

Agricultural New Quality Productive Forces: Connotative Features and Research Prospects

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Abstract

Agricultural new quality productive forces serve as a crucial lever for advancing agricultural modernization and building a leading agricultural nation. This paper primarily conducts a literature review to elucidate the connotation and characteristics of agricultural new quality productive forces and offers research prospects for future inquiry. It argues that future efforts should be advanced in a coordinated manner across four dimensions: subject incentives, factor allocation, data empowerment, and technological innovation. By constructing a pattern of multi-subject collaborative governance and removing institutional barriers to factor allocation, a systematic transition from traditional productive forces to new quality productive forces can be achieved, thereby injecting lasting momentum into high-quality agricultural development and the building of a leading agricultural nation.

Keywords

Agricultural New Quality Productive Forces, Connotative Features, Practical Challenges, Development Pathways.

1. Introduction

Against the backdrop of a new round of scientific and technological revolution and industrial transformation, disruptive technologies represented by artificial intelligence, biotechnology, and big data are reshaping the global industrial landscape. As a major agricultural country in the world, how China can achieve high-quality agricultural development under multiple pressures-including increasingly tight resource and environmental constraints, volatile global food security patterns, and growing urban-rural development imbalances-is not only a major economic proposition but also a strategic one critical to the country's long-term stability and security. The report to the 20th National Congress of the Communist Party of China clearly states that "the most arduous and onerous task in building a modern socialist country in all respects still lies in rural areas," emphasizing the fundamental position and formidable challenges of agricultural and rural modernization in the overall context of Chinese modernization. In this grand historical context, the introduction of the important concept of new quality productive forces has pointed out a new direction for breaking through agricultural development dilemmas and realizing agricultural and rural modernization.

New quality productive forces is a strategic judgment put forward by General Secretary Xi Jinping on the development of productive forces in response to the domestic context of high-quality development. In September 2023, General Secretary Xi Jinping first proposed this concept when presiding over a symposium on promoting the all-round revitalization of Northeast China in the new era. The 2024 Central Rural Work Conference called for developing productive forces in light of local conditions and integrating the development of new quality productive forces into agriculture. Subsequently, the 2025 No. 1 Central Document officially put forward the concept of developing agricultural new quality productive forces for the first time,

requiring the promotion of coordinated breakthroughs in agricultural scientific and technological forces and the guidance of advanced factors to focus on developing agricultural new quality productive forces through scientific and technological innovation. The 2026 No. 1 Central Document once again lists developing agricultural new quality productive forces as an important task for comprehensively advancing rural revitalization and accelerating agricultural and rural modernization. Therefore, accurately understanding the connotation of agricultural new quality productive forces, grasping its basic characteristics and current development status, points the way for promoting agricultural modernization and realizing the historic leap from “a big agricultural country with smallholder farming” to “a strong agricultural power.”

2. Connotation and Characteristics of New Quality Productive Forces in Agriculture

2.1. Connotation of New Quality Productive Forces in Agriculture

As the concrete manifestation of new quality productive forces in the agricultural sector, the connotation of new quality productive forces in agriculture has been continuously enriched and improved with in-depth research. Based on existing literature, the academic community mainly interprets this concept from the following four perspectives.

From the perspective of industrial chain and industrial system, Jiang Changyun (2024)[1] defines new quality productive forces in agriculture as an advanced form of productive forces that relies on the modern agricultural industrial system, production system, and management system, characterized by scientific and technological advancement, digitalization, intelligence, and integration, achieving breakthrough upgrades in the quality attributes and qualitative combination of productive factors in agriculture and its related industrial and supply chains. Gao Yuan and Ma Jiujiu (2024)[2] further condense this view, arguing that its essence lies in the innovative transformation of agricultural production factors, production processes, and organizational division of labor in the industrial chain, thereby creating greater value in the agricultural field. This perspective emphasizes integrity and systematicness, highlighting the industrial correlation effect of new quality productive forces in agriculture.

