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# **China Smart Agriculture and Autonomous Agricultural Machinery Market Report, 2022**

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# Research on smart agriculture and autonomous agricultural machinery: top-level design, agricultural digitization and automation present a potential market

Amid the pandemic, the conflict between Russia and Ukraine has directly led to a reduction in global food production, which will exacerbate the global instability. Since 2022, the FAO (Food and Agriculture Organization) Food Price Index (FFPI) of has been soaring.

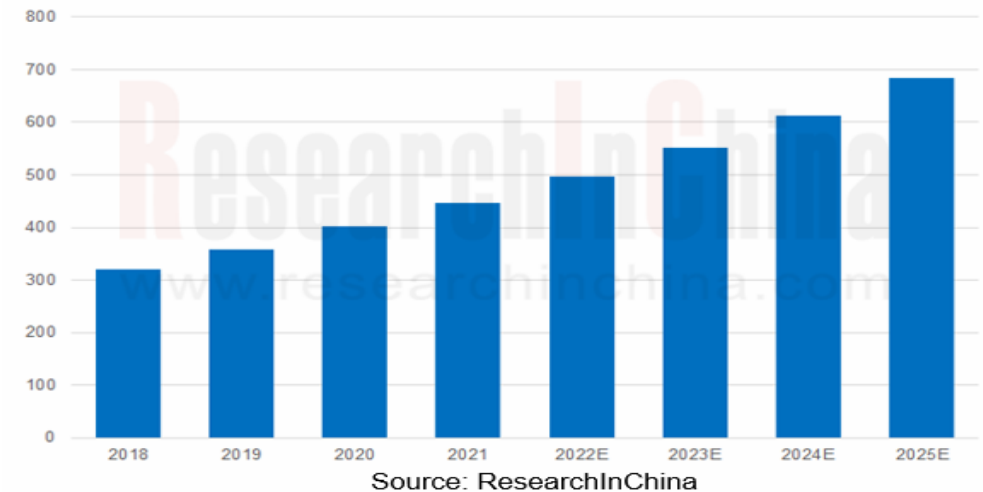
The No.1 central document, which is issued by China's central authorities in 2022, pointed out, "We must firmly hold the bottom lines of guaranteeing China's grain security and ensuring there will be no large-scale return to poverty." It also called for greater efforts in the construction of digital villages, development of smart agriculture, as well as integrated application of information technology, agricultural machinery and agronomy. The outline of the "14th Five-Year Plan" mentioned that it is necessary to accelerate the development of smart agriculture and promote the digital transformation of agricultural production, operation and management services. The government's work report in 2022 stipulated "the development of digital villages" for the first time, signaling an important way to realize the modernization of agriculture and rural areas.

***The CAGR of China's smart agriculture market size exceeds 14.1%, and agricultural digitalization generates a potential market***

It is estimated that by 2025, the total output value of smart agriculture in the world will reach USD68.389 billion. In Asia-Pacific, the fastest growing region, smart agriculture mainly includes precision agriculture in fields, smart animal husbandry, smart fishery, and smart greenhouses; main technologies include remote sensing and sensor systems, agricultural big data and cloud service technology, intelligent agricultural equipment (UAVs, robots).

According to UN projections on population and hunger, the global population will increase by 2 billion by 2050, and agricultural productivity will need to increase by 60% to provide adequate food. Artificial intelligence and machine learning are likely to be at the core of new technologies to help close the gap in anticipated food needs for an additional 2 billion people worldwide by 2050. Global spending on connected smart farming technologies and systems, including artificial intelligence and machine learning, will grow significantly in the future.

