Realistic Dilemmas and Optimization Paths of Cultivated Land Protection in China under the Guidance of Food Security

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Abstract

The Central No. 1 Document of 2025 explicitly mandates sustainably enhancing the capacity to ensure the supply of grain and other major agricultural products, which underscores the state's great emphasis on food security. Given that cultivated land is the cornerstone of grain production, relevant documents and policies in 2025 continue to emphasize strengthening the protection and utilization control of cultivated land, including strictly controlling the total area of cultivated land. These provisions offer clear guidance for enforcing the strictest cultivated land protection system. Protecting cultivated land has become a cornerstone of ensuring food security and one of the key issues in the current sustainable development of agriculture. Safeguarding the red line of cultivated land and holding the bottom line of food security are urgent issues to be addressed. Furthermore, strengthening research on cultivated land protection can effectively promote the adjustment of agricultural production methods and the rational utilization of land resources, facilitate the sustainable development of grain production, mitigate damage to natural resources, improve economic and social benefits, and ultimately realize the harmonious coexistence between humans and nature.

Keywords

Food security, Arable land protection, High standard farmland, Cultivated land protection

Introduction

Against the global backdrop, emerging challenges such as climate change and environmental pollution have been posed to cultivated land protection. Long-standing issues including droughts, floods, soil erosion, and contamination have exerted adverse impacts on the stability and sustainability of cultivated land [1]. Moreover, amid rapid urbanization and industrialization, the reduction in land quantity has severely impacted the area of cultivated land [2]. Meanwhile, with population growth and economic development, the issue of food security has grown increasingly pressing [3]. As cultivated land protection involves multiple dimensions, such as the management and utilization of land resources, and the adjustment of agricultural production methods-it has become a cornerstone for ensuring food security and one of the key issues in the current sustainable development of agriculture.

The 2025 Central No. 1 Document explicitly mandates "sustainably enhancing the capacity to ensure the supply of grain and other major agricultural products" and repeatedly emphasizes contents related to cultivated land protection, such as strictly controlling the total area of cultivated land and implementing the "occupation compensation balance" mechanism, which highlights the significance of cultivated land protection to food security. Furthermore, the current international situation is complex, with overlapping factors like wars, epidemics, and extreme weather, leaving no room for error in food security. As food security constitutes a crucial strategic issue for a country, cultivated land protection serves as a vital foundation for safeguarding food security [4].

Ensuring food supply, as the core of food security, not only helps mitigate social instability factors but also maintains social harmony. There is a close link between cultivated land protection and the ecological environment. The rational utilization and protection of cultivated land can reduce environmental problems such as soil erosion and water loss, thereby maintaining ecological balance. More importantly, cultivated land is the source of livelihood for farmers [5]. Effectively protecting cultivated land can boost farmers' income, promote the sustainable development of the rural economy, and facilitate the adjustment of the rural economic structure and increase farmers' income [6]. Therefore, analyzing and researching cultivated land protection policies from the perspective of food security holds important theoretical and practical significance. It also exerts positive effects on ensuring food supply, preserving the ecological environment, promoting rural economic development, and safeguarding social stability.

With the acceleration of urbanization and the demand for industrialization, the quantity of arable land has been decreasing, posing severe challenges to grain production and the sustainable development of agriculture. The negative impact of land reduction on arable land protection could be alleviated by improving land use efficiency and rationally planning the land use structure, but the problem of the continuous decrease in arable land quantity has not been effectively solved [7]. The importance of food security to the country and people's well-being is self-evident, which has prompted many scholars to focus on the urgency of food security. Kong X suggested that strengthening agricultural infrastructure construction, improving the level of agricultural production technology, and increasing grain reserves can ensure food security while effectively promoting the development of arable land protection work [8]. However, they did not elaborate on the impact of the construction of high standard farmland on food security. The frequent occurrence of extreme weather events caused by climate change and the impact of environmental pollution on land quality have posed serious threats to arable land protection. Shi S proposed that strengthening the protection of agricultural ecological environment, promoting sustainable agricultural management models, and improving the adaptability and resilience of arable land can better protect and utilize arable land resources [9]. Nevertheless, they have not deeply explored the impact mechanisms of climate change and environmental pollution on arable land.

