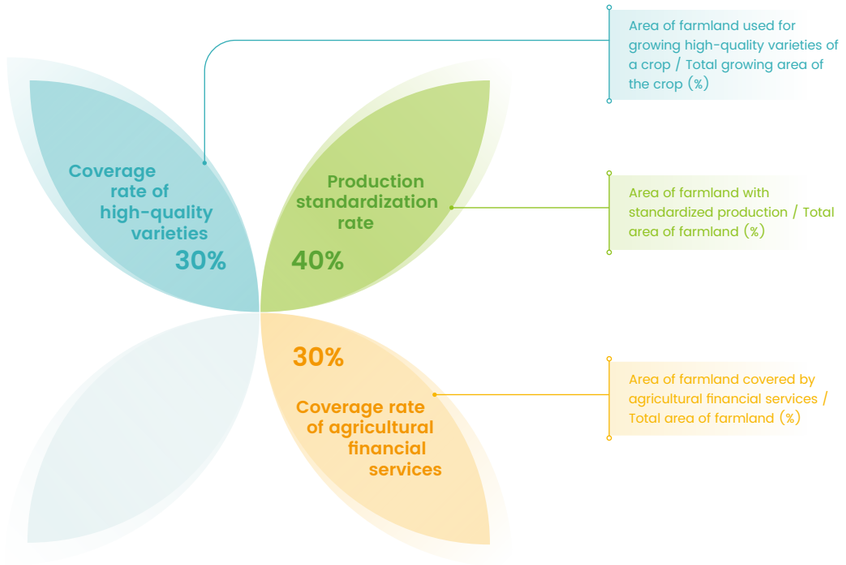


Driving Development with Technological Innovation

The Ministry of Science and Technology issued the *Special Plan for Innovation-Driven Rural Revitalization and Development (2018-2022)*, which specifies that the overall goal of implementing the rural revitalization strategy is to realize agricultural and rural modernization. The key to agricultural and rural modernization lies in technological progress, while innovation provides the strategic support for rural revitalization.

Currently, agricultural development in China is faced with a number of severe challenges such as the shortage of high-quality resources, rising costs, and lack of fine management. MAP contributes to the transformation of traditional agriculture by building both a complete industrial chain and a complete value chain with high-quality seeds and whole-process standardization.

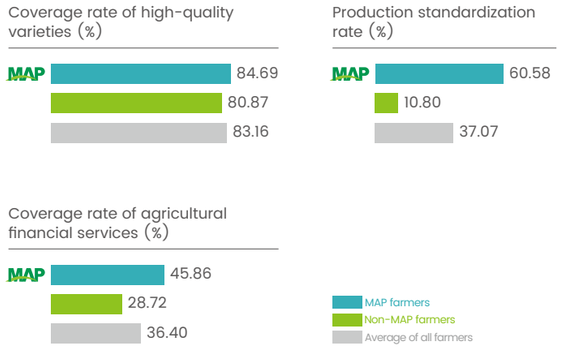
Indicators



Indicator Definitions

Coverage rate of high-quality varieties	High-quality varieties refer to crop varieties that with valid national or provincial level approval for growing in suitable ecological areas.
Production standardization rate	Standardized production refers to standardized activities of the entire agricultural industrial chain. Standards for key industrial chain links are formulated, revised and implemented to ensure necessary and reasonable level of standardization.
Coverage rate of agricultural financial services	Agricultural financial services refer to financial services that financing and supporting agricultural economic and production activities. The 2021 survey only covers agricultural loans.

Survey Findings



Indicator Interpretations

Production standardization rate

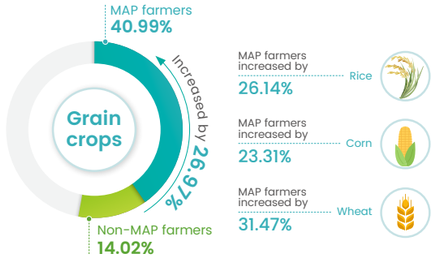
This is a new indicator added to the 2021 MAP Agricultural Green Development Index.

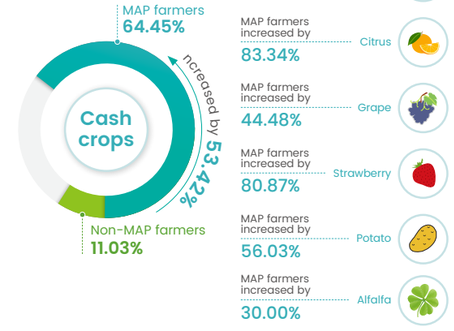
> ***We need to promote the cultivation of good varieties, quality improvement, brand building and standardized production.***
>
> —Xi Jinping, remarks at the Central Rural Working Conference in December 2020

The roadmap for achieving standardized production: To establish a standard system for the entire industrial chain of modern agriculture, following the principles of "using existing standards when available, establishing new standards when there are no existing standards, and covering the full-process with standards", and support farmers' cooperatives, leading enterprises and other new agricultural business entities to adopt these standards.

—The Implementation Plan for the Cultivation of Superior Varieties, Quality Improvement, Brand Building and Standardized Production (VQB-S)

Production Standardization Rate in 2021 (%)





A Bumper Harvest Starts with MAP Services

In September 2021, MAP organized a harvest festival event in the National Modern Agricultural Industrial Park of Guanghan City, Sichuan Province. Over 500 large growers across the province participated in the event, twice the attendance it had planned.

MAP provides tailor-made high-yield and high-efficiency plans for large grain farmers, with implementation plans covering all aspects of the growth period, including soil preparation, sowing, fertilization, irrigation, pest control, harvesting, etc. The plans are optimized based on local geographic and climate conditions, the selection of varieties and other factors, to help the farmers achieve customized, precise and standardized agricultural production.