**Global Smart Agriculture Output Value, 2018-2025E**  
(USD100 million)



# Financing of Technology Start-ups Related to Smart Agriculture

Financing of Technology Start-ups Related to Smart Agriculture

Industries	Enterprises	Established	Location	Business	Rounds of financing	Occurrences of financing
UAVs	DJI	2006	Shenzhen	Plant protection UAVs	Strategic investment	5
	XAG	2012	Guangzhou	Software and hardware of unmanned farms	C++	5
	Wuxi Hanhe Aviation Technology	2008	Wuxi	Agricultural UAVs	Equity transfer	1
	TXA	2012	Guangzhou	Plant protection UAVs	A	2
	SUPERHEXA	2015	Beijing	Plant protection UAVs	A	2
	Coolfarmers	2015	Zhoukou	Plant protection UAVs	Undisclosed	
	TopXGun Robotics	2015	Shanghai	Plant protection UAVs	B+	4
Agricultural robots	Botian Automation Technology	2011	Suzhou	Agricultural robots	Strategic investment	1
	Thirty-three Information Technology	2013	Nanjing	Agricultural robots	Undisclosed	
	FJ DYNAMICS	2017	Xiangyang	Agricultural robots	B	6
	WEBULL	2017	Qingdao	Agricultural robots	Undisclosed	
	AIForceTech	2018	Beijing	Autonomous agricultural machinery	A+	6

In China, the increasing demand for modern agricultural machinery and the continuous R&D and application of new technologies will promote the sustained and rapid growth of the smart agriculture market. Driven by stimuli such as the national rural revitalization strategy and the national digital agriculture strategy, a potential agriculture market appeals to giants like Alibaba, JD.com, Baidu, and Tencent that have deployed smart agriculture to promote the construction of smart agriculture in China.

Smart agriculture is the starting point of rural revitalization. The encouragement and benefits at the macro level have spurred a large number of technology companies to smart agriculture, covering all sectors ranging from production to marketing. More and more technology start-ups bring a lot of capital while flocking into smart agriculture construction.

Agricultural IoT	Kebai Sciences	2008	Beijing	Agricultural IoT	B	3
	Top Cloud-agri Technology	2008	Hangzhou	Agricultural IoT	Strategic investment	4
	31 Smart Agriculture	2008	Beijing	Smart IoT platforms	Angel	1
	Zuoan Xinhui	2010	Shanghai	Agricultural IoT	Angel	1
	Chenfeng Information Technology	2014	Guangzhou	Agricultural IoT	A	1
Agricultural big data	LinkDotter	2015	Suzhou	Agricultural IoT	Angel	2
	Foidn Technology	2007	Nanjing	Agricultural big data	Pre-A	2
	Acsn	2009	Beijing	Agricultural big data	A	1
	TalentCloud	2012	Nanning	Agricultural big data	B	3
	Jiahe Technology	2013	Wuhan	Agricultural big data	A+	4
	Bric	2014	Suzhou	Agricultural big data	C	3
	Daqiuyin Technology	2015	Kunming	Agricultural big data	Undisclosed	
	Qianmo Technology	2015	Wuhu	Agricultural big data	Angel	1
	Big climate agriculture	2015	Guangzhou	Agricultural big data	Angel	1
	Heda Technology	2015	Wuhan	Agricultural big data	Strategic investment	1
	Nongxin Technology	2015	Beijing	Agricultural big data	Angel	1
	Gago Big Data	2016	Beijing	Agricultural big data	Strategic investment	3
	McFly	2016	Beijing	Agricultural big data	A	2
	Cloud Young	2016	Beijing	Agricultural big data	Pre-A+	3
	TerraQuanta	2016	Chengdu	Agricultural big data	A+	4
	Standard Agriculture	2017	Guangzhou	Agricultural intelligent connectivity and big data	Undisclosed	
	Shuxi.ai	2018	Shenzhen	Agricultural big data	Angel	1
	Simple Cultivate	2019	Beijing	Agricultural big data	Strategic investment	2
	Harvest-Code	2019	Nanjing	Agricultural big data	Undisclosed	
Precision agriculture	AI KE NONG	2016	Beijing	Precision agriculture	Strategic investment	3
	Rain Agricultural Intelligence	2017	Beijing	Precision agriculture	Undisclosed	
	Guangxi Zhiguo Technology	2017	Nanning	Precision agriculture	Angel	1
	AITOAGRO	2019	Wuhan	AI agriculture platforms	Undisclosed	
	UML-TECH	2014	Beijing	Unmanned farms	Equity investment	8

