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Report Highlights:

On October 25, 2024 the Ministry of Agriculture and Rural Affairs (MARA) of the People's Republic of China (PRC) published a National Smart Agriculture Action Plan (2024-2028) (hereafter "Action Plan"). The Action Plan highlights the PRC's goal of creating new digital platforms to integrate big data, deploying new software and machinery to improve efficiency, and digitizing data collection throughout the supply chain. The PRC has invested heavily in new high-tech agricultural production technologies and this Action Plan signals a commitment to getting these technologies out of the laboratory and into the field. However, no new resources or funding for this initiative was announced.

Background

Due to its geography and large population, the PRC faces unique dynamics related to food production. PRC officials frequently cite that China has less than 10 percent of the world's arable land and even less usable water to support roughly 19 percent of the world's population. Despite being a world leader in production volume for many crops, the average farm size is about 0.65 hectares (1.6 acres). The level of intensification needed to sustain this production on a limited land base means that Chinese agricultural soils are under pressure, pest and disease outbreaks can have outsize impact, and climate and environmental changes are keenly felt. With an aging agricultural workforce, increased urbanization, and other social challenges, the pressures on the PRC's broader agricultural system are driving significant investment and innovation, increased mechanization, and the use of broader information technology and "smarter" systems. Frequently stated goals in PRC agricultural policy documents include references to increasing production and maximizing total productivity through the agricultural supply chain, though there are occasional references to the roles of agricultural trade as means of supporting food and feed demand.

Summary

The Action Plan is in line with the country's Number One Document, as described in a prior GAIN report [Top Ag Policy Document Outlines Food Security and Rural Development Priorities in 2024](link) where smart agriculture is one of the important components to achieve agricultural modernization, a medium-long term goal of PRC policy. Previous PRC planning documents related to smart agriculture including the 2022 [Guidelines for Digital Construction of Agricultural Modernization Demonstration Zones](link), the 2021 [Digital Rural Village Development Guideline 1.0](link) and the 2020 [Digital Agricultural and Rural Development Plan (2019-2025).](link)

A central goal of PRC agricultural policy is boosting the production of staple crops to improve self-sufficiency. The PRC faces a number of challenges to this goal such as an aging rural population, limited arable land and water resources, and increasing extreme weather conditions related to climate change, which it hopes to address through increased digitization and modernization. The PRC has created a number of demonstration farms highlighting the potential of new technologies and is seeking to find ways to deploy them on a wider scale. Of particular note are the PRC's progress in drone technology, indoor farming, and plant breeding. China is already a leader in digital payment systems. An important focus of the Action Plan is data centralization. Existing PRC data regulations make cross-border data exchange difficult and could limit the role of foreign companies in launching smart agriculture products and software in China.

A challenge for the PRC's modernization goals is that capital intensive technologies such as automated machinery tend to be more economically viable on larger plots of land than the small-holder farms which have traditionally been the mainstay of Chinese agriculture. Deploying more technology could

require either subsidies for small producers or the encouragement of land consolidation, which could result in higher rural unemployment. At the same time, while consolidation could displace older farmers, higher-paying, more technically demanding roles in advanced farming companies may be more attractive to younger rural residents and help reinvigorate rural areas which have seen generations of young people depart for urban centers.

The Action Plan is divided into three parts: 1.) Overall Requirements, 2.) Key Tasks, and 3.) Organizational Guarantee. In the second part, "Key Tasks", the Action Plan outlines a series of specific goals including creating new centralized platforms for agricultural big-data, including a "One-Map" for agricultural lands; boosting crop yields through improved plant breeding, automated machinery, and use of sensors; and further developing demonstration farms, particularly in Zhejiang Province. An unofficial translation can be found on the following pages.

National Smart Agriculture Action Plan (2024-2028)

In order to implement the decisions and arrangements of the Party Central Committee and the State Council on the development of smart agriculture, further promote the implementation of the "Guiding Opinions of the Ministry of Agriculture and Rural Affairs on Vigorously Developing Smart Agriculture", and accelerate the promotion and application of smart agricultural technology and equipment, this action plan is formulated.