There were more than 30 different new varieties of rice growing in this 2.67-ha MAP farm where the event is hosted, providing an intuitive comparison of how different varieties of rice grew and responded to the rice smut infection. In combination with the quality requirements from large gain-buying customers, the experiment had tested the key characteristics for different rice varieties, such as adaptability, disease (reverse) resistance, yield, etc. in Guanghan area, providing a scientific basis to assist large rice customers and growers with their selection of varieties.

During the Harvest Festival Event, the drone strip sowing technology of rice also attracted the attention of many rice growers, which allows rice sowing at higher accuracy, from a specific patch of farm to a specific strip of farm, and to precisely control the sowing amount in accordance with farm conditions and the rice varieties selected, achieving both time saving and higher germination rate benefits compared with conventional spreading sowing method. In addition, this strip sowing drone can also be used to apply pesticides and fertilizers, saving production costs for growers with its multi-tasking capabilities.

> "MAP services liberated me from exhausting farm management. An agronomist came to my farm every week. With his support, I can tend my 27-ha farm by myself with no need for extra hand."
>
> —— Ding Jiagao, large-scale farmer, Guiyuan Village, Xinghua Township, Guanghan City

△ A MAP harvest celebration event was hosted in Xinmin City, Liaoning Province on September 29, 2021.

Ensuring Premium Quality with Standardized Production

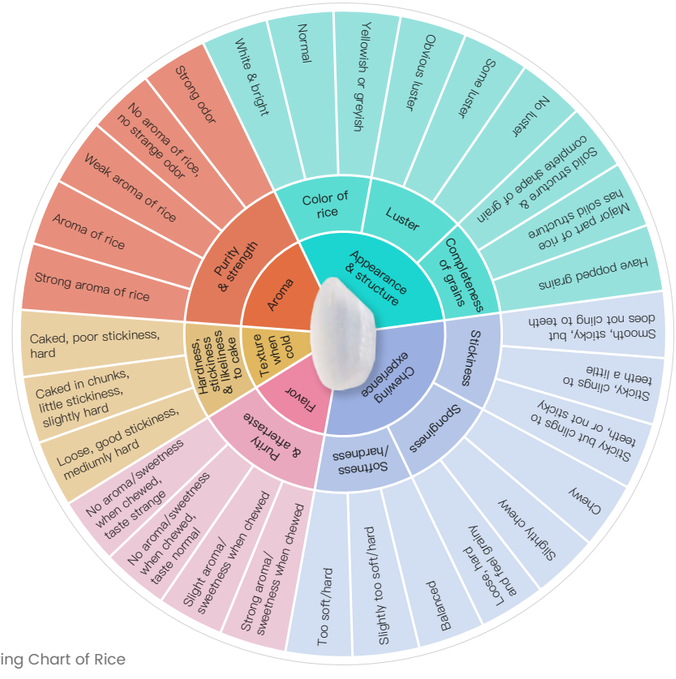
Zhijiang is located on the north bank of the middle reaches of the Yangtze River and on the west edge of the Jianghan Plain. It was famous for rice production since ancient times. The Zhijiang Agate Rice, named after the Manao (Agate) River running through Zhijiang, won the silver award at the Hubei Provincial Geographical Indication Conference in 2021.

MAP implemented large-scale contracting growing model in Zhijiang, which has helped increase the purchase price of rice by Rmb0.06-0.1 per kilogram. Furthermore, the centralized supply of seeds and integrated pest control practices promoted by MAP has helped significantly improve the quality of the rice crop, increasing the rice yield by 2-3 percentage points on average. As results, farmers were able to increase their income by increase of Rmb1,200-1,350 per ha of farmland.

Meanwhile, MAP implemented whole process quality control and simultaneously an established electronic database with "field-to-fork" whole process traceability and authenticity guarantee, covering all value chain segments including planting, procurement, storage, processing and sales, guaranteeing the premium "green, fresh, nutritious and healthy" quality of the Zhijiang Agate Rice.

Standardized Production of MAP

01 Centralized seed supply: Reduce seed supply from 70-80 local varieties to 4-6 varieties.
02 Well-timed sowing: Adjust the sowing date according to weather forecast and variety characteristics.
03 Scientific fertilization: Conduct soil testing to customize crop nutrition plan and fertilization selection.
04 Integrated pest control: MAP agronomists provide on-site guidance on crop protection plans.



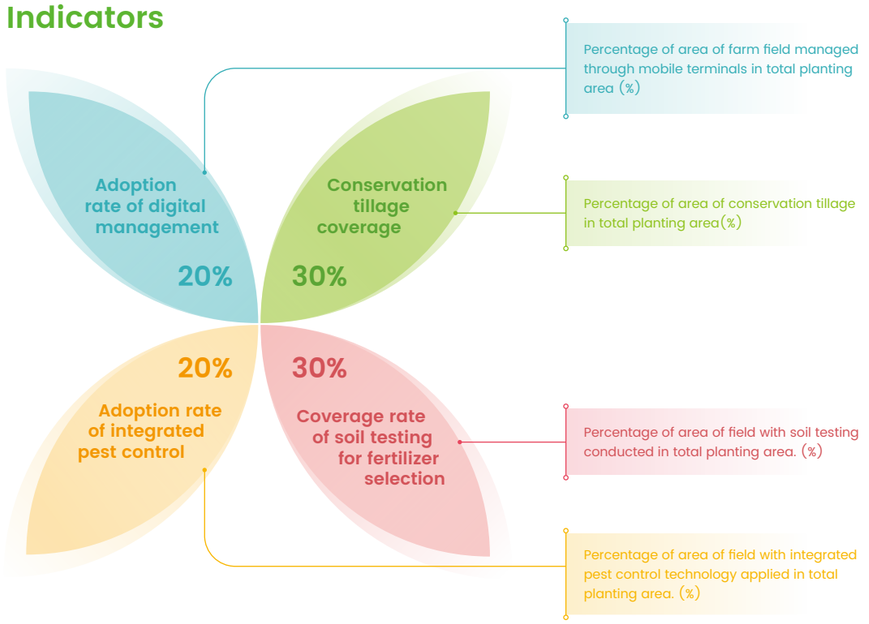
△ Flavoring Chart of Rice

Boosting Efficiency with Green Practices

Xi Jinping pointed out that the promotion of green agricultural development is a profound revolution in the concept of agricultural development, as well as the main direction of agricultural supply-side structural reform. Green agricultural practices contribute to the optimization of the supply-side factors of production (such as labor, land, etc.) to achieve optimal resource allocation, expand effective supply, improve the overall productivities of factors of production, and promote sustainable and healthy development of Chinese agriculture.