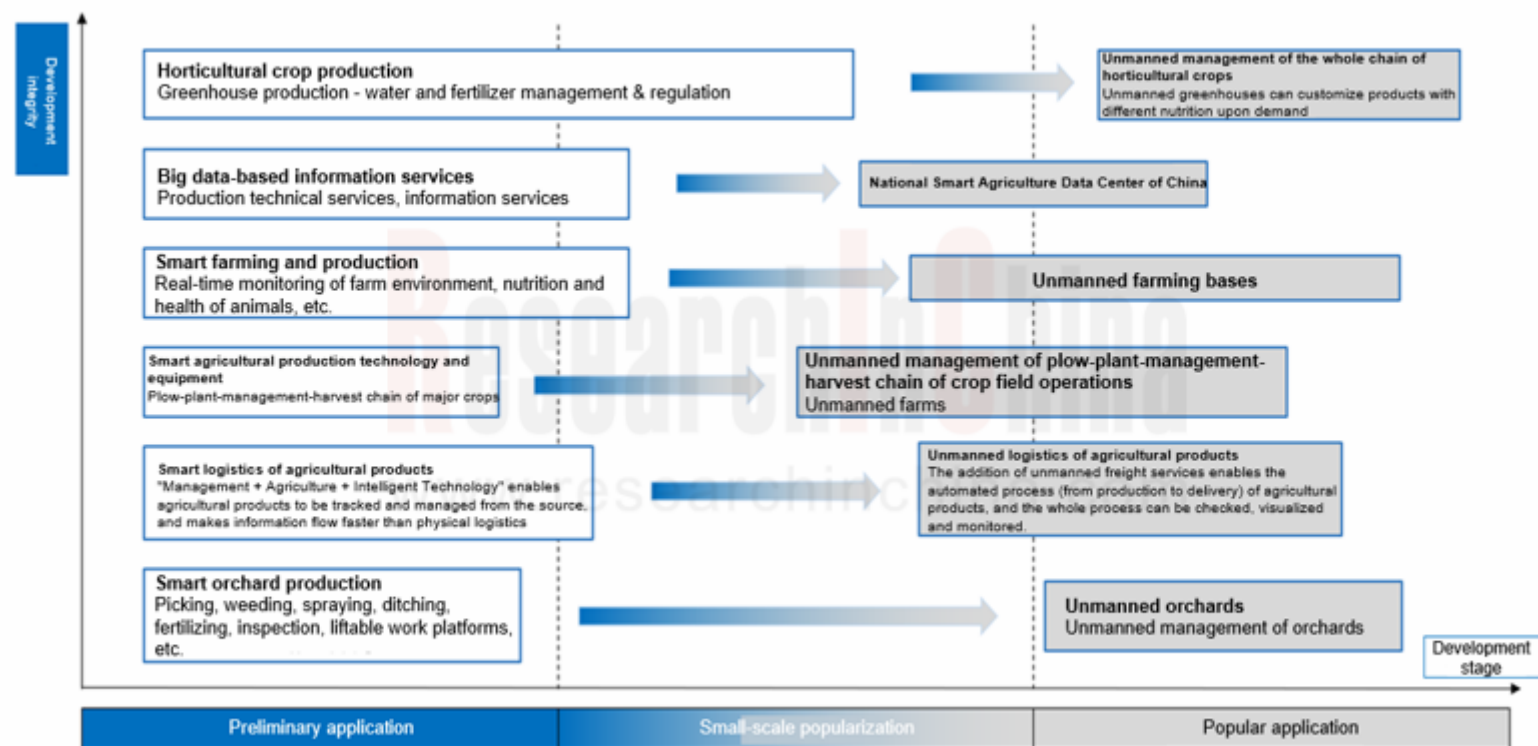
Source: ResearchInChina

# Smart agriculture is widely used at the micro level, with the top-level design in the planning and design stage

When it comes to smart agriculture, agricultural planting is in the spotlight. The main technologies involved herein include intelligent water and fertilizer integration, agricultural IoT monitoring, satellite remote sensing/meteorology/UAV-based aerial surveys with remote sensing, plant protection UAVs, autonomous agricultural machinery, and plant chemical factories. However, smart agriculture is far more than just agricultural planting where application cases are ubiquitous.