In summary, this paper will employ methods of literature review and case study to conduct an in-depth analysis of the current problems in cultivated land protection from multiple dimensions, including the reduction of land quantity, the urgency of food security, climate change, and environmental pollution. Specifically, this paper will explore the impact mechanisms of land reduction on food security and sustainable agricultural development and identify solutions to the problems, analyze the significance of food security urgency to cultivated land protection and put forward practical measures; examine the impact mechanisms of climate change and environmental pollution on cultivated land and propose corresponding countermeasures and responses. Based on the in-depth analysis of the above issues, this paper will put forward a series of targeted solutions, aiming to enhance the effectiveness of cultivated land protection from the perspective of food security.

Conceptual definition

The concept of food security is dynamic and varies across countries. It refers to ensuring that all individuals have constant access to sufficient food, both physically accessible and economically affordable, to meet their survival and health needs. This concept has evolved over time: In 1974, the Food and Agriculture Organization (FAO) of the United Nations defined food security as a basic human right to subsistence. In 1983, the FAO

revised this definition, stating that the goal of food security is "to ensure that all people, at all times, have physical and economic access to the basic food they need." In 2025, General Secretary Xi emphasized that food security is a crucial foundation of national security and a key guarantee for social stability. From a period when 400 million people faced hunger to the current scenario where 1.4 billion people enjoy a high-quality diet, there is no room for error in safeguarding food security. It serves as a vital foundation for political and economic security and stands as one of the most critical issues concerning people's livelihoods.

Cultivated land protection refers to the use of legal, political, economic, and technological means by relevant stakeholders to safeguard both the quantity and quality of cultivated land [10]. It is a strategic issue bearing on national welfare and people's livelihoods. With a population of 1.4 billion, China has achieved self-sufficiency in staple grains and maintained an overall grain self-sufficiency rate of over 90%, which relies on the absolute productivity of fertile farmland. When discussing cultivated land protection, it is imperative to address the multiple challenges facing current cultivated land resources, such as the irreversible compression of cultivated land due to urbanization and the decline in farmland quality caused by land degradation. However, mere protection is insufficient to resolve these issues, more proactive measures are needed to enhance land use efficiency and productivity.

Against this backdrop, the concept of high standard farmland has emerged. The construction of high standard farmland aims to improve productivity and sustainable utilization through scientific management and advanced agricultural technologies, thereby realizing the comprehensive protection and rational utilization of cultivated land resources [11]. High standard farmland is defined as drought-resistant, flood-proof, high-yield, and stable-yield farmland that meets the standards of flat terrain, complete infrastructure, contiguous plots, fertile soil, sound ecology, and strong disaster resistance, and is compatible with modern agricultural production and management models. As the essence of cultivated land constitutes a critical foundation for ensuring national food security. As a key component of the cultivated land protection system, the construction of high standard farmland has received significant attention from the Party and the state. While cultivated land protection emphasizes safeguarding both the quality and quantity of cultivated land, the construction of high standard farmland not only enhances cultivated land quality but also creates greater potential for increasing cultivated land quantity. Thus, cultivated land protection and the construction of high standard farmland are inseparable, collectively forming a core strategic direction for China's sustainable agricultural development, which warrants in-depth exploration and attention.

