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China's digital village development: Progress from 2019 to 2025

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Summary & analysis

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Overview

In September 2026, the Cyberspace Administration of China (CAC) and the Ministry of Agriculture and Rural Affairs (MARA) released the China Digital Village Development Report (2019–2025). The report reviews China's digital rural development since the Chinese government issued the Digital Village Development Strategy Outline in May 2019, and it marks 2025 as the year in which the Outline's second-stage goals were met. According to the report, China made substantial progress in digitalizing its rural economy, agricultural production, public services, and governance between 2019 and 2025, laying the foundation for a more technology-driven model of agricultural and rural development. Over this period, digital village development has evolved into a central component of China's agricultural modernization, rural revitalization, and food security strategies.

The report highlights six major developments:

- **Rural connectivity:** Rural internet penetration increased from 38.4% at the end of 2018 to 69.5% in 2025. China achieved gigabit connectivity at county level, 5G coverage at township level and broadband coverage in all villages.
- **Smart agriculture:** By 2025, more than 3.5 million BeiDou agricultural machinery terminals and over 300,000 agricultural drones had been deployed. AI, robotics, precision farming and digital breeding applications also expanded.
- **Rural digital economy:** Rural online retail sales exceeded RMB 3 trillion in 2025. The report records approximately 20.07 million rural online businesses, alongside expanding logistics infrastructure.
- **Agricultural data and food security:** National agricultural databases, digital farmland monitoring, seed-information platforms and intelligent grain-storage systems strengthened agricultural management and support for food security.
- **Rural governance and public services:** Digital government services reached more than 99.4% of townships. Telemedicine, digital education, rural financial services and environmental monitoring also expanded.
- **Future development:** During the 15th Five-Year Plan (2026–2030), China aims to move beyond basic connectivity towards integrated, AI-enabled agricultural production, digital rural industries, intelligent governance and more inclusive public services.

The report identifies artificial intelligence as a transformative technology for future agricultural development.

Key indicators and achievements

Rural connectivity and digital infrastructure

Indicator	Reported achievement
Rural internet penetration	69.5% in 2025, versus 38.4% in late 2018
Urban–rural internet penetration gap	Narrowed from 36.2 to 15.6 percentage points
Telecommunications coverage	Gigabit networks in all counties; 5G in all townships; broadband in all villages
Rural road digital inspections	Nearly 4 million km, covering over 90% of eligible rural road surfaces
Smart irrigation demonstration projects	49 digitally enabled irrigation districts
Rural power supply reliability	Above 99.9%

Agricultural production, innovation and food security

Indicator	Achievement by 2025
BeiDou agricultural machinery terminals	More than 3.5 million
Agricultural drones in operation	More than 300,000
Annual drone operating area	More than 30.7 million hectares
Smart agriculture innovation centers and subcenters	34
Smart agriculture innovation application projects	116
Key technologies with reported R&D breakthroughs	104
Intelligent machinery and equipment breakthroughs	62
Crop germplasm resource records available online	588,000
Grain storage losses during the storage cycle	Below 1%
Farmland protection red line	120 million hectares

The rural digital economy, data platforms and public services

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Major policy and implementation milestones, 2019-2025

The report traces a shift from expanding rural connectivity and digital infrastructure towards wider use of digital technologies in agriculture, commerce and public administration.

2019: Launch of the national digital village strategy

The government issued the Digital Rural Development Strategy Outline in May, followed by the Digital Agriculture and Rural Development Plan (2019–2025) in December. Together, these documents established the policy framework and priorities for digital development in agriculture and rural areas.

2020: National pilots and digital poverty alleviation

The first national digital village pilot program was launched. By the end of the year, fiber-optic connectivity had reached more than 98% of formerly poor villages, linking digital infrastructure development with poverty alleviation.

2021: Standardization and integration with the 14th Five-Year Plan

The Digital Village Construction Guidelines 1.0 provided a common implementation framework. The 14th Five-Year Plan for National Economic and Social Development and the Long-Range Objectives Through 2035, alongside sectoral agricultural plans, further integrated digital development into modernization planning.

2022: Shift from strategy to implementation

The Digital Rural Development Action Plan (2022–2025) set out 26 tasks across eight areas. Guidance on the digital rural standards system established a framework for standardization.

2023: Expansion of agricultural data infrastructure

MARA officially launched the national agricultural coding platform (全农码), supporting the integration of data on agricultural land, family farms, rural collective economic organizations, and other agricultural assets.

2024: Acceleration of smart agriculture

The second round of national digital village pilots began. The government issued Digital Village Construction Guidelines 2.0, MARA's guiding opinions on developing smart agriculture, and the National Smart Agriculture Action Plan (2024–2028).