Smart agriculture covers the entire industrial chain of agricultural production, distribution and marketing, mainly including four application scenarios: digital agriculture (data platform services), plant protection UAVs, precision agriculture, and autonomous agricultural machinery. It is widely used in agricultural planting and animal husbandry. Wherein, data platform services and plant protection UAVs account for 75% of the total.

## Main Application Scenarios and Development Trends of Smart Agriculture



Source: ResearchInChina



# China is still planning smart agriculture with the ongoing top-level design

In China, there are many smart agriculture projects, and UAVs and autonomous agricultural machinery have developed rapidly. Chinese products can compete with foreign counterparts. The development potential of UAVs and autonomous agricultural machinery is enormous. However, China is still planning smart agriculture with the ongoing top-level design:

**The construction of big data platforms is relatively late:** the Big Data Center of the Ministry of Agriculture and Rural Affairs of China (MARA) was established in 2021. The top-level design of China's agricultural and rural big data system construction has entered the stage of practical operation; by contrast, foreign agricultural big data platforms have developed for more than ten years, for example, the United States started building agricultural informatization in the 1950s, and supported smart agriculture through the establishment of agricultural informatization systems and agricultural databases with the state as the entity.

**The top-level design of digital villages is being planned:** since 2021, domestic local governments and Internet companies have launched their own top-level design for digital villages, such as 2021 Pukou's suburban digital villages, Tencent's top-level design for digital villages, the overall architecture of Alibaba Cloud Big Data Center, Tencent's digital village system architecture, China Unicom's overall digital village architecture, and Huawei's overall business architecture for digital agriculture and rural areas. The top-level design has not yet been implemented. Mostly, the projects about autonomous planting, breeding and regional big data analysis platforms have been performed.

**The UAV market is highly concentrated:** 160,000 agricultural UAVs existed in China in 2021 with a year-on-year increase of 60%, and they served over 1.4 billion mu of land. DJI and XAG occupy more than 90% market share.

**The pattern of autonomous agricultural machinery industry is unsettled:** China's best-selling autonomous agricultural machinery systems in 2021 included those from Heilongjiang Huida Technology Development Co., Ltd., Shanghai CHCNAV Co., Ltd. and Hunan Xiangshu Big Data Technology Co., Ltd. which adopted the BeiDou Navigation Satellite System. In 2021, the sales pattern of the BeiDou Navigation Satellite System changed significantly, and the dark horse sprung up, as a result of the sharp drop in the price of automatic navigation equipment.

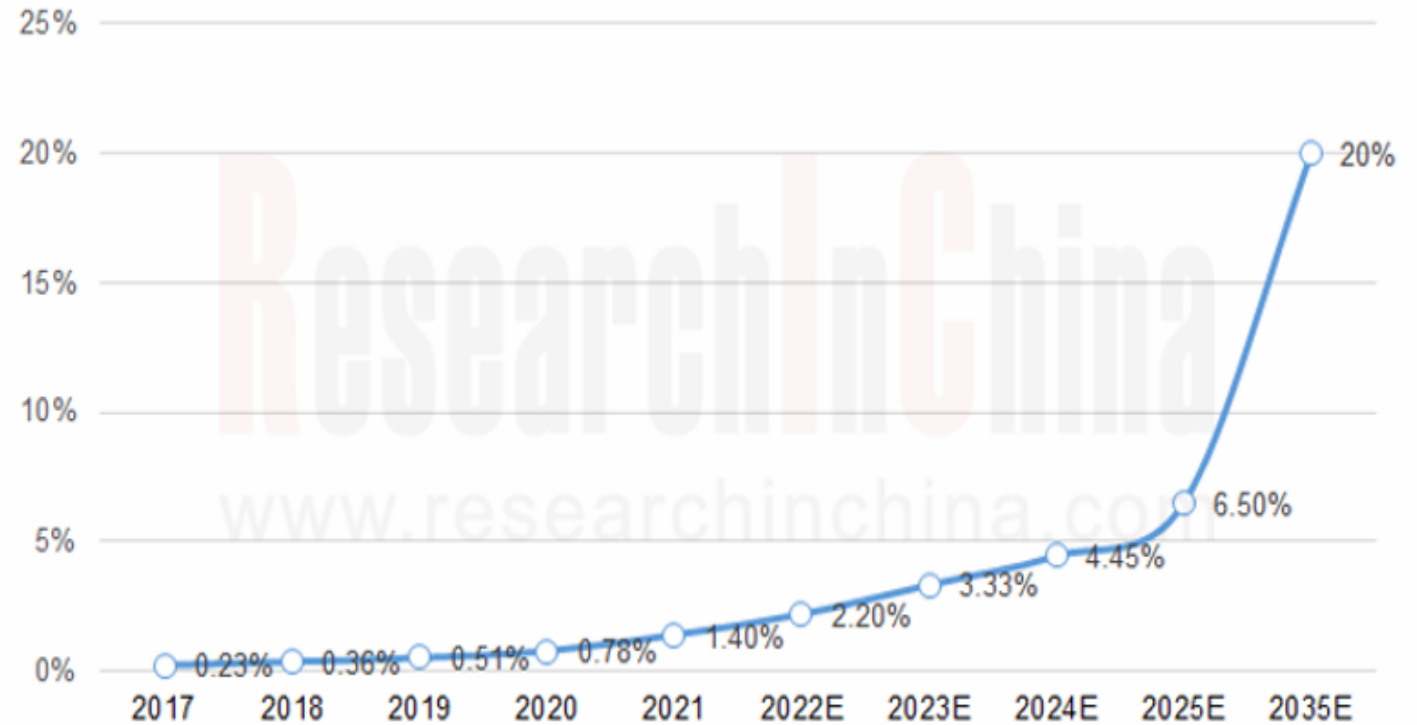
# Autonomous agricultural machinery has seen a higher sales volume but a lower price. It is experiencing a mature development period, with the market penetration rate swelling