From the perspective of the "three factors" in political economy, Luo Biliang (2024)[3] holds that new quality productive forces in agriculture are characterized by new-type labor force, new-type labor tools, and new-type subjects of labor, reflecting the quality improvement and optimal combination of the three factors of productive forces. Kong Xiangzhi and Xie Dongdong (2024)[4] analyze from the two dimensions of laborers and means of production, stressing the synergy between high-quality new agricultural talents and a high-tech material foundation. Jiang Yongmu and Li Mingxing (2024)[5] further point out that its fundamental connotation lies in the deep integration of "newness" and "quality" at the core of productive forces in the agricultural context. This perspective emphasizes fundamentality and structure, providing a theoretical framework for factor analysis at the micro level.

From the perspective of "new-quality" products, factors, and production modes, Huang Jikun (2024)[6] puts forward a more operable definition standard. He believes that only productive forces that generate or apply new-quality agricultural products, new-quality production factors, and new-quality production modes constitute new quality productive forces in agriculture in a true sense. This definition identifies new quality productive forces from both result and process dimensions, emphasizing the necessity to produce and use agricultural products with "new-quality" characteristics, and possesses strong practical guiding significance.

From the perspective of the evolution of productive forces, Luo Biliang and Geng Pengpeng (2024)[7] emphasize that new quality productive forces in agriculture represent a new form distinct from traditional agricultural productive forces, characterized by high technology, high

efficiency, and high quality, fostered by revolutionary technological breakthroughs, innovative allocation of production factors, and in-depth industrial transformation and upgrading. Song Zhenjiang et al. (2024)[8] expand its connotation to an organic unity of technological productive forces, green productive forces, and digital productive forces. Lin Qingning et al. (2024)[9] further note that new quality productive forces in agriculture not only share the common characteristics of new quality productive forces but also possess the unique features of high publicity, high scientific and technological content, high digitalization, and high industrialization.

In summary, new quality productive forces in agriculture are an advanced form of productive forces driven by scientific and technological innovation as the core driving force, based on high-quality laborers, high-tech means of labor, and high-value subjects of labor, and manifested in new industries, new forms of business, and new models. Through innovative allocation of production factors and in-depth industrial transformation and upgrading, they achieve a substantial increase in agricultural total factor productivity and high-quality agricultural development. This definition integrates the core elements of existing research, reflecting the essential characteristics of new quality productive forces in agriculture while demonstrating strong inclusiveness and explanatory power.

2.2. Characteristics of New Quality Productive Forces in Agriculture

Against the background of the scientific and technological revolution and industrial transformation in the new era, technological innovation plays a leading role in the formation and development of new quality productive forces in agriculture. Agricultural production has gradually broken away from the growth path driven by traditional factor inputs, forming an advanced form of productive forces characterized by high technology, high efficiency, and high quality. Its main features are embodied in the following aspects.

First, new quality productive forces in agriculture are driven by disruptive technological innovation as the core driving force, reflected in the deep integration of cutting-edge technologies such as biotechnology, information technology, and digital technology with agricultural production. This integration is not a simple superposition of technologies, but a fundamental shift from experience-dependence to technology-driven development in key links such as breeding, equipment, and management. In the field of biological breeding, breakthroughs in gene editing, whole-genome selection and other technologies are reshaping the innovation pattern of the seed industry, realizing the leap from "empirical breeding" to "precision breeding". In the field of intelligent equipment, the wide application of unmanned aerial vehicles, unmanned agricultural machinery, agricultural robots and other intelligent equipment is transforming the traditional mode of agricultural production, achieving an upgrade from "human and animal labor" to "machine replacement" and further to "machine intelligence". In the field of digital technology, the in-depth penetration of the Internet of Things, big data, cloud computing and other technologies is promoting the transformation of agricultural production from "experience-driven" to "data-driven", realizing precise perception, intelligent decision-making and automatic control of the production process (Zhou Zhen, 2024)[10]. The cluster breakthroughs of these disruptive technologies jointly constitute the fundamental technological source for the emergence and evolution of new quality productive forces in agriculture.