I. Overall Requirements

Basic idea. Focus on the key areas and key links in the development of smart agriculture, aim at the difficult problems faced by agricultural and rural production management, organize and implement the three major actions of smart agriculture, and form a group of tangible and accessible solutions through policy pull, model drive, technology drive, and service push. The work results have accelerated the comprehensive development of smart agriculture and strongly supported agricultural modernization.

Work layout. In terms of public service capacity building, we will accelerate the creation of national agricultural and rural big data platforms, agricultural and rural land "one map" and basic model algorithms and other public service products; in terms of industrial layout, we will strive to promote the increase of large-area yields of major crops and cultivate a number of Smart farms, smart pastures, and smart fisheries will promote the digital transformation of the entire industry chain; in terms of demonstration and promotion, Zhejiang will be supported in pilot trials to explore and promote future application scenarios such as "Fuxi Farm".

Action goals. In accordance with the work arrangement of "laying the foundation in one year, achieving results in three years, and moving up to the next level in five years", we will advance in stages. In 2024, three major actions and eight key tasks will be launched: improving the public service capabilities of smart agriculture, expanding the application of key areas of smart agriculture, and driving smart agriculture demonstrations. By the end of 2026, the public service capabilities of smart agriculture will be initially formed, and a number of intelligent solutions for improving large-area yields of major crops and smart agricultural (pastoral and fishery) technology models will be explored, and the informatization rate of agricultural production will reach more than 30 percent. By the end of 2028, the public service capabilities of smart agriculture will be greatly improved, the role of information technology in helping grain and oil crops and important agricultural products to save costs and increase production and efficiency will be fully realized, the digital transformation of the entire agricultural industry chain in pilot areas will be basically realized, and the mechanism for promoting the construction of smart agriculture will be implemented across the region. The path is basically mature, and the informatization rate of agricultural production has reached over 32 percent.

II. Key tasks

1.   Implement actions to improve public service capabilities in smart agriculture

1)   Build a national agricultural and rural big data platform. Improve the architecture design of the national agricultural and rural big data platform, coordinate the planning of existing resources and incremental projects, accelerate the improvement of computing power, storage, security, network conditions and the construction of disaster recovery systems, and build a unified data resource pool and data collection, aggregation and management, Analyze decision-making and other systems to create an agricultural and rural data management service center. Formulate and improve agricultural and rural data classification and grading specifications, data resource catalogs and sharing systems, apply "all-agricultural codes" to uniformly code agricultural resources, subjects, and product data, and further promote the aggregation, management, sharing and exchange of data resources. Upgrade and optimize the "Farming Direct" mobile window to enrich and expand digital applications for agricultural services. Build an agricultural and rural big data collaborative innovation system, formulate standards and specifications that promote collaboration across data platforms, and promote software tools such as agricultural and rural big data platform bases. In 2025, relevant data management systems and standards will be basically established. By the end of 2028, a national agricultural and rural big data platform with complete functions, coordination from top to bottom, and pragmatism will be basically completed.

2)   Jointly build "one map" of agricultural and rural land. Coordinate and make good use of existing conditions such as agricultural and rural geographical information public service platforms, develop agricultural and rural digital base maps that meet the needs of agricultural and rural management applications, improve map production, release, service and other functions, and provide basic capacity support for agricultural and rural departments at all levels. Cooperation between the central and local governments and departments has promoted the uploading of various agriculture-related data into the database, and the construction of thematic layers such as cultivated land, permanent basic farmland, high-standard farmland, contracted land, homesteads, cultivated land for planting, and breeding pits and ponds, etc., for each piece of land. Create digital archives. Agricultural and rural departments at all levels and various entities are encouraged to rely on the "one map" of land use to develop various applications such as management and control of cultivated land for planting purposes, disaster prevention and reduction, production trusteeship, and precise operation of agricultural machinery.

3)   Develop a basic model of smart agriculture. Build an open platform for agricultural basic models and algorithms, establish an open source community for agricultural intelligent model algorithm software, and provide efficient and agile development tools and basic model libraries

for the development of various agricultural models. Develop and promote basic model algorithms with independent intellectual property rights such as crop growth, animal behavior and physical sign recognition, production management decisions, and multi-factor linkage control of facility environment, as well as general software tools or SaaS software services such as intelligent breeding, feed formulation, and farm management, to provide Various smart agricultural applications provide a technical base. Accelerate the application of large artificial intelligence models in key areas such as agricultural and rural scientific research, production and operations, and management services. By the end of 2026, the open platform and basic model library for basic agricultural models and algorithms will be basically completed. By the end of 2028, more than 20 basic model algorithms and general software tools or SaaS software services will be developed and promoted.