MAP improves the accuracy and precision of farm field management by introducing digital technology, enhances soil fertility by promoting measures such as conservation tillage and soil testing for fertilization selection, and actively adopts comprehensive pest control measures to reduce the environmental damage caused by chemical pesticide application, improve the ecological environment of farmland, and boost the production efficiency of various factors of agricultural production.

Indicators

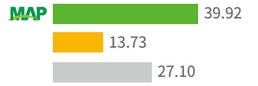


Indicator Definitions

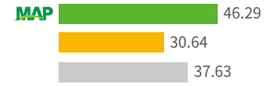
Adoption rate of digital management	Digital management refers to helping farmers improve productivity through GIS remote sensing, accurate weather forecasting, crop protection prediction based on planting model, and other capabilities.
Conservation tillage coverage	Conservation tillage techniques include less tillage, no tillage, straw mulching, green cover planting, crop rotation and other technologies.。
Coverage rate of soil testing for fertilizer selection	Soil testing for fertilizer selection refers to providing farmers with customized formula fertilizers and application plans based on the fertilizer requirements of different crops in combination with soil testing data.
Adoption rate of integrated pest control	Integrated pest control refers to controlling the loss of pests and diseases through technologies and methods such as ecological regulation, physical and chemical control, biological control, and low-toxicity and low-residue pesticides.

Survey Findings

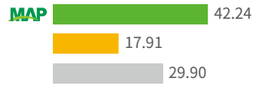
Adoption rate of digital management (%)



Conservation tillage coverage (%)



Coverage rate of soil testing for fertilizer selection (%)



Adoption rate of integrated pest control (%)

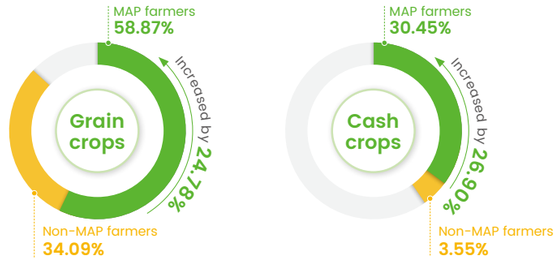
MAP farmers
Non-MAP farmers
Average of all farmers

Indicator Interpretations

Adoption rate of digital management

MAP provides farmers with a mobile application that integrates various practical agricultural functions, including GIS remote sensing to monitor crop growth, and weather forecast with plot-level accuracy. Farmers can enjoy the convenience of modern technology at their fingertips.

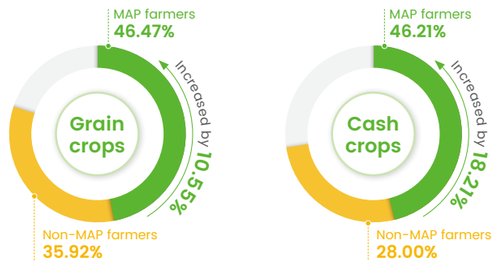
Adoption Rate of Digital Management in 2021(%)



Conservation tillage coverage

MAP actively promotes conservation tillage technology and provides farmers with customized agricultural machinery and supporting technologies, and minimize soil erosion and disturbance and improving soil fertility through measures such as integrated digging-fertilization-sowing-covering operation, crop straw and stubble mulching, and green mulching planting, protecting the farm environment.

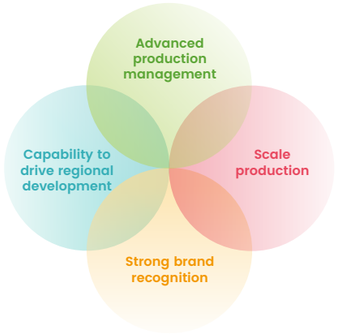
Conservation Tillage Coverage in 2021 (%)



Leading Green Development with VQB-S

This year, the VQB-S (the cultivation of superior varieties, quality improvement, brand building and standardized production) Xiaozhan Rice Base in Wangwenzhuang Township, Xiqing District, Tianjin Municipality, was selected into the first batch of National Planting Industry VQB-S Bases, and recommended by the Ministry of Agriculture and Rural Affairs as an Outstanding Case of National Agricultural Green Development.

△ Patterned rice fields in Wang Wenzhuang



Characteristics of the VQB-S Bases

Xiaozhan Rice is a valued rice variety that first grown in the Liao and Song Dynasties. It gained wide recognition in the late Qing Dynasty when it became a designated supply for the imperial court. In 2019, Xiaozhan Rice was added to the Agricultural Brand Directory of China.

Tianjin used to be the origin of Xiaozhan Rice. However, the coastal saline-alkali soil has an 8.5 plus pH value and a salinity of 3‰, making it very difficult to grow rice there. In 2021, after three years of exploration, the technical team of MAP Tianjin Farm successfully developed a green rice production technical solution and turned the local saline-alkali soil into productive rice farms.

