Advances in Social Science and Culture
ISSN 2640-9682 (Print) ISSN 2640-9674 (Online)
Vol. 6, No. 1, 2024
www.scholink.org/ojs/index.php/assc

*Original Paper*

# Research on Legal Issues of Ecological Protection of Cultivated Land under the Background of Food Security

Peng Mingru[1*]

1 Law School of Guangxi University, Nanning City, China

* Peng Mingru, Law School of Guangxi University, Nanning City, China

Received: October 29, 2023 Accepted: December 15, 2023 Online Published: December 29, 2023

doi:10.22158/assc.v6n1p57 URL: http://dx.doi.org/10.22158/assc.v6n1p57

***Abstract***

*A sound legal system for ecological protection of cultivated land plays an important role in ensuring ecological protection of cultivated land and food security. The legalization of ecological governance will inevitably become an important governance approach in the future. With the development of agriculture and the further expansion of urban scale, the sustained high-intensity utilization of arable land resources has led to severe degradation, quality decline, ecological imbalance, and insufficient reserve resources. The sustainable utilization of arable land resources is facing severe challenges. This requires stricter requirements for farmland protection work, clear implementation of hard measures for farmland protection, and adherence to the strictest farmland protection system while comprehensively promoting the rule of law and ensuring food security. By exploring the problems in legal system for ecological protection of arable land, starting from timely strengthening the systematic legislation for ecological protection of arable land, improving the legal mechanism for ecological protection of arable land, improving legal measures for ecological control of arable land, and improving the legal protection system for pollution prevention and control of arable land, we aim to improve the legal system for ecological protection of arable land, promote the sustainable utilization of arable land resources, and ensure national food security.*

***Keywords***

*Food security, Ecological protection of cultivated land, Legal system, Improve the path*

## 1. The Necessity of Ecological Protection of Cultivated Land under the Background of Food Security

The concept of food security was first proposed at the 1974 World Food Conference. Food is a necessary condition for human survival. To achieve the goal of food security, it is necessary to ensure

that every person in a specific region can access a certain amount of food at any time to ensure human survival and health. The 2021 publication of the "Food Security Cadre Reader" believes that the connotation of China's food security includes food quantity security, food quality security, and food industry security. The 2019 Bulletin on the Quality Grades of Cultivated Land in China classified the quality of cultivated land into grades one to ten, with an average grade of 4.76, an increase of 0.35 levels compared to 2014. Among the 1.918 billion acres of arable land in China, less than one-third are high-quality, while over one-fifth are of poor quality. About two-fifths of them are sloping farmland, facing abandonment due to the difficulty of machine farming. There are also 180 million mu of arable land with a slope greater than 15 degrees, which is close to one tenth of the total arable land area. Flat arable land only accounts for about 62% of China's arable land. Due to the difficulty of mechanized cultivation, these sloping arable lands are facing the threat of natural degradation and desertification. According to the communique, the quantity and quality of China's arable land resources are worrying. In addition, in recent years, the phenomenon of abandonment, non agriculturalization, and non grainification of arable land in China has been expanding, further exacerbating the shortage of arable land resources, leading to a serious impact on food production capacity. Cultivated land is an important foundation for food production. Without ecological protection, cultivated land cannot guarantee the production and supply of food, thereby endangering national food security. Farmland protection can improve the efficiency of food production. Ecological high-quality farmland can increase the yield and quality of crops, reduce production costs, improve the economic benefits of agriculture, thereby increasing food supply and providing strong support for national food security. Ecological protection of arable land is also a necessary measure to promote sustainable agricultural development. In modern agriculture, agricultural production has shifted towards efficiency, ecology, and sustainability. This requires ensuring high-quality ecological farmland resources, strengthening ecological protection and management of farmland, maintaining soil fertility and ecological environment stability, and promoting sustainable agricultural development. In summary, under the background of food security, strengthening the ecological protection and management of arable land, ensuring the stable supply of arable land resources, improving food production efficiency, and promoting sustainable agricultural development are inevitable choices to ensure national food security.