Analysis of achievements in cultivated land protection

The quantity of cultivated land in China has tended to be stable and has increased to some extent. Through the efforts of all parties, the Chinese government has firmly maintained the red line of 120 million hectares of cultivated land. In recent years, various measures have been taken to strictly prevent and crack down on cases related to the destruction and occupation of cultivated land, and local governments at all levels have carried out many cultivated land verifications works. In a short period of time, the quantity of cultivated land will not decrease, and it is normal to gradually increase while being stable. As shown in Figure 1, the national cultivated land quantity remains at 127.4 million hectares, which has basically stabilized above 126.7 million hectares. As of the end of 2024, the national cultivated land area reached 129.3 million hectares, increasing by 1.87 million hectares compared with 2020, thus firmly maintaining the red line for cultivated land protection.

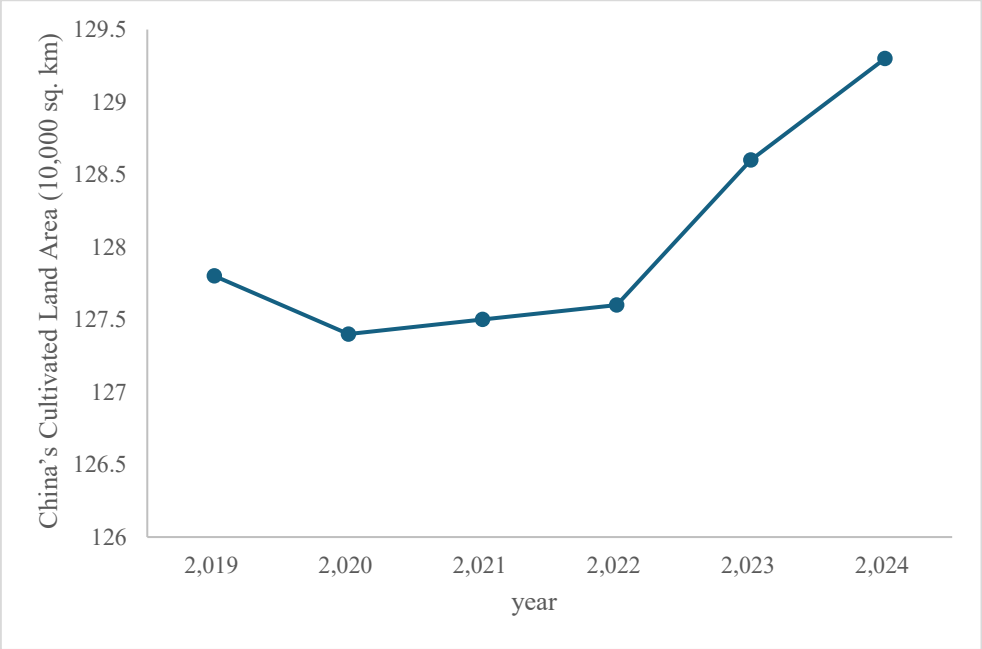

Figure 1. Annual cultivated land area of China (2019-2024).

The construction of high standard farmland within the cultivated land protection system has yielded remarkable outcomes. General Secretary Xi JP emphasized, "We must resolutely safeguard the 120 million hectares red line of cultivated land and gradually develop all permanent basic farmland into high standard farmland." By 2025, a total of 8.00 million hectares of high standard farmland will have been built nationwide, accounting for over 60% of China's current cultivated land area. These high standard farmlands can ensure a grain production capacity of 50.00 million metric tons and have played an irreplaceable part in safeguarding national food security. In 2024, efforts will continue to advance the construction of high standard farmland, with 0.33 million hectares of new high standard farmland and 0.27 million hectares of upgraded farmland to be completed. This initiative will enhance grain farmers' confidence and create more favorable conditions for building a strong agricultural country.

Furthermore, the legal and regulatory system for cultivated land protection has been steadily enhanced, providing a sound legal guarantee for cultivated land protection. China has enacted a series of laws and regulations, such as the Land Administration Law and the Regulations on Basic Farmland Protection, which clarify the responsible entities and legal liabilities for cultivated land protection, impose heavier penalties for illegal occupation of cultivated land, and effectively curb the commission of cultivated land-related illegal acts [12].