△ The famous Xiaozhan Rice

Ensuring Soil Health with Intelligent Diagnosis

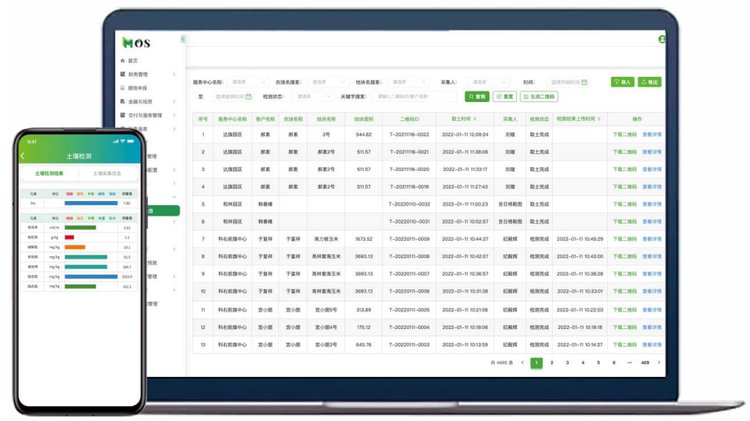
△ MAP automatic soil sampling vehicle

Soil testing service provides the foundation for MAP to provide farmers with customized full-process planting solutions. By building a digital soil platform, MAP has realized the digitization and informatization of the whole process from field soil sampling to developing solutions online.

With the automatic soil sampling vehicle, MAP can implement rapid soil sampling with both efficiency and accuracy. Meanwhile, MAP creates a customized QR code for each soil sample, which can be used to access relevant data such as sampling location, farmer profiles, and testing results, etc. These data are uploaded to the digital soil platform database at the same time they are generated, while agronomists and farmers receiving a message on client terminals reminding them to check testing results online. Historical soil nutrient information can be retrieved from a plot-based soil testing database.

The MAP Soil Big Data Platform contains both a nationwide soil type database and a soil nutrient database with a 30x30m accuracy, providing soil data support for the development of MAP regional fertilization recommendations and precision planting plans.

At present, the MAP Soil Big Data Platform has covered soil data of 2,552 counties around China, forming a nationwide spatial distribution data map of 200+ sub-categories of soil types that covers 100% of soil types in China.



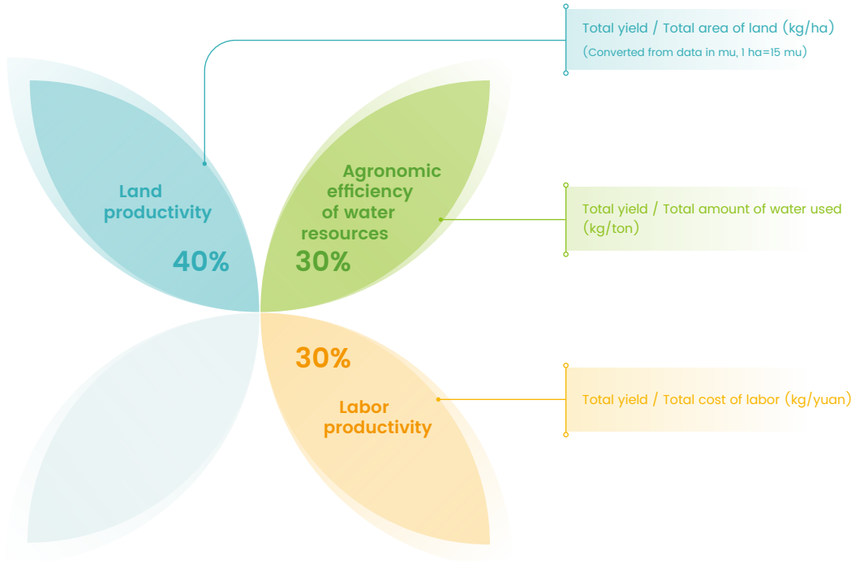
MAP Soil Big Data Platform ▷

Transforming Towards Resource Efficient Agriculture

Natural resources such as water and land provide the material basis and important guarantee for sustainable economic and social development. China has specified resource conservation as a fundamental national policy.

MAP attaches great importance to the efficient use of agricultural resources, striving to help farmers improve the utilization efficiency of key factors of production such as land, water and labor through various innovations and green practices.

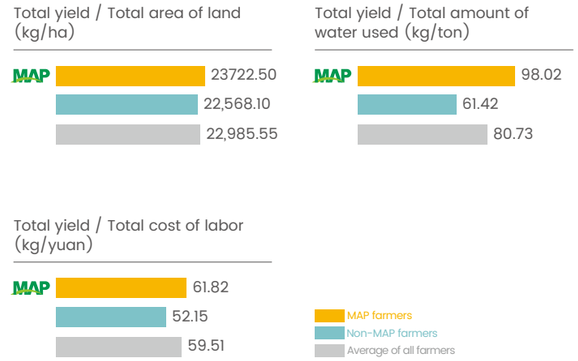
Indicators



Indicator Definitions

Land productivity	The yield of a crop during a single production cycle per unit of farm field.
Agronomic efficiency of water resources	The ratio between the total yield of a crop to the total amount of irrigation water used during a single production cycle. It is related to factors such as the natural conditions of the irrigation area, water management conditions, and irrigation technology used.
Labor productivity	The ratio of crop yield to its corresponding labor cost in a single production cycle of the crop. In the 2021 survey, labor cost consists of the direct cost of hiring labors and leasing agricultural machinery, and the payment to agricultural machinery operators.