## 2. The Current Situation of Ecological Protection System for Cultivated Land under the Background of Food Security

At present, the ecological protection of cultivated land in China has just begun, and the connotation of ecological protection of cultivated land is vague and even controversial. Professor Zhang Fengrong believes that the connotative of ecological protection of cultivated land should include three aspects: firstly, from the perspective of regional land spatial structure is inhibited to cultivate wetlands with important ecological service functions or even large areas of "unused land", and to return farmland that has caused serious ecological problems and severe degradation, or adjust it to other suitable land types;

The second is to improve the production function of high standard farmland or transform medium and low yield farmland, and make every effort to maintain or play its ecological function; Thirdly, it is necessary to ensure that cultivated land is not polluted during the utilization process and to minimize negative external environmental effects. (Zhang, 2021) Ecological protection of cultivated land is an important way to maintain sustainable development of cultivated land. It is necessary to simultaneously consider the quantity, quality, and ecological protection of cultivated land, and achieve the sustainable utilization and development of cultivated land resources. Due to long-term excessive pursuit of economic development, ecological protection of cultivated land has been neglected, resulting in many problems: firstly, the soil fertility foundation of cultivated land is weak and severely degraded. The data shows that the average organic matter content in Chinese farmland soil is 1.86%, which is lower than the world average. (Kong, 2020) According to the research of Zhang Fushuo (Zhang, 2016), since the 1980s, the pH of cultivated soil in China has decreased by 0.13-0.80, with soil acidification in the southern region being the most significant; The degradation of soil physical properties and the long-term excessive use of chemical fertilizers in monoculture have led to physical barriers in the soil of Chinese farmland. Secondly, the scarcity of water resources restricts and restricts the realization of the production potential of cultivated land. The center of gravity of cultivated land in China has an obvious northward movement trend. The north is a major grain producing area and a traditional resource water shortage area. The North China Plain has become one of the three major groundwater "funnels" in the world. The decline of groundwater level is not conducive to the utilization of cultivated land resources. Thirdly, soil pollution and ecological problems seriously constrain the sustainable utilization of arable land resources. The 2021 China Ecological Environment Status Bulletin shows that heavy metals are the main pollutants affecting the soil environmental quality of agricultural land in China, with cadmium being the primary pollutant. In 2021, the area of soil erosion in China was 2.6927 million square kilometers, with mild, moderate, severe, extremely severe, and severe erosion accounting for 63.3%, 17.2%, 7.6%, 5.7%, and 6.2% of the total soil erosion area in China, respectively. China is also one of the countries with the largest desertification area, the largest affected population, and the most severe sandstorm hazards in the world. According to data released by the State Forestry and Grassland Administration, the total area of desertified land in China is 2.6116 million square kilometers, accounting for 27.2% of the national land area; Desertification covers 1.7212 million square kilometers, accounting for 17.9% of the national land area. Desertification and desertification have become important hidden dangers affecting regional economic development and ecological security.

The stability of the farmland ecosystem is related to food security and livelihood strategies. The quantity and quality of farmland systems are of great significance for maintaining their basic functions and structure, promoting sustainable agricultural development, and maintaining ecosystem stability. China is a populous country, a major producer, importer, and consumer of food. In the current era of food hegemony, frequent extreme climate disasters, and increasingly complex international food trade

environment, the uncertainty of food production and imports has increased, and the national food security situation is severe. The security of farmland ecosystems has a profound impact on national food security, and practical and effective measures must be taken to ensure national food security.

## 3. Problems in the Legal System of Ecological Protection of Farmland under the Background of Food Security

Since the reform and opening up, China has continuously strengthened the construction of land rule of law, effectively protecting arable land and ensuring national food security has always been a major strategic focus of the country to ensure food security. At present, China has basically formed a legal system for the protection of arable land, with the Land Management Law and its implementation regulations, the Land Reclamation Regulations, the Basic Farmland Protection Regulations, and others as the core. Although the construction of the legal system for cultivated land has achieved good results, there are still many shortcomings in the legal system for ecological protection of cultivated land.

### *3.1 The Decentralization of Legislation on Ecological Protection of Farmland*

One is that the legal system for protecting arable land is not sound. Nowadays, important single line legislation in environmental protection such as the Marine Environment Protection Law, the Air Pollution Prevention and Control Law, the Water Pollution Prevention and Control Law, and the Mineral Resources Protection Law have already been promulgated. However, as a basic national policy in China, the Farmland Protection Law has not yet been officially promulgated, which is not in line with the importance of farmland resources. In this context, the relevant laws and regulations on the protection of cultivated land in China are scattered among multiple laws, mainly including the Land Management Law, the Implementation Regulations of the Land Management Law, the Land Reclamation Regulations, and the Basic Farmland Protection Regulations, covering various aspects such as land use control, basic farmland protection, land occupation tax and fee system, and legal responsibilities for land occupation. The current legal system for farmland protection is incomplete and scattered, which may lead to conflicts between different laws regarding farmland protection, affecting the effectiveness of farmland protection.