Second, new quality productive forces in agriculture take a substantial increase in total factor productivity as the core symbol, reflecting the essential feature of high efficiency. Different from traditional agricultural productive forces, which mainly rely on the expansion of input scale of land, labor, capital and other factors, new quality productive forces in agriculture break through the scale constraints of traditional factor inputs through technological innovation and optimal allocation of factors, achieving the multiplier effect and efficiency improvement of factor

combination. Specifically, new quality productive forces in agriculture can empower labor factors through technology, transforming farmers from "physical laborers" into "industrial workers" mastering modern technologies, thus upgrading human capital. They can empower land factors through technology, improving land productivity and sustainable utilization. Driven by data factors, they realize precise control of the production process and accurate prediction of market demand, thereby driving the dynamic optimal allocation of labor, land, capital and other factors. This high-efficiency characteristic is centrally reflected in the substantial improvement of agricultural total factor productivity, enabling agricultural production to maintain sustained growth momentum under increasingly tight resource and environmental constraints.

Third, new quality productive forces in agriculture are value-oriented toward providing high-quality agricultural products and services, featuring high quality. Different from traditional agricultural productive forces, which mainly meet basic living needs, new quality productive forces in agriculture aim to supply green, organic, functional and traceable high-quality agricultural products, and take meeting consumers' increasingly diversified, personalized and high-quality demands as the value orientation. At the product quality level, new quality productive forces in agriculture can produce higher-quality, safer and more nutritious agricultural products. At the ecological quality level, they require a greener, low-carbon and sustainable production process to achieve coordinated development between agriculture and the ecological environment (Zhao Minjuan and Du Ruirui, 2024)[11]. At the quality of life level, by extending the industrial chain and enhancing the value chain, new quality productive forces in agriculture bring higher incomes to farmers and better experiences to consumers. This high-quality characteristic is not only reflected in the quality improvement of final products, but also runs through the whole process and entire chain of agricultural production, serving as an important marker distinguishing new quality productive forces from traditional ones.

Fourth, new quality productive forces in agriculture take data as a key production factor, featuring a highly digitalized technological foundation. Under the framework of new quality productive forces in agriculture, data has become a more critical factor than traditional production factors, deeply penetrating the whole process of pre-production forecasting, mid-production management and post-production circulation in agriculture. In the pre-production link, big data analysis is used to predict market demand and guide production decisions. In the mid-production link, the Internet of Things monitors the production environment in real time to achieve precise regulation. In the post-production link, e-commerce platforms expand sales channels, and blockchain technology realizes product traceability. Such full-chain digital penetration transforms agricultural production from experience-driven to data-driven, from extensive management to refined management, and from passive adaptation to active prediction. Taking the crayfish industry in Qianjiang, Hubei as an example, by building e-commerce platforms such as "Xiagu 360" and a digital cold-chain logistics system, the region has realized precise sales and rapid distribution of crayfish, with products sold to more than 600 cities nationwide and a daily trading volume of 1,500 tons at the peak, fully demonstrating the empowering effect of digitalization on the improvement of agricultural productive forces.

Fifth, new quality productive forces in agriculture take innovative integration of the industrial chain as the basic path, reflecting the industrial feature of high convergence. New quality productive forces in agriculture run through the entire industrial chain of agricultural R&D, production, processing, circulation and services, reflecting the deep integration of primary, secondary and tertiary industries. This convergence is embodied in three dimensions: firstly, the integration of technology and industry. Cutting-edge technologies such as biotechnology, information technology and digital technology penetrate the entire agricultural industrial chain, giving birth to new technologies, new processes and new equipment. Secondly, the integration among industries. Agriculture, processing industry and service industry infiltrate and empower

each other, fostering new business forms such as leisure agriculture, rural tourism and rural e-commerce. Thirdly, the integration among factors. New-type factors such as data, knowledge and technology are deeply integrated with traditional factors, realizing the optimization and upgrading of factor combination. Through multi-dimensional integration, new quality productive forces in agriculture have realized the leap from efficiency improvement in a single link to systematic reconstruction of the entire industrial chain.

Sixth, new quality productive forces in agriculture take adjusting measures to local conditions as the basic premise, reflecting the regional adaptability feature of high ecological dependence. Different from industrial production, which can be centrally spatially distributed, agricultural production is highly regional and ecologically dependent, which determines that the development of new quality productive forces in agriculture must fully respect and base itself on local natural and geographical conditions, resource endowments and economic and social foundations (Ma Yuting et al., 2026)[12]. In water-scarce areas, any exploration of new quality productive forces must center on water conservation. In ecologically fragile areas, environmental protection must be given priority. In areas rich in characteristic resources, resource characteristics should be transformed into industrial advantages. This high ecological dependence means that the development path of new quality productive forces in agriculture is bound to be diversified and differentiated. As pointed out by Hu Bingchuan, the principle of "adjusting measures to local conditions" is prominently reflected in the dynamic and precise adaptation of general agricultural science and technology with regional resource endowments, forming two development paths: the "transformational type" that optimizes resources and strengthens production capacity, and the "adaptive type" that is feature-oriented and ecologically empowered.