Meanwhile, the scientific and technological support capability for cultivated land protection has been continuously strengthened. By leveraging advanced technologies including remote sensing and geographic information systems, dynamic monitoring and precision management of cultivated land have been achieved, thereby enhancing the efficiency and standards of cultivated land protection.

The attainment of these achievements is attributable to the high priority and substantial investment of governments at all levels, the close collaboration and coordinated advancement of relevant departments, and the active participation and support of many farmers. In future efforts, all relevant parties should continue to consolidate and expand upon the achievements of cultivated land protection, constantly explore and innovate new mechanisms and approaches for cultivated land protection and lay a solid foundation to ensure national food security and sustainable agricultural

development.

Existing problems in cultivated land protection

Massive loss of agricultural practitioners

Specifically, large-scale rural population outflow has resulted in an increasingly severe problem of cultivated land abandonment [13]. With the improvement of economic development, urban and industrial sectors have created more employment opportunities and higher income levels, attracting many rural laborers to migrate to cities. Compared with the data from the 2000 Fifth National Population Census, the latest data in 2025 show that China's rural population has decreased by 35%, including a significant number of rural migrant workers.

The outflow of young laborers has significantly altered the structure of the rural labor force. Most of the remaining population are elderly and infirm individuals, who are no longer suitable for field work. For example, in some remote mountainous areas, the shortage of labor has led to large-scale idleness and abandonment of cultivated land, and the once fertile land has gradually become barren. This not only wastes land resources but also exerts a severe impact on local agricultural production.

Rural land is operated by smallholder farmers in a relatively scattered manner, and the imperfect land transfer mechanism makes it difficult to centralize land for large-scale operations. Even if some farmers are willing to transfer their land, the scattered distribution of land and inconsistent willingness to transfer adjacent plots increase the difficulty of land transfer. For instance, if farmer Zhang is willing to transfer his land while his neighbors, farmer Li and farmer Wang, are unwilling to transfer or lease theirs, it causes inconvenience in land management and hinders the formation of economies of scale.

In addition, after comparing their wages from nonagricultural work with the income from land contractual management, migrant workers find that the latter is relatively low, which makes it difficult to stimulate their enthusiasm for land transfer. Furthermore, the traditional agricultural labor pattern is relatively arduous, and the farmer's life of "facing the loess and turning one's back to the sky" can hardly attract young people to return to their hometowns for agricultural work, which further exacerbates the phenomenon of cultivated land abandonment.

If this trend persists, the area of abandoned cultivated land will continue to expand, posing a potential threat to China's food security and affecting the sustainable development of the rural economy [14].

Inadequate supervision leading to frequent irregularities

Problems have arisen in the construction of high standard farmland amid cultivated land protection. In some regions, the audit of high standard farmland has not been effectively enforced, or cases of favoritism and fraud have occurred. For instance, in the high standard farmland of Mibao Village, Wenquan Town, Xifeng District, Qingyang City, Gansu Province, there was illegal cultivation of apple trees. When reporters investigated, the apple trees had already grown as thick as a bowl in diameter-indicating that the audit of high standard farmland had not been implemented for a long time, or that irregularities existed during the implementation process. During field investigations, large areas of high standard farmland specified in project documents were not found, and the absurd situation of "holding blueprints but failing to locate the land" has occurred repeatedly.