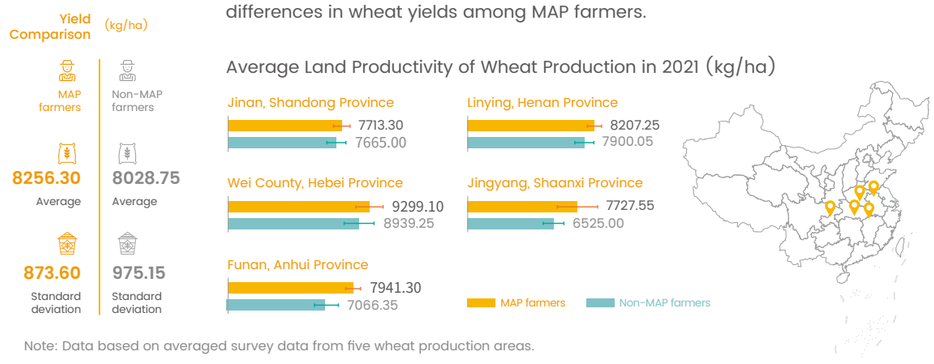
Survey Findings



Indicator Interpretations

Land productivity

MAP provides farmers with full-process technical service solutions to help ensure a stable and high-yield supply of grains with steady growth, providing an important guarantee for ensuring food security of China. Taking wheat as an example, survey data from the five wheat production areas all demonstrate that the wheat yields of MAP farmers are significantly higher than that of non-MAP farmers, and the output are more stable as demonstrated by the smaller differences in wheat yields among MAP farmers.

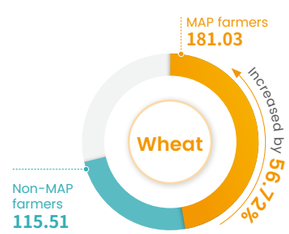


Note: Data based on averaged survey data from five wheat production areas.

Labor productivity

MAP strives to alleviate the labor shortage commonly found in in rural areas by promoting mechanization and large-scale production to improve labor productivity and reduce planting costs.

Average Labor Productivity of Wheat Production in 2021 (kg/yuan)



case

Drops of Sweetness: Water Saving Production of the Chu Orange

In recent years, the Chu Orange's growing popularity among consumers stimulated citrus production in Yunnan Province. Because of the high water consumption for growing citrus, some areas face water shortage, making it a priority to change the traditional irrigation method from sprinkler irrigation to more water-saving drip irrigation. Water efficient development became a "top priority" for the citrus industry.

△ Yunguan Orange, the Chu Orange product with the MAP beSide label.

△ A MAP agronomist examines the appearance of Chu Orange harvest.

Balancing the need to saving water and the need to ensuring enough water for the orchard takes expertise. When to water, when to stop watering, for how long, how many times a day, and to what amount? In 2021, MAP implemented a precision irrigation technology application and demonstration project with answers to all these questions in Chu Orange Ranch, Xinping County, Yunnan Province.

The principle of precision irrigation depends on weather conditions, soil conditions, and crop conditions. Accurate irrigation amounts and schedule are calculated based on weather conditions, water storage characteristics of soil, and the water needs of the crop during its growth cycle.

MAP monitors changes in weather conditions and soil moisture readings in real time through weather meters, moisture meters, tensiometers and other IoT connected devices, then formulates irrigation plans based on irrigation algorithms based on real-time data.

Precision irrigation also needs the understanding of the water retention characteristics of soil based on soil texture, as well as the distribution of the effective root system of the crop. MAP obtains these parameters by digging profile, measuring root system, and measuring the distance and depth of water diffusion, etc., making decisions by "asking" the root and the soil.

Since its launched in early 2021, the precision irrigation project has already realized the water saving result of 3.4 cubic meters per plant and 4440 cubic meters per ha of land compared with the original sprinkler irrigation belt used. In addition to water savings, there are also efficiency gains. It would only take 2-3 hours to water a 0.67-ha orchard with the new irrigation system, compared with 9 hours with the previous sprinkler irrigation system.

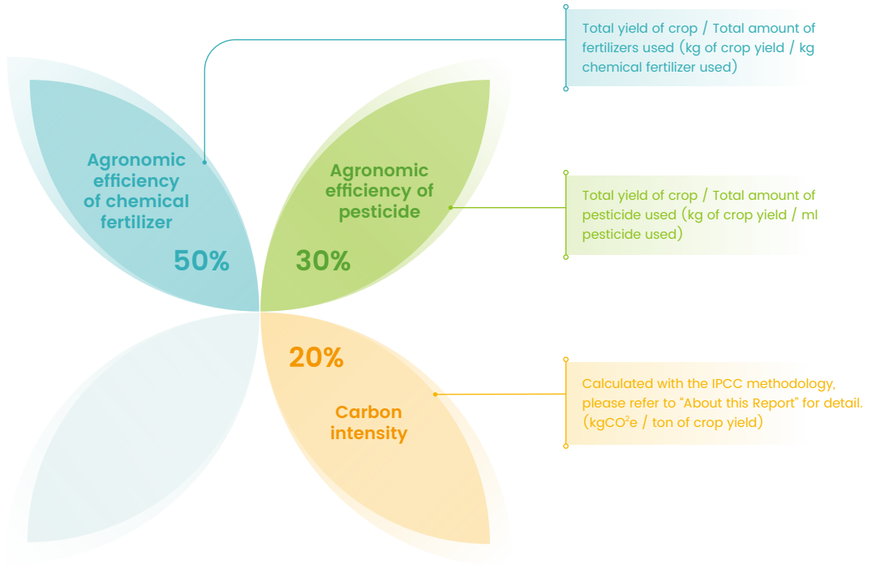
△ The MAP team and the Chu Orange team worked together in the demonstration orchard.

Developing Environmentally Friendly Agriculture

Environmentally friendly agriculture is a sustainable agricultural form in which agricultural production activities are coordinated with natural ecosystems. It focuses on ecological protection and give priority to production methods that are beneficial to the environment.

MAP strives to promote innovative and green agricultural technologies to help farmers reduce the use of pesticide and chemical fertilizers. We also attach great importance to responding to climate change, and are committed to contributing to reducing agricultural greenhouse gas emissions in China.

Indicators



Indicator Definitions

Agronomic efficiency of chemical fertilizer

The crop yield that can be produced per unit of fertilizer application, which varies with factors such as crop varieties, soil conditions, cultivation management, and fertilization techniques.

Agronomic efficiency of pesticide

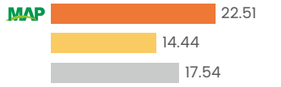
The crop yield that can be produced per unit of pesticide application, which varies with factors such as the application time and the application tools used.