2025: Completion of the 14th Five-Year Plan period

A targeted initiative to strengthen agriculture, benefit rural areas and increase farmers' incomes through digitalization was launched in eight provincial-level regions. The first National Smart Agriculture Innovation Competition showcased technologies including precision-spraying robots, greenhouse transport robots and field-inspection drones.

Key technologies highlighted in the report

The report presents technological innovation as an increasingly important driver of agricultural productivity, food security, and rural modernization.

Technology	Applications and achievements described
Artificial intelligence and machine learning	AI-assisted breeding, intelligent soybean variety design, multimodal pest and disease recognition, livestock behavior analysis, and medical diagnosis
BeiDou satellite navigation	Agricultural machinery positioning, precision operations, autonomous equipment guidance, fleet monitoring, and maritime communications
Agricultural drones and robotics	Crop protection, field inspection, targeted herbicide application, greenhouse transportation, automated feeding, and feed-pushing robots
Satellite remote sensing and geographic information systems (GIS)	Integrated space-air-ground monitoring of crop growth, farmland protection, natural resources, and environmental conditions
Internet of Things (IoT) and smart sensors	Precision irrigation, soil and crop monitoring, intelligent livestock housing, aquaculture water-quality monitoring, and grain storage
Digital twins	Digital simulation and management of rural water supply systems, irrigation infrastructure, and related water resources
Agricultural big data and cloud platforms	Land management, agricultural insurance, seed databases, price monitoring, livestock quarantine, rural collective assets, and agricultural credit
5G and satellite communications	Remote medical services, rural connectivity, smart farming, disaster warnings, and fishing vessel communications
Digital traceability systems	Agricultural product safety, seed and pesticide monitoring, veterinary drug QR-code traceability, and food supply-chain management

Technological developments of particular significance

AI-assisted breeding and digital seed systems: The report highlights intelligent soybean breeding, national seed-sector big data platforms, and the digitization of 588,000 crop germplasm records. These developments support more data-driven plant breeding and improved access to genetic resources.

Autonomous agricultural machinery: BeiDou-enabled agricultural machinery, autonomous field operations, and increasingly sophisticated agricultural drones demonstrate China's progress toward automated farm management. The report also emphasizes shared machinery services, which can improve smallholders' access to advanced technology.

Livestock and aquaculture digitalization: Precision feeding, automated environmental control, animal behavior monitoring, intelligent aquaculture cages, water-quality sensors, and automated feeding systems are becoming increasingly important in intensive agricultural production.

Food security and precision monitoring: Satellite remote sensing, integrated monitoring networks, agricultural data platforms, and smart grain storage contribute to farmland protection, crop monitoring, weather-risk management, and loss reduction.

AI research and commercialization: The reported 104 key technology breakthroughs and 62 intelligent equipment breakthroughs illustrate the expanding innovation ecosystem.

Additional achievements in rural development and revitalization

The digital village program extends well beyond agricultural production.

Rural e-commerce and employment: Online retail has become an important channel for agricultural product sales and rural entrepreneurship. Livestreaming, short-video marketing, digital tourism, and platform-based retail have created new employment opportunities. The report records more than 15.1 million people returning to their hometowns to start businesses by 2025, although this is not exclusively attributable to digitalization.

Digital public services: All primary and secondary schools, including teaching sites, have internet access, and 99.5% have multimedia classrooms. Telemedicine networks now cover all cities and counties, while AI-assisted medical systems have provided more than 37 million diagnostic recommendations in grassroots healthcare settings.

Rural environmental protection: Satellite monitoring, aerial surveys, digital water-resource management, and agricultural traceability platforms support more effective environmental governance. By 2025, more than 98% of the 5,042 identified large rural black and odorous water bodies had been remediated, benefiting approximately 9.72 million people.

Digital rural governance: Digital platforms facilitate transparency in village affairs, agricultural land management, collective asset supervision, emergency management, and public administration. By 2025, digital emergency broadcasting infrastructure included 3.11 million loudspeaker terminals covering approximately 394,900 administrative villages.

Key policy documents referenced in the report

The report's appendix provides a detailed policy chronology covering 2019–2025. The following are the most consequential national-level documents for understanding the evolution of China's digital village strategy.