Notably, the 2025 Central No. 1 Document explicitly stipulates that high standard farmland shall, in principle, be fully used for grain production and must not be arbitrarily adjusted or altered. However, despite the central government's high attention and clear requirements, phenomena such as "mismatch between actual farmland and project records" and "data fraud" persist. Furthermore, in accordance with the General Rules for High standard Farmland Construction, renovated high standard farmland shall feature "flat terrain,

concentrated and contiguous plots, and complete facilities". Yet, according to the actual conditions of high standard farmland in Qingyang, farmland related fraud takes various forms. For example, the management and maintenance of high standard farmland require central and local government subsidies for mechanical deep ploughing and organic fertilizer applications. However, in the local area, some farmland has not been fertilized effectively and properly. Surveys show that the local government directly distributed fertilizers to villagers, with no subsequent supervision or follow up measures after distribution. As a result, some villagers even resold the fertilizers. In 2025, Qingyang City was hit by a drought. Owing to the absence of supporting water cellars in the construction of high standard farmland, a local farmer cultivated 0.000267 million hectares of corn but yielded only over 1,000 kg, with an average yield of more than 3.75 metric tons per million hectares. This falls far short of the national target of ensuring stable and high yields irrespective of drought or flood conditions. Furthermore, the funds originally earmarked for the construction of "farmland access roads" in high standard farmland have been diverted to the asphalt-paved roads connecting to county-level roads. These problems have severely undermined the quality and efficiency of high standard farmland construction, diminished the effectiveness of cultivated land protection, and thus required high attention and the implementation of effective measures to address them.

Insufficient publicity on cultivated land protection

Some farmers have an insufficient understanding of the importance of cultivated land protection and lack awareness of it. Take a township in Henan Province as an example. In spring February, after surviving the winter, the wheat grew well, with dark green seedlings firmly rooted in the soil. Upon hearing that growing medicinal herbs would bring higher profits than growing wheat, farmer Zhang persuaded some villagers to uproot the wheat seedlings overnight. This practice is completely contrary to China's current policies on cultivated land protection and food security. As farmer Zhang put it, "Who would come to inspect here? This area is underdeveloped, and no one cares about whether we protect the land or not. This is my land, so I decide what to grow."

Farmers' lack of awareness of cultivated land protection and the overall concept of food security, as well as their limited understanding of the current international situation, is partly attributed to their own limitations. On the other hand, it also highlights the inadequacy of publicity on cultivated land protection. In some rural areas, farmers have limited knowledge of the laws, regulations and policy documents related to cultivated land protection, and even hold misunderstandings and prejudices. They believe that cultivated land protection is the government's responsibility and has nothing to do with their own interests, or that if they do not illegally occupy cultivated land, they can arbitrarily change its use.

This outdated mindset has led some farmers to prioritize short-term economic interests, arbitrarily changing the use of cultivated land-such as growing cash crops, engaging in other non-grain production, or even illegally constructing buildings on cultivated land. In addition, the forms of publicity and education on cultivated land protection are relatively simplistic, relying mainly on traditional methods such as slogan-posting and leaflet distribution. These methods fail to attract farmers' attention and achieve poor publicity results. Furthermore, the depth and scope of publicity and education are insufficient, failing to fully convey the importance and urgency of cultivated land protection to farmers. This results in farmers' lack of a sense of responsibility and mission regarding cultivated land protection.

To address these issues, it is essential to strengthen the publicity on cultivated land protection, innovate publicity approaches, improve publicity effectiveness, enhance farmers' awareness of cultivated land protection, and foster a sound atmosphere of whole-society participation in

cultivated land protection.