Carbon emission intensity

The direct or indirect greenhouse gas emissions caused by various agricultural activities during the entire production process of producing a unit of crop yield. Carbon emission sources covered in the 2021 survey include seeds, fertilizers, pesticides, agricultural film, and energy consumption of agricultural machinery and irrigation.

Survey Findings

Agronomic efficiency of chemical fertilizer (kg of crop yield / kg chemical fertilizer used)



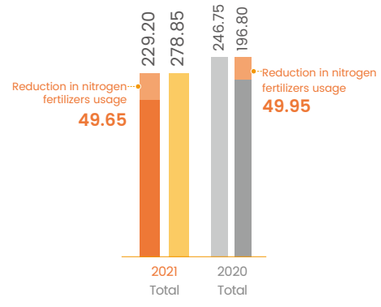
Agronomic efficiency of pesticide (kg of crop yield / ml pesticide used)

Carbon intensity (kgCO2e/ton of crop yield)

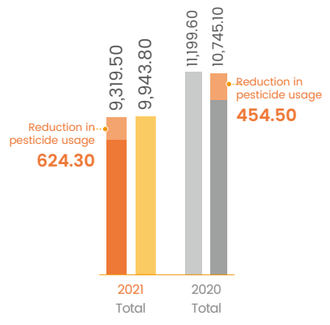
Indicator Interpretations

Pure Volume of Nitrogen Fertilizers Used and Pesticide Usage

Pure Volume of Nitrogen Fertilizers Used in 2020-2021 (kg nitrogen/ha)



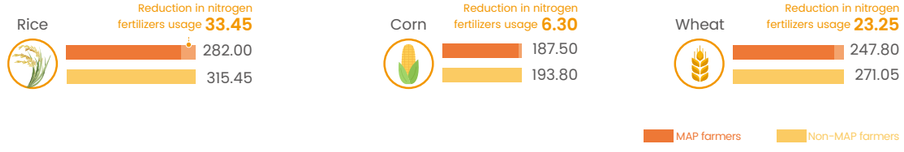
Pesticide Usage in 2020-2021(ml/ha)



Note: Average value of survey data from five area, including rice production in Songyuan County, Jilin Province; wheat production in Jingtai County, Gansu Province, and Jinan City, Shandong Province; grape production in Dawei County, Anhui Province; and, potato production in Zhenglan Banner, Inner Mongolia Autonomous Region.

The Pure Volume of Nitrogen Fertilizers Used for Grain Production

The Pure Volume of Nitrogen Fertilizers Used for Grain Production in 2021 (kg nitrogen/ha)



MAP beSide: Building A Brand with Full Traceability

MAP beSide is a new sustainable low-carbon brand established by MAP. Relying on its green growing solutions and modern management approaches, and in accordance with of strict quality and safety control, as well as green and clean production principles, MAP provides consumers with safe, high-quality and delicious agricultural products, as well as visualized traceability information covering the whole value chain, including growing, harvesting, warehousing, transportation, sales, etc., demonstrating MAP's dedication to low-carbon agricultural production with its whole-process quality control and traceability services and quality standard assurance.

MAP beSide ensures whole-process quality control and traceability of agricultural products, and the balance between high quality and reasonable price with a mechanism of "Three Stamps and One Index", which includes a Quality Stamp, a Geographic Stamp, a Time Stamp and a Green Index.

Quality Stamp

熊猫指南 PANDA GUIDE

Based on data from the Panda Guide: List of High-quality Agro-products of China.

⩾ 75 points: Recommended
⩾ 85 points: Strongly Recommended
⩾ 90 points: Must Eat

Geographic Stamp

Location data

Real-time temperature data

Humidity data

Real-time precipitation data

Time Stamp

MAP agronomists formulate the whole-process planting plan with fertilization and pest control solutions that accurately configured and calculated based on comprehensive considerations of factors such as the nutritional needs of crop, soil fertility and soil residual nutrients, ensuring that pesticide residues lower than the amount required by national standards.

Green Index

Provides a comprehensive evaluation of the "Greenness" of the production process of the agricultural product.

To date, MAP beSide is working together with dozens of large- and medium-sized agricultural product distributors, such as Dole, Yihai Kerry, COFCO, Freshippo and JD, on a number of high-quality agricultural products. In the future, we strive to bring consumers more high-quality agricultural products with the MAP beSide QR code for whole-process quality control and traceability.

MAP beSide aims to provide customers with better quality grains and traceability service, and at the same time, to support the capacity building at the grow, production and sale stages of the crop.

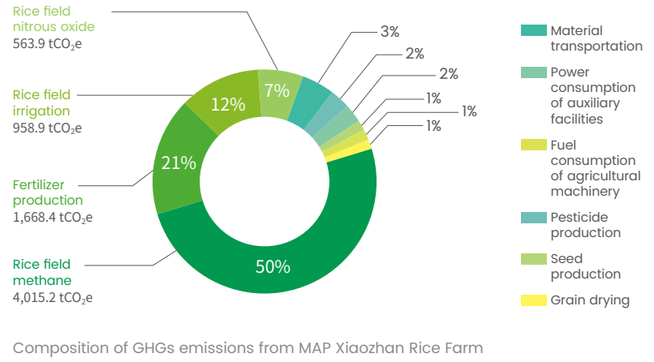
—Ying Minjie, Vice President of Syngenta Group China, President of MAP and Digital Agriculture

△ Agricultural products with the MAP beSide whole-process quality control and traceability label.

MAP Low-carbon Rice Fields with Reduced Methane Emission

In the second half of 2021, MAP conducted a greenhouse gas (GHGs) emissions assessment of the MAP beSide farms and their products. In accordance with the "2019 IPCC Inventory Guidelines" and following the Life Cycle Assessment methodology, we assessed the GHGs emission sources in the rice production process of the Tianjin Xiaozhan Rice Farm (coastal saline-alkali soil), and calculated the relevant carbon emissions data accordingly, with a data boundary starting from the extraction of agricultural raw materials and before the sale of the agricultural products produced.