2. Implement application expansion actions in key areas of smart agriculture

4) Enable the large-area yield increase of major crops. Organize the National Smart Agriculture Innovation Center, advantaged scientific research units and leading technology enterprises to focus on key varieties in key regions across the country and integrate and promote a number of digital planting technology solutions to increase yields in large areas. Encourage local governments to promote the construction of digital farmland such as water and fertilizer integrated smart management and control facilities and information-based supervision equipment according to local conditions, explore and improve construction standards, and optimize the four-level cultivated land quality monitoring network at the national, provincial, municipal, and county levels. Accelerate the digital upgrade of agricultural machinery and equipment, guide the equipment terminals equipped with systems such as Beidou assisted driving, and improve the level of precision operations. Encourage qualified localities to promote the construction of monitoring and early warning networks for field meteorology, crop growth, soil moisture, pests and diseases, and form an integrated monitoring system covering the entire region. Encourage qualified localities to promote the construction of monitoring and early warning networks for field meteorology, crop growth, soil moisture, pests and diseases, and form an integrated monitoring system covering the entire region. Encourage qualified agricultural socialization service entities to expand smart agricultural services and provide various information services such as agricultural guidance, market information, disaster prevention and mitigation throughout the entire production cycle for small farmers and other operating entities. It strives to have the digital planting technology solutions for major grain and oil crops basically mature by the end of 2028.

5) Cultivate a number of smart farms (animal husbandry and fisheries). Guide various localities to integrate and apply appropriate information technology equipment according to the actual needs of breeding varieties and production conditions, and build diversified smart

farming (animal husbandry, fishery) farms according to local conditions. Smart farms focus on the application of environmental monitoring and control, precise management of water, fertilizers and chemicals, intelligent plant protection, unmanned inspection and transportation, intelligent agricultural machinery and other technical equipment. Smart ranches focus on the application of technical equipment such as individual physical signs monitoring and management, precise environmental regulation, automatic inspection and disinfecting, intelligent disease diagnosis, precise formula feeding, automatic collection and cleaning, and harmless treatment of waste. Smart fisheries focus on the application of technical equipment such as environmental and water quality monitoring, automatic oxygenation, intelligent inspection, intelligent feeding, individual behavior observation, intelligent diagnosis of fish diseases, and graded counting. Implement the farm (livestock, fishery) farm smart empowerment plan, bring together agricultural and rural departments at all levels, market entities and other resources to provide general software tools for smart agriculture to willing and qualified farmers' cooperatives, family farms, agricultural enterprises and other entities. , information technology training, agricultural technology online services, market information and other services.

6)   Promote the digital transformation of the entire agricultural industry chain. Encourage all localities to create a number of benchmarks for the digital transformation of industrial chains, give full play to the role of industry organizations, "chain owner" enterprises, leading enterprises, etc., drive the digital transformation of agricultural production and operation entities, and improve the efficiency of collaboration across the entire industry chain. Deeply implement the "Internet +" project of agricultural products from villages to cities, promote the intelligent upgrading and transformation of national agricultural product origin markets, strengthen the information construction of cold chain logistics for warehousing and preservation of agricultural products in origin, and create a market-oriented, data-driven, efficient and collaborative smart supply chain. Promote smooth connection between production and sales, high quality and good price. Build a number of big data analysis and application centers for the entire industry chain of important agricultural products, strengthen information monitoring of the entire industry chain of important agricultural products, and guide the orderly development of the industry. Promote smart supervision of agricultural product quality and safety, build a national comprehensive supervision platform, guide qualified production entities to establish information-based quality and safety management and control systems, promote the application of electronic commitment compliance certificates, and encourage qualified regions to carry out traceability brand guarantee pilots.