Countermeasures and suggestions for cultivated land protection

Simultaneous implementation of incentive and restraint mechanisms

To address the phenomenon of cultivated land abandonment, measures can be taken to encourage the reclamation of abandoned land. Through publicity and guidance, the public's awareness of the relationship between land reclamation and national food security, as well as its significance to food security, can be raised-thereby enhancing their enthusiasm for reclamation. Township and village governments should strengthen the statistics of migrant workers and adopt a statistical method based on the duration of migrant work. For example, for farmers who work outside for a short period, the government can encourage them to transfer their land contractual rights by means of reducing or exempting land rent and providing financial compensation, to accelerate land circulation. For those who work outside for a long time with no family members to cultivate the land on their behalf, a warning should be issued first. If the land remains unused after the warning, restraint measures must be implemented. Specifically, the contracting party can transfer the abandoned contracted land of such farmers within the village collective economic organization and assign the land for which farmers have failed to fulfill their cultivation obligations for a long time to capable land operators on a paid basis. Furthermore, a compensation mechanism for cultivated land protection can be established to provide certain economic compensation to rural collective economic organizations and farmers that have achieved remarkable results in cultivated land protection, to improve their enthusiasm for protecting cultivated land. Meanwhile, the responsibility assessment for cultivated land protection should be strengthened. The target of cultivated land protection should be incorporated into the assessment system of local governments, and accountability should be imposed on regions that fail to complete the cultivated land protection tasks, to ensure the implementation of cultivated land protection responsibilities. Through the dual functions of incentive and restraint mechanisms, farmers can be guided to rationally utilize cultivated land, reduce the occurrence of land abandonment, and thus ensure the effective supply of cultivated land resources.

Strengthening supervision and conducting irregular inspections

In terms of supervision, relevant departments can leverage technologies such as remote sensing and GIS to conduct real-time monitoring through satellite image comparison. Once abnormal areas are detected, advance notification should be avoided to prevent localities from evading central policies. Relevant personnel can conduct on-site inspections in plain clothes and report on the actual situation in a timely manner. In terms of inspections, irregular approaches should be adopted as much as possible to minimize the risk of "local evasion of policies".

To prevent bribery and malpractices for personal gain, higher-level authorities, taking workload into account, should carry out unannounced spot checks, strengthen mapping and archiving work, strictly investigate frauds such as digital land fabrication, and remain vigilant against the recurrence of similar incidents. Additionally, during the construction of high standard farmland, responsibilities for each link should be assigned to specific individuals. There must be designated people in charge of approval, supervision, and accountability, and shirking of responsibilities-where no one takes primary responsibility when problems occur-is strictly prohibited.

It is also necessary to encourage multi-stakeholder participation, expand the scope of entities involved in supervision, and form a supervision pattern involving the government, society, and the public. Meanwhile, the supervision and reporting

mechanism for cultivated land protection should be improved: Encouraging the public to report acts of illegal occupation or damage to cultivated land and providing certain rewards to those whose reports are verified. This will foster a sound atmosphere of whole-society joint supervision. By strengthening supervision and inspection work, problems in cultivated land protection can be promptly identified and corrected, ensuring the effective implementation of cultivated land protection policies and safeguarding the quantity and quality of cultivated land.

Strengthening publicity and enhancing guidance

Against the backdrop of the complex international situation, global food security has faced new challenges due to international factors such as the Russia-Ukraine conflict and the Palestine-Israel war. Coupled with the three-year COVID-19 pandemic, food security has become an increasingly pressing issue to address. Villagers should be made aware of such social contexts: Village cadres can regularly disseminate such information through the village public address system, helping villagers perceive the urgency of protecting cultivated land and safeguarding food security-thereby motivating them to actively comply with relevant regulations on cultivated land protection.

Furthermore, various problems encountered in the process of cultivated land protection can be used as typical cases and shared via the Internet to raise public awareness of the current situation. Relevant departments can guide village cadres to establish village-specific social media groups to forward related articles. To stimulate villagers' enthusiasm for engagement, village cadres can hold regular meetings where villagers are encouraged to share their views on typical cases of cultivated land protection. Villagers who actively speak up can be recognized and commended, for example, by posting their names in the village and sharing them in the group chat simultaneously.

Behaviors harmful to cultivated land protection and food security in the village should be addressed with prudence. Such handling should serve as a warning to others while preserving the harmonious atmosphere of the village collective. Meanwhile, diverse publicity activities for cultivated land protection should be carried out, such as holding knowledge competitions and cultural performances themed on cultivated land protection. These activities can convey knowledge and concepts of cultivated land protection to farmers in a vivid and engaging manner, enhancing their participation and interest.