Seventh, new quality productive forces in agriculture take ensuring national food security as the bottom-line constraint, reflecting the strategic attribute of high publicity. Agriculture is not only an industrial sector, but also a basic and strategic industry related to national economy and people's livelihood. This determines that the development of new quality productive forces in agriculture must take ensuring food security and social welfare as the bottom-line constraint, which is a remarkable feature distinguishing it from new quality productive forces in industry. At the level of food security, new quality productive forces in agriculture must serve the national strategy of "holding the Chinese people's rice bowls firmly in their own hands", and solve the future problems of "what to grow grain with", "how to grow grain" and "who will grow grain" through scientific and technological innovation. At the level of farmers' interests, new quality productive forces in agriculture must benefit the majority of farmers, allowing farmers to share the value-added benefits of the industry through improving benefit linkage mechanisms and avoiding widening the income gap. At the level of ecological environment, new quality productive forces in agriculture must practice the concept of green development, aiming at improving ecological efficiency and minimizing environmental footprint. This highly public feature requires that the development of new quality productive forces in agriculture must achieve a dynamic balance between the pursuit of efficiency and national strategy and social well-being.

3. Challenges in the Formation of New Quality Productive Forces in Agriculture

As an advanced form of productive forces, the formation and development of new quality productive forces in agriculture are not achieved overnight, but evolve gradually in the complex interaction of technological innovation, factor restructuring, industrial transformation and institutional adaptation. At present, China's agricultural productive forces present a pattern of coexistence at multiple levels with obvious regional differences, and the industrial foundation

and technological development level vary from region to region. As a key engine empowering agriculture to move from the information era to the intelligent era, the practical dilemmas faced by new quality productive forces in promoting agricultural development are mainly reflected in development willingness, factor supply, data support, innovation capacity and other aspects (Ma Xianlei et al., 2024)[13].

Fang Qian (2025)[14] points out that there are still four major challenges in developing new quality productive forces in agriculture: the willingness of economic entities to promote development needs to be strengthened, the effective supply of production factors needs to be expanded urgently, the empowering support of data factors for agriculture is insufficient, and the level of agricultural scientific and technological innovation still needs to be improved. Wang Jing et al. (2024)[15] argue that the problems in developing new quality productive forces in agriculture mainly stem from two aspects: labor force and means of labor. The core issues to be solved urgently include insufficient labor force, low education level, weak scientific and technological innovation capacity, and backward infrastructure. From the perspective of rural reform, Ni Kunxiao (2024)[16] identifies three constraints: the lagging development of the agricultural socialized service system, shortcomings in the digital development of agriculture and rural areas, and institutional obstacles in the integrated development of urban and rural areas.

Therefore, a systematic review of these challenges is of great significance for developing new quality productive forces in agriculture in light of local conditions and avoiding potential risks in the development process.

4. Ideas and Suggestions for the Development of New Quality Productive Forces in Agriculture

The development of new quality productive forces in agriculture needs to follow the general laws of productive forces development and fully consider the particularity of the agricultural industry and the differences in regional development. Therefore, developing new quality productive forces in agriculture in accordance with local conditions is the cornerstone for promoting high-quality agricultural development. Based on the previous elaboration of the connotation and characteristics of new quality productive forces in agriculture and the analysis of practical challenges, this paper puts forward policy suggestions from four dimensions: subject motivation, factor allocation, data empowerment, and scientific and technological innovation.