Secondly, there is insufficient coordination in legislation on ecological protection of cultivated land. In terms of legislation on ecological protection of cultivated land, it mainly involves a series of laws and regulations such as the land Management Law, the Environmental Protection Law, the Land Contracting Law, the Agriculture Law, the Water Law, the Fisheries Law, the Forest Law, and the Grassland Law. From the division of labor among management departments and the different legal settings, it can be fund that the Land Management Law is independent of other ecological and environmental protection legal systems and lacks integrated integration. (Wu, 2018) The current legislation on natural resources in China is to issue separate laws for each type of resource, which directly relates to the reasonable development of a certain type of natural resource under the jurisdiction of a single law. This may lead to neglecting the development and protection of other

resources, and even damaging and polluting other resources. The construction of ecological civilization and the protection of arable land in certain areas are a pair of contradictions, often colliding, and the phenomenon of "land competition" is repeatedly prohibited. Local governments sacrifice the ecological services of arable land for ecological civilization construction. In recent years, through investigations in Beijing, Tianjin, Hebei and other places, a large number of new illegal land use behaviors have emerged, using ecological agriculture, tourism development and other names to illegally occupy farmland and construct "greenhouse houses", "agricultural ecological houses", and "tourism villas" in disguised form. The ecological service value of farmland has been destroyed by such illegal land use behaviors, which is related to the insufficient legal system of ecological protection of farmland in China. The legal system for ecological protection of cultivated land is decentralized, with a fragmented legal framework and a lack of supporting policies for regulating the ecological service functions of cultivated land. There is a lack of clear regulatory standards and boundaries in policy implementation, which affects the timeliness and effectiveness of law enforcement and supervision of illegal land use.

*3.2 The Legal Mechanism for Ecological Protection of Farmland Is Incomplete*

One is insufficient protection of the ecological function of cultivated land. Cultivated land is the essence of land resources, which bears the functions of economic production, social security, ecological services and cultural inheritance. Farmland is a valuable means of agricultural production, which can provide products and services that meet the needs of human survival and development. It is also an important material condition for promoting economic development and an important barrier for maintaining social stability and supporting ecological security. At different stages of human social development, the demand for the function of cultivated land varies, and the economic and social factors of cultivated land currently dominate the impact on its function. Therefore, we are currently facing a situation where various functions of arable land are not coordinated, mainly manifested in the following aspects: firstly, we have long focused on "economic functions". As a traditional agricultural country, cultivated land has long played an important role in economic development in China. Moreover, influenced by the national political system, although local governments play the role of proxy managers for farmland protection, they often relax their control over farmland in order to explore more development opportunities. In some cases, farmland protection is seen as a burden on local economic development. Farmers, on the other hand, are limited by their own level of understanding and place greater emphasis on the economic output function of cultivated land, while neglecting the ecological, landscape, and cultural functions that are less relevant to their immediate interests. Secondly, overloading "social functions". The important impact of arable land on national food security is fundamental and strategic, and the production function of arable land can derive functions such as national food security and social security for farmers. The issue of agriculture, rural areas, and farmers has always attracted widespread attention in China and is also related to the stable operation of the entire society. China's special urban-rural dual system determines that most farmers still regard arable land as their primary livelihood guarantee. For a long time, China's rural social security system can

only rely on arable land, and the rural social security system is not yet perfect. It is difficult to build a comprehensive social security system for 900 million farmers in the short term, both financially and institutionally. In addition, due to the decrease in the quantity and quality of cultivated land in China, and the Russia-Ukraine conflict, the prospect of global food security is worrying. Cultivated land should not only take into account the social security function of farmers, but also ensure food security. Social functions have become "overloaded". Thirdly, neglecting the ecological value function. Currently, China advocates for the "three in one" protection of cultivated land quantity, quality, and ecology. The protection of cultivated land quantity and quality has already achieved significant results, but the ecological protection of cultivated land is facing difficulties, making it difficult to choose between production and ecology. It is crucial to play the ecological role of cultivated land. At present, the academic community has recognized the ecological value of cultivated land, but has not yet proposed specific methods and approaches to incorporate cultivated land into the ecological protection system. Governments at all levels and relevant departments also recognize the ecological value of cultivated land, but their understanding of ecological civilization construction and cultivated land protection has not yet reached a high level of collaborative protection. At present, China has a vague understanding of the ecological value of cultivated land in terms of farmland protection, and the ecological function of cultivated land is also relatively neglected.