△ MAP Tianjin Xiaozhan Rice Products



Composition of GHGs emissions from MAP Xiaozhan Rice Farm

It is the first time that MAP conducted carbon footprint assessment on the production of a specialty agricultural products. We clarified the boundary and methodology for calculating carbon emissions, identified the key sources of carbon emissions in rice production, and reached the current carbon emission data of rice production.

By comparing the carbon footprint of rice production in Xiaozhan Rice Farm with the data from surrounding farms by emission source, MAP Farm produce **2.0%** lower methane emissions and **4.4%** lower nitrous oxide emissions than local farms in Tianjin (Xu Yang et al., 2019).

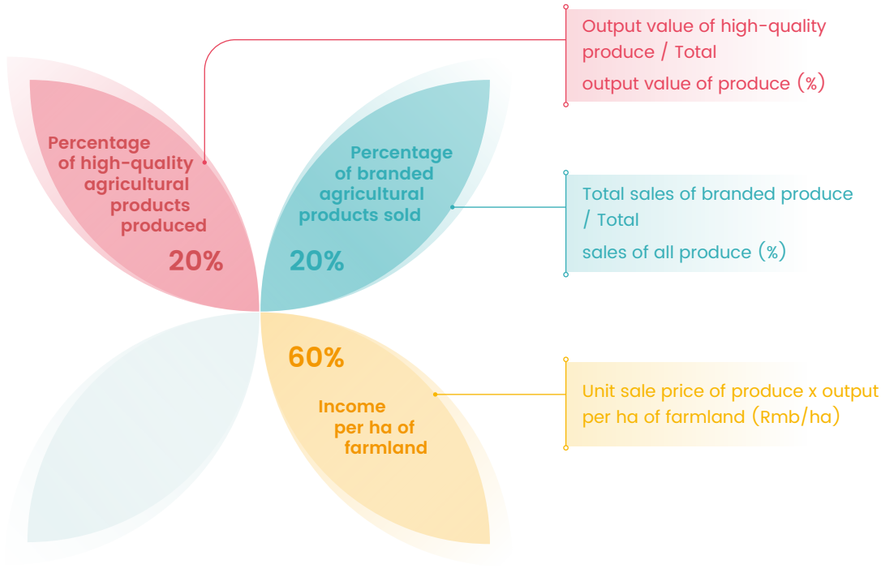
Historical data show that the GHGs emissions of a single crop of rice in the North China Plain are approximately 11,806.95 kgCO2e/ha (Zhang et al. 2017). The GHGs emission of Tianjin Xiaozhan Rice is 7,060.35 kgCO2e/ha, which is equivalent of a **40.20%** reduction from the regional average.

Ensuing Both Good Harvest and Good Income

MAP strives to promote the transformation of traditional agriculture from "production-oriented" to "consumption-oriented", improve the overall layout and quality of the agricultural development, and help farmers generate higher income and achieve more sustainable development.

Guided by consumers' demand, MAP focuses on value creation and the promotion of high-quality agricultural products, and helps farmers "grow good products and get good prices".

Indicators



Indicator Definitions

Percentage of high-quality agricultural products produced

The ratio of the output value of high-quality agricultural products to the total output value of all agricultural products. The term "high-quality produce" used in the 2021 survey refers to national standard grade 2 or above produce, or produce of contract farming.

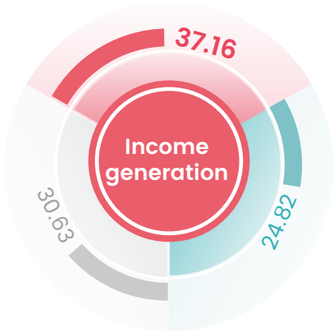
Percentage of branded agricultural products sold

The ratio of the sales volume of branded agricultural products to the total sales volume of agricultural products. The term branded agricultural products include pollution-free agricultural products, green food, organic food, and agro-products with geographical indications.

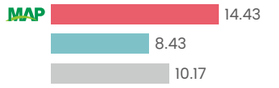
Income per ha of farmland

The total income per ha generated by farmers through the sale of crops, which measures the benefits that farmers get from growing crops.

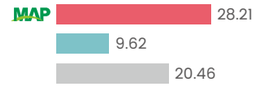
Key Findings



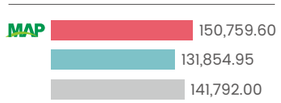
Percentage of high-quality agricultural products produced(%)



Percentage of branded agricultural products sold (%)



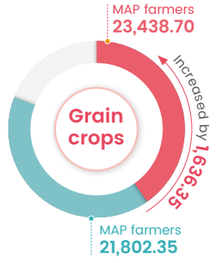
Income per ha of farmland (Rmb/ ha)

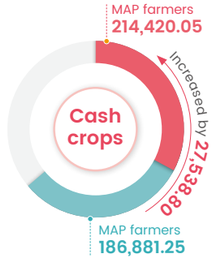


Indicator Interpretations

Income per ha of farmland

Income per ha of Farmland in 2021 (Rmb/ha)





Among the grain crops,

Rice	Increased by 1,778.55
Wheat	Increased by 1,528.20
Corn	Increased by 1,602.45

Percentage of high-quality agricultural products and percentage of branded agricultural products sold

To accelerate quality improvement by building a core quality indicator system of agricultural products, identifying core product quality indicators for different industries and varieties, establishing quality evaluation methodologies and standards, and promoting the grading and packaging labeling of agricultural products.

To accelerate the development of agricultural brands by cultivating well-known brands, establishing agricultural brand standards, encouraging local governments and industry associations to develop a number of regional public brands with distinctive regional and product characteristics.