First, build an incentive-compatible mechanism for the coordinated participation of multiple subjects to enhance the willingness of economic entities to advance development. The cultivation of new quality productive forces in agriculture cannot rely solely on administrative promotion; instead, multiple subjects including the government, enterprises, farmers, and scientific research institutions should be integrated into a pattern of collaborative governance. At the government level, the development of new quality productive forces in agriculture should be incorporated into the local high-quality development assessment system to stimulate grassroots enthusiasm for exploration and innovation. At the enterprise level, tax incentives, R&D subsidies and other policies can be adopted to further guide agri-related enterprises to increase R&D investment and foster a number of "chain-leading" enterprises with innovation-driven capabilities. At the farmer level, respect for farmers' pioneering spirit should be upheld, and capacity of smallholders to connect with new quality productive forces should be improved through technical training, demonstration and promotion, and credit support, so as to avoid the marginalization of smallholders caused by "scale bias" in technology popularization.

Second, promote the coordinated development of laborers, means of labor, and subjects of labor to achieve a systematic leap. In response to the prominent problem of the lagging skill structure

of laborers, focus should be placed on building a multi-level and targeted training system. On the one hand, platforms for agricultural technology learning can be established to offer cutting-edge courses such as smart agriculture, intelligent equipment operation, and agricultural data analysis to cultivate talents proficient in modern technologies. On the other hand, scientific researchers should be encouraged to provide on-site technical guidance to improve the skills of existing farmers through "learning by doing". Furthermore, policy support for supporting technical services of intelligent agricultural machinery should be strengthened, and agricultural machinery enterprises should be encouraged to extend their service chains and establish a three-level maintenance network for intelligent agricultural machinery covering counties, townships and villages. Meanwhile, the agricultural machinery purchase subsidy policy should be improved to include digital equipment such as intelligent terminals, operation monitoring and precision navigation in the subsidy scope, lowering the threshold for smallholders to adopt intelligent equipment.

Third, strengthen the coordinated advancement of digital infrastructure and digital governance to alleviate the insufficient empowerment of data factors. In the era of digital economy, data has become a key driving force for new quality productive forces in agriculture, and three thresholds must be crossed: infrastructure construction, core technological breakthroughs, and governance capacity improvement. The government should continue and intensify efforts to advance the construction of digital countryside, focusing on strengthening weak links such as network communication and smart logistics in remote mountainous areas and underdeveloped regions. At the core technology level, the government should increase R&D investment in key technologies such as agricultural sensors, intelligent decision-making models, and agricultural robots, support leading agricultural enterprises, research institutes and universities to establish innovation consortia for collaborative research, and accelerate the formation of an independent and controllable agricultural digital technology system.

Fourth, improve the agricultural science and technology innovation system and promote the deep integration of innovation chain and industrial chain. Scientific and technological innovation is the core driving force of new quality productive forces in agriculture. At present, it is urgent to solve problems such as insufficient effective supply, poor transformation of achievements, and imperfect coordination mechanisms. In basic research and cutting-edge technologies, a number of major agricultural science and technology projects should be deployed around biological breeding, intelligent equipment, digital agriculture and other fields to concentrate efforts on breaking through key core technical bottlenecks.

The cultivation and development of new quality productive forces in agriculture require the coordinated promotion of subject motivation, factor allocation, data empowerment and scientific and technological innovation on the premise of respecting the particularity of the agricultural industry and regional differences. These four dimensions are interrelated and mutually supportive: subject motivation provides impetus for factor allocation; factor allocation creates conditions for data empowerment; data empowerment expands space for scientific and technological innovation; and scientific and technological innovation in turn enhances subject capacity and factor quality. Only by forming such a virtuous cycle can we truly realize the leap from traditional productive forces to new quality productive forces and inject sustained impetus into high-quality agricultural development and the construction of a strong agricultural country.

5. Conclusion

Against the backdrop of the rapid development of the digital economy, new quality productive forces in agriculture serve as the core engine leading high-quality agricultural development. This paper interprets its connotation from four perspectives: industrial chain and industrial

system, the "three factors" of political economy, "new-quality" products and production modes, and the evolution of productive forces patterns, and summarizes seven core characteristics: high technology, high efficiency, high quality, high digitalization, high integration, high ecological dependence, and high publicity. At present, the formation of new quality productive forces in agriculture still faces multiple challenges, including insufficient willingness of relevant entities, weak factor coordination, inadequate data empowerment, and low innovation capacity. The root cause lies in the contradiction between the economic rationality of the technological revolution and the geographical particularities of agriculture and rural areas. In the future, on the premise of respecting the characteristics of the agricultural industry and regional differences, efforts should be made to coordinate the four dimensions of subject motivation, factor allocation, data empowerment, and scientific and technological innovation. By building a multi-stakeholder collaborative pattern, removing institutional obstacles, strengthening digital governance capacity, and improving industry-university-research integration mechanisms, we will promote the virtuous interaction of technological breakthroughs, factor restructuring, and industrial transformation, so as to achieve a systematic leap from traditional productive forces to new quality productive forces, and continuously inject impetus into the construction of a strong agricultural country and the modernization of agriculture and rural areas.