In addition, publicity and education on laws and regulations related to cultivated land protection should be strengthened. Through activities like legal knowledge lectures and legal consultations, farmers can gain an understanding of relevant laws and regulations on cultivated land protection, improve their legal awareness and rule of law concepts, and thus consciously comply with the law and protect cultivated land in accordance with legal provisions. By strengthening publicity and guidance, farmers' awareness of cultivated land protection can be enhanced, and a sound atmosphere of whole-society participation in cultivated land protection can be fostered-thus laying a solid foundation for ensuring China's food security and the sustainable development of agriculture.

Outlook for cultivated land protection

China possesses the institutional advantage of pooling resources to accomplish major undertakings, which can provide strong factor support for cultivated land protection. General Secretary Xi JP emphasized, "A single grain can save a country, and it can also bring a country down" and "Whoever controls food controls humanity."

Food security is not only related to the daily needs of the people, but also an important part of national security. China must firmly uphold its food

sovereignty, allow no room for slackening on the issue of food security, and thus always keep the string of food security taut through careful planning. The Chinese people should unite their strength to jointly consolidate the "ballast stone" of China's food security.

With the continuous advancement of science and technology and the improvement of innovation capabilities, China is expected to make more breakthroughs and progress in the field of cultivated land protection. On the one hand, agricultural science and technology innovation will provide stronger technical support for cultivated land protection. For example, through the research, development and promotion of new agricultural planting technologies, soil improvement technologies, water-saving irrigation technologies, etc., Chinese agriculture can improve land output efficiency and resource utilization efficiency and realize the sustainable use of cultivated land.

On the other hand, digital information technology will play an increasingly important role in cultivated land protection. With the help of big data, cloud computing, Internet of Things and other technologies, it is possible to realize precise monitoring, precise management and precise decision-making of cultivated land, and improve the effectiveness of cultivated land protection.

Meanwhile, with the enhancement of people's awareness of ecological protection, cultivated land protection will be more closely integrated with ecological civilization construction, promoting the formation of green development methods and lifestyles, and realizing positive interaction between agricultural development and ecological protection. In addition, strengthening international cooperation and exchanges is also an important direction for cultivated land protection in the future.

China has made significant and lasting contributions to the sustainable development of global agriculture and the enhancement of world food security by actively sharing its expertise, technologies, and resources with other nations. This commitment is realized through various impactful approaches.

Conclusion

Cultivated land protection is a major strategic task related to the long-term stability of the country and the sustainable development of the nation. As the "lifeblood" of agricultural production and the material foundation for ensuring national food security, cultivated land bears the dual responsibilities of feeding nearly 1.4 billion Chinese people and maintaining the balance of the rural ecological environment. In an era where urbanization and industrialization are advancing rapidly, the phenomenon of illegal occupation, arbitrary conversion, and quality degradation of cultivated land still exists, which poses a hidden danger to the long-term stability of the national economy and social development.

In the future journey, the Chinese people should advance the work of cultivated land protection solidly with a firmer determination, more effective measures and a more pragmatic style. On one hand, we need to further improve the legal system for cultivated land protection, strictly implement the red line of 1.8 billion mu of cultivated land, and severely crack down on illegal acts such as occupying cultivated land for construction without approval. On the other hand, we should increase investment in agricultural science and technology, promote the construction of high standard farmland, improve the quality and productivity of cultivated land, and realize the coordinated development of cultivated land protection and agricultural modernization.

Only by taking cultivated land protection as a long term and systematic project, integrating it into the overall layout of national development, and mobilizing the enthusiasm of the whole society to participate in it, can we lay a solid foundation for

the realization of the Chinese Dream of the great rejuvenation of China, and ensure that the country has a stable “grain barn” and the nation has a sustainable “development foundation” for generations to come.

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Conflicts of Interest

The authors declare no conflict of interest.

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