—The Implementation Plan for the Cultivation of Superior Varieties, Quality Improvement, Brand Building and Standardized Production (VQB-S)

High-moisture Corn Making a Better Feed Choice

Studies have shown that compared with dry corn, corn after reasonable wet storage have better performance in dry matter, organic matter, and the digestibility of energy. It also stays longer in the rumen, and gets digested more sufficiently, allowing cattle to have better growth of fat.

Corn is an important feed crop, and is usually harvested in October. In October 2021, many areas in China experienced rainy weather conditions. When corn is harvested with too much moisture and does not get aired and dried in time, mildew will occur during storage, which will not only consume nutrients, but also pollute the feed and cause serious health hazard to livestock and poultry.

High-moisture Corn (HMC) provides an effective solutions to this problem. HMC is an energy rich feed, which is corn harvested with 25-38% moisture, then rolled or crushed and wrapped up for wet storage and fermentation. Compared with dry corn, HMC not only saves on drying and storage costs, but also allows farmers to have greater yield potential by selecting longer-season corn varieties due to its earlier harvest, usually by2-3 weeks, compared with dry corn.

Leveraging its whole industrial chain resources, MAP has established a comprehensive and efficient HMC production process with full control of the key processes, such as raw material quality, harvesting method, rolling and crushing, and oxygen-exclusion fermentation technology. In August 2020, MAP established its first HMC processing plant in Dongying City, Shandong Province. To date, there are already 6 MAP HMC processing plants in the province, which have provided a total of over 25,000 tons of high-quality HMC feed to farms across China. Their production needs approximately 40,000 tons of corn, and help more than 500 farmers to reduce losses and increase income.

△ HMC feed products

case

Award-winning Tomatoes: Full of Flavor

In August 2021, MAP organized a tasting event for two of its specialty tomato products, the Yangmu Cocktail Tomato and the Sweet Dimple Cherry Tomato, in Shanghai, presenting the guests with new perceptions of the distinctive flavors of cherry tomatoes.

△ YOOM tomatoes

△ Nebula tomatoes

MAP cooperated with the Seed Business Unit of Syngenta Group to implement the "licensed growing" business model for two cherry tomato varieties, the YOOM variety, named as Yangmu Cocktail Tomato, and the Nebula variety, named as Sweet Dimple Cherry Tomato, respectively in Chinese.

The YOOM tomato has won the Gold Award for Innovation at the Berlin Fruit Logistica and the Belgian Delicious Award. It is rich in anthocyanins, vitamin C and amino acids. Its purple fruit with a star-shaped mark at item appeals not only to people's taste buds, but also to the eyes. The Nebula tomato, as their new Chinese name suggests, has a unique sweetness that explodes in taster's mouth with sweet and refreshing juice that satisfy the taste buds at once.

Both varieties are produced under the field and online full-process management, from pre-production, production and post-production stages, and with whole-process quality control and traceability data fully managed online.

△ YOOM tomatoes & Nebula tomatoes

Afterword

Industry Recognition

MAP Sinochem Agriculture was included in the "APEC 2021 50 Industry Best Practices of China Digital Economy"

In December 2021, APEC China Business Council released the "APEC 2021 50 Industry Best Practices of China Digital Economy", and compiled the annal report Industry Best Practices of China Digital Economy 2021, to showcase the unique advantages of China's digital economy. The report highlights the economic contribution, technological innovation, social responsibility and corporate influence of MAP Sinochem Agriculture in the fields of industrial digitalization and rural revitalization, and also presents a thorough illustration of how MAP Sinochem Agriculture creatively uses digital technology to solve problems in agricultural production practice, and contribute to China's rural revitalization and sustainable agricultural development.

About this Report

Reporting Period

The survey data in the report are from July to September 2021, mainly covering the full growth period of crops in 2020. All other data cited are as of the end of December 31, 2021 unless otherwise noted.

Source of Data

During the research, the following areas have been surveyed:

Corn: Shapotou, Ningxia; Jingtai, Gansu; Horqin, Inner Mongolia; Tieling in Liaoning, Harbin Shuangcheng in Heilongjiang;

Wheat: Shanghe, Shandong; Linying, Henan; Wei County, Hebei; Funan, Anhui; Jingyang, Shaanxi;

Rice: Dawa, Liaoning; Xinmin, Liaoning; Qianguo, Jilin; Sheyang, Jiangsu; Chongzhou, Sichuan;

Grapes: Jieshou, Anhui; Xinyi, Jiangsu; Daxu, Anhui;

Apple: Luochuan, Shaanxi;

Citrus: Wuming, Guangxi; Zizhong, Sichuan; Xinping, Yunnan;

Strawberry: Changfeng, Anhui; Licheng, Shandong;

Cherry Tomato: Yuanmou, Yunnan;

Potato: Xinghe, Inner Mongolia; Zhenglan Banner, Inner Mongolia;

Alfalfa: Alu Horqin Banner, Inner Mongolia.

Number Valid Questionnaires

crops	Valid questionnaires	MAP Farmers	Non-MAP farmers
Corn	123	59	64
Wheat	122	74	48
Rice	119	70	49
Grape	88	36	52
Apple	114	75	39
Citrus	95	42	53
Strawberry	78	33	45
Cherry Tomato	17	6	11
Potato	49	21	28
Alfalfa	13	6	7
Total	**818**	**422**	**396**

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Methodology

Weight Determination

The weights of the MAP Agricultural Green Development Index are determined by expert scoring method following the Delphi methodology. Experts in the agricultural field are selected to determine the weights independently, and the weights for the indicator are calculated based on their input statistically.

Index Calculation

Please scan the QR code to see the calculation method of the MAP Agricultural Green Development Index.

Carbon Emission Calculation

Please scan the QR code to see the calculation method of the carbon emissions data.

Members of the Expert Team

Yin Changbin, Li Yu'e

Ren Jing, Wang Shu, Shi Boyang, Duan Wenjing, Hao Aibo, Long Zhaoyu, Yang Zihong

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