3.   Implementing smart agriculture demonstration and driving actions

7)   Promote smart agriculture as a pilot project. Support Zhejiang in building a leading area for smart agriculture, comprehensively apply policies and measures such as technological innovation, talent introduction, fiscal and taxation support, and financial services, explore the establishment of special funds for smart agriculture, and promote the formation of a mechanism path for ministries and provinces to jointly promote the construction of smart agriculture. Support the priority application of smart agricultural public service products in Zhejiang, promote the organic connection between "Zhejiang Agricultural Code" and "All Agricultural Code", and take the lead in realizing data interconnection and business collaboration between ministries and provinces. Continue to promote the iterative upgrade of Zhejiang's "rural brain", build an "agricultural industry brain" for planting, animal husbandry, and fishery, develop and promote a series of "Zhejiang farmers" applications, and build a number of smart farms (pastoral and fishery) with different technical models. By the end of 2028, Zhejiang's agricultural industry brain will be basically completed, cultivating more than 1,000 digital agricultural factories and 100 future farms, forming a number of standards and specifications, and developing and promoting a number of mature and applicable smart agricultural software and hardware products.

8)   Explore the future direction of smart agriculture. Support scientific research institutions to continue to promote iterative innovation of smart agriculture technology models, strengthen the research and development and system integration of cutting-edge smart agriculture technologies, and lead the future development direction of smart agriculture. Support the Chinese Academy of Sciences in continuing to explore and summarize the "Fuxi Farm" model. Continue to optimize models such as soil nutrient inversion, crop simulation prediction, and precise meteorological analysis, carry out grid and digital management of cultivated land, promote digital simulation and deduction of agricultural production processes, and form optimal planting plans. Continue to promote innovation in smart agricultural machinery, and achieve precise operations such as precise land preparation, precise sowing, variable pesticide application, variable fertilization, variable irrigation, harvest loss reduction, transportation loss reduction, storage loss reduction, and rational utilization of straw in large-scale application scenarios. Cultivate a group of leading scientific and technological enterprises in the field of smart agriculture, gather innovative resources, and accelerate the research and development, transformation and industrial application of smart agricultural technology.

III. Organizational guarantee

1) Strengthen organizational leadership. Establish a mechanism to promote smart agriculture work, set up special work teams, clarify the division of responsibilities, formulate an annual task list, and promote the implementation of various tasks in a solid and orderly manner. Provincial agricultural and rural departments must formulate specific measures, clarify main

responsibilities, strengthen policy support and work force guarantees, and ensure that mission goals are achieved as scheduled. Strengthen the monitoring and scheduling of action plans, track, schedule, analyze and summarize the implementation of key tasks and projects, and timely discover and solve problems during the implementation process. Improve the smart agriculture expert advisory committee, study smart agriculture development trends and major issues, and put forward policy recommendations.

2) Increase policy support. Make good use of existing projects and policies such as high-standard farmland construction, smart agriculture construction, facility agriculture construction, agricultural industry integrated development, agricultural machinery purchase and application subsidies, etc., to form a policy synergy to support the development of smart agriculture. Coordinate the use of central budget investment, major information platform upgrades, major science and technology projects and other funding channels to support the construction of smart agriculture capabilities and accelerate key technology research and development innovation. Strengthen publicity and training on smart agriculture public service applications. Encourage all localities to explore new policies such as special subsidies for smart agriculture, and improve diversified policy support systems such as technology, services, and finance.

3) Strengthen summary exchanges. Timely summarize work progress and results, promote typical experiences and models, and compile and distribute outstanding cases of smart agriculture. Establish a catalog and information release system for smart agriculture's main technologies, select and release new technologies and equipment for smart agriculture, and promote the effective connection between technology supply and demand. An on-site promotion meeting for smart agriculture construction was held to promote mutual learning among various places and improve the overall situation from point to point. Make good use of online and offline platforms such as the official website of the Ministry of Agriculture and Rural Affairs, new media, and the China International Agricultural Products Fair to fully demonstrate the results of the smart agriculture action plan. Strengthen international exchanges and cooperation in technology, talent, standards, experience, etc. in the field of smart agriculture.

END UNOFFICIAL TRANSLATION

[Original in Chinese](#)

Attachments:

No Attachments.