Year	Policy document (English / Chinese)	Strategic importance
2019	Digital Village Development Strategy Outline (数字乡村发展战略纲要)	Foundational policy establishing targets for 2020, 2025, and 2035 and 10 priority tasks
2019	Digital Agriculture and Rural Development Plan (2019–2025) (数字农业农村发展规划 (2019—2025 年))	Establishes agricultural data systems, production digitalization, digital governance, and technology innovation priorities
2021	Digital Village Construction Guidelines 1.0 (数字乡村建设指南 1.0)	Introduces a framework covering six areas of digital village development
2021	14th Five-Year Plan for Agricultural and Rural Modernization (“十四五”推进农业农村现代化规划)	Integrates smart agriculture and digital village development into agricultural modernization
2022	Digital Village Development Action Plan (2022–2025) (数字乡村发展行动计划 (2022—2025 年))	Establishes 26 implementation tasks in eight priority areas
2022	Digital Village Standards System Construction Guidelines (数字乡村标准体系建设指南)	Establishes a national framework for standardization

2024	Digital Village Construction Guidelines 2.0 (数字乡村建设指南 2.0)	Updates technical and implementation guidance based on earlier experience
2024	Guiding Opinions on Vigorous Development of Smart Agriculture (关于大力发展智慧农业的指导意见)	Establishes 2030 and 2035 development objectives and 13 tasks
2024	National Smart Agriculture Action Plan (2024–2028) (全国智慧农业行动计划 (2024—2028年))	Introduces three major actions and eight tasks focused on public services, applications, and demonstrations
2025	Rural Revitalization Plan (2024–2027) (乡村全面振兴规划 (2024—2027年))	Calls for digital village construction, smarter infrastructure, and digital rural public services
2025	Notice on Launching the Special Initiative to Strengthen Agriculture, Benefit Farmers, and Increase Farmers' Incomes through Digital Villages (关于开展数字乡村强农惠农富农专项行动的通知)	Launches six tasks in eight provinces and municipalities

The report also references the annual Central No. 1 Documents from 2019 through 2025, annual Digital Village Development Work Priorities, policies on rural e-commerce and logistics, digital financial inclusion, and the two national digital village pilot programs. The principal coordinating institutions are the CAC, MARA, the National Development and Reform Commission (NDRC), and the Ministry of Industry and Information Technology (MIIT), working with other relevant ministries.

Outlook for the 15th Five-Year Plan (2026-2030)

The report considers the 15th Five-Year Plan a critical period for advancing digital village development from infrastructure expansion toward deeper integration of digital technologies with agricultural production, rural economic development, and governance.

Its outlook can be grouped into six priorities.

Priority	Expected direction during 2026–2030
1. Smart agriculture and AI	Accelerate AI applications, agricultural robotics, autonomous machinery, smart breeding, and precision livestock and crop management
2. Agricultural data integration	Improve data sharing between agencies and strengthen agricultural data platforms, resource monitoring, and digital management systems
3. Rural industries and farmer incomes	Expand digitally enabled agricultural value chains, rural e-commerce, platform services, digital tourism, and entrepreneurship
4. Intelligent rural governance	Integrate village management, public administration, and emergency monitoring into more efficient digital governance systems
5. Inclusive digital public services	Continue improving rural education, healthcare, financial services, and digital literacy while narrowing the urban-rural digital divide
6. Green and sustainable rural development	Extend digital monitoring to water conservation, precision irrigation, ecological protection, food safety, and agricultural resource efficiency

The report also stresses several conditions for successful implementation. These include region-specific deployment rather than uniform technology solutions, stronger digital skills among rural residents, sustainable public-private investment models, improved cybersecurity and agricultural data protection, and benefits that reach smallholders rather than only large commercial farms. Importantly, these are strategic priorities and development directions, not newly quantified targets from the report.

Implications for agricultural technology and international cooperation

Agricultural machinery and automation: China's expanding investment in BeiDou-enabled machinery, robotics, and intelligent production systems could create opportunities for agricultural equipment manufacturers and precision farming technology providers. For German manufacturers such as CLAAS, potential areas of cooperation include automated machinery, equipment interoperability, machine data integration, and high-efficiency field operations.

Digital crop protection and breeding: AI-assisted breeding, pest recognition, precision application, and agricultural data platforms may offer opportunities for cooperation involving agricultural research institutes and companies such as Bayer and BASF, particularly in digital agronomy and sustainable crop management.

Smart livestock production and resource efficiency: Precision feeding, animal monitoring, water management, and intelligent environmental control are areas where German and Chinese technology developers could exchange expertise and jointly demonstrate solutions.

Research, standards, and data governance: Collaborative research on agricultural AI, sensors, digital twins, technology validation, data interoperability, and cybersecurity may become increasingly important. Successful cooperation will depend on compatibility with China's regulatory requirements and access to appropriate agricultural data.



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