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References

- [1] Jiang, C. Y. New Quality Productive Forces in Agriculture: Connotation, Characteristics, Priorities, Constraints and Policy Recommendations [J]. Journal of Nanjing Agricultural University (Social Sciences Edition), 2024, 24(3): 1–17.
- [2] Gao, Y., Ma, J. J. New Quality Productive Forces in Agriculture: A Political Economy Perspective [J]. Issues in Agricultural Economy, 2024(4): 81–94.
- [3] Luo, B. L. On New Quality Productive Forces in Agriculture [J]. Reform, 2024(4): 19–30.
- [4] Kong, X. Z., Xie, D. D. Theoretical Connotation, Main Characteristics and Cultivation Path of New Quality Productive Forces in Agriculture [J]. China Agricultural University Journal of Social Sciences Edition, 2024, 41(4): 29–40.
- [5] Jiang, Y. M., Li, M. X. A Political Economy Analysis of Developing New Quality Productive Forces in Agriculture [J]. Economic Review, 2024(5): 12–20.
- [6] Huang, J. K. New Quality Productive Forces in Agriculture: Connotation and Extension, Potential and Challenges, and Development Ideas [J]. China Rural Survey, 2024(5): 19–34.
- [7] Luo, B. L., Geng, P. P. New Quality Productive Forces in Agriculture: Theoretical Context, Basic Core and Promotion Path [J]. Issues in Agricultural Economy, 2024(4): 13–26.
- [8] Song, Z. J., Leng, M. N., Zhou, B., et al. New Quality Productive Forces in Chinese Agriculture: Evaluation System, Dynamic Evolution and Policy Implications [J]. Journal of Agro-Forestry Economics and Management, 2024, 23(4): 425–434.
- [9] Lin, Q. N., Li, J. D., Mao, S. P. Theoretical Logic, China's Practice and Key Focus of the Formation of New Quality Productive Forces in Agriculture [J]. Journal of Northwest A&F University (Social Science Edition), 2024, 24(6): 1–10.
- [10] Zhou, Z. Digital Technology Empowering New Quality Productive Forces in Agriculture: Mechanism, Obstacles and Countermeasures [J]. China Agricultural University Journal of Social Sciences Edition, 2024, 41(4): 55–70.

- [11] Zhao, M. J., Du, R. R. New Quality Productive Forces Promoting Green Transformation of the Whole Agricultural Industry Chain: Theoretical Logic and Path Selection [J]. *Research of Agricultural Modernization*, 2024, 45(5): 723–732.
- [12] Ma, Y. T., Hui, L., Ye, C. S. How Can New Quality Productive Forces in Agriculture Realize Endogenous Development in Light of Local Conditions [J]. 2026(2).
- [13] Ma, X. L., Fan, J. X., Guo, E. Z. New Quality Productive Forces in Agriculture: Connotation, Characteristics, Realistic Conditions and Development Path [J]. *Rural Economy*, 2024(9).
- [14] Fang, Q. New Quality Productive Forces Empowering Agricultural Transformation and Upgrading: Theoretical Logic, Practical Dilemmas and Paths [J]. *Rural Economy*, 2025(2): 77–85.
- [15] Wang, J., Teng, Y. Z., Li, K., et al. The Logical Necessity, Dilemma Source and Path Exploration of New Quality Productive Forces Empowering High-Quality Agricultural Development [J]. *Jiangsu Agricultural Sciences*, 2024, 52(24): 291–296.
- [16] Ni, K. X. New Quality Productive Forces Promoting Rural Reform: Internal Logic, Practical Dilemmas and Paths [J]. *Research of Agricultural Modernization*, 2024, 45(5): 773–781.