In recent years, China's autonomous agricultural machinery systems have developed radically. They have been just applied in northern regions (Xinjiang and Heilongjiang), while they are still in the germination stage in other areas of China where the farmland scale is moderate. Despite the regional disparity, China's autonomous agricultural machinery systems as a whole have been growing swiftly.

More than 65,000 sets of the BeiDou Navigation Satellite System had been deployed for agricultural machinery as of 2021 when China might boast over 4.6 million domestic large and medium-sized agricultural tractors, which means the penetration rate of autonomous agricultural machinery systems was 1.4%. Among agricultural machinery, tractors are the first that realize autonomous driving in China. It is expected that the penetration rate of autonomous agricultural machinery systems will reach 6.5% by 2025 and about 20% by 2035.

The penetration rate of autonomous agricultural machinery systems in China is much lower than that in Europe and the United States. The EU plans to have 50% of agricultural machinery equipped with automatic navigation driving systems by 2025. According to Purdue University, the penetration rate of automatic navigation for agricultural machinery in the US hit 90% in 2019.

**Penetration Rate of Autonomous Agricultural Machinery Systems in China, 2017-2035E**



Source: ResearchInChina

# Autonomous agricultural machinery has seen a higher sales volume but a lower price. It is experiencing a mature development period, with the market penetration rate swelling

In 2020, the average price of autonomous agricultural machinery systems and equipment in China was RMB50,000-60,000 per set. In 2021, the substantial reduction in the subsidy standard dragged down the average price of automatic navigation equipment to only RMB36,000 per set.

With the completion of the ground base station network and the improvement of agricultural electrical control systems, the price of China's autonomous agricultural machinery systems and equipment will decline slowly in the future, may be less than RMB25,000 per set by 2025.

In March 2022, China Association of Agricultural Machinery Manufacturers, China Agricultural Mechanization Herald, and China Agricultural Machinery Distribution Association jointly released the 2021 Best-selling Agricultural Machinery List (by the sales volume of subsidized agricultural machinery as of December 31, 2021), honoring Heilongjiang Huida Technology Development Co., Ltd., Shanghai CHCNAV Co., Ltd. and Hunan Xiangshu Big Data Technology Co., Ltd. which adopted the BeiDou Navigation Satellite System, as well as praising Heilongjiang Huida Technology Development Co., Ltd., Golden Field Technology Co., Ltd. and Beijing Agricultural Intelligent Equipment Technology Research Center for their best-selling agricultural operation monitoring terminals.

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