Secondly, there is a lack of ecological compensation mechanism for regional cultivated land. The health status of cultivated land directly determines food security. While the main grain producing areas shoulder the burden of national food security, they also face increasingly severe agricultural security and ecological security protection issues of cultivated land. Due to long-term neglect of the ecological environment of cultivated land, major grain producing areas in China have varying degrees of ecological problems. Due to the long-term implementation of farmland protection policies, a large amount of farmland in the main grain producing areas has been used for grain production, resulting in the loss of opportunities to develop the secondary and tertiary industries and obtain high economic benefits. This has led to slow economic development, severe population loss, and backward socio-economic development. In addition, the lack of compensation for the interests of the main grain producing areas has made the vast grain producing areas "major grain producing areas", "industrial areas", and "financially poor areas". Nowadays, the core areas of China's grain production have shifted their focus, and hard constraints such as arable land and water resources have been further tightened. The economic benefits of agricultural and ecological land in the vast grain producing areas are low, and ecological land restoration is difficult to sustain. Farmers have meager income, and abandonment and abandonment of farmland occur from time to time. Despite possessing abundant land resources, they face the dilemma of "ecological diseconomy", "food diseconomy", and "agricultural diseconomy". In some economically developed areas, the process of industrialization and urbanization is accelerating, and construction land resources are scarce, making it difficult to find a single land, resulting in rising land prices. They do not need to play the role of major grain producing areas, allowing the government

to obtain substantial income through land transfer. The main grain producing areas have taken on too much responsibility for farmland protection, leading to an imbalance in farmland protection between regions. The current compensation mechanism for the interests of major grain producing areas in China is not perfect enough, coupled with limited compensation provided by cities and developed regions to these areas. This lack of institutional guidance and non-standard compensation mechanism will further widen the gap between major grain producing areas and other regions, exacerbating regional development imbalances (Zhao, 2018).

*3.3 Lack of Legal Measures for Ecological Control of Farmland*

Firstly, there are significant regional differences in the implementation of the policy of returning farmland to forests. Firstly, compared to other ecological projects, returning farmland to forests has extremely significant regional differences. This is because the implementation of returning farmland to forests covers a wide range of provinces in northern and western China, from Inner Mongolia Autonomous Region in the north to Yunnan Province in the south, from Heilongjiang Province in the easternmost part to Gansu Province in the westernmost part. China has a vast territory, significant differences in climate and terrain, and a complex and diverse geographical environment, which makes the problems encountered in the implementation of returning farmland to forests different. According to monitoring data in 2021, the area of soil erosion in the western region is 2.2473 million k square meters, accounting for 33% of its land area, seriously threatening the survival and development of people in the region. The implementation difficulty of the Grain for Green project in the region has also increased. In addition, there are differences in the level of economic development between different regions of returning farmland to forests. Compared with the eastern region, the western region has a lower level of economic development, which leads to significant differences in the understanding and acceptance of the policy by the local people. This is also an important factor affecting the implementation effect of returning farmland to forests. There are significant differences in natural conditions and cultural backgrounds among different regions, which can also limit the implementation of the policy of returning farmland to forests. Therefore, the complexity of the Grain for Green project is relatively high. Secondly, there are conflicts among the various stakeholders involved in returning farmland to forests. The main stakeholders include the central government, local governments, and farmers returning to farmland. Due to the central government's greater consideration of national ecological environment construction and social development, it is more cautious in implementing the policy of returning farmland to forests, prioritizing the overall interests. Local governments, on the other hand, place greater emphasis on local interests and prioritize the economic development and living standards of residents in the region. This has led to certain conflicts between the two sides in the implementation of the policy of returning farmland to forests. Due to the policy of returning farmland to forests being supported and supported by national financial funds, farmers will only actively participate in afforestation projects when private interests outweigh costs. These three issues are mutually conflicting, and how to resolve each conflict is a key factor in the success or failure of reforestation.

The second is the excessive utilization of arable land in the main grain producing areas. Grain production is the cornerstone of national food security, and the main grain producing areas are the core driving force for ensuring effective food supply. In the past decade, the grain production in 13 main production areas including Heilongjiang, Henan, and Shandong accounted for over 75% of China's total grain production. From 2013 to 2022, the total grain production of 13 major grain producing regions in China continued to increase, from 488.1 million tons to 537.18 million tons. The proportion of grain production in major grain producing regions to China's total production increased from 77.42% in 2013 to 78.25% in 2022, and the total grain production increased by 10% in these 10 years. (Xue, 2021) The pressure of grain production has led to high-intensity continuous cropping of arable land in the main grain producing areas, overdraft of arable land fertility, and many problems such as land degradation, serious decline in arable land quality, soil pollution, soil erosion, excessive consumption of water resources, and serious overexploitation of groundwater. The utilization and protection of arable land face significant pressure. The sustained intensive agricultural development and excessive exploitation of arable land directly threaten the sustainable utilization of resources and the ecological security of arable land, and may affect the country's long-term food security strategy.

The third issue is the imperfect legal system related to crop rotation and fallow. Firstly, the legal system for crop rotation and fallow has not yet been established. In recent years, China has successively issued relevant documents and the "Thirteenth Five Year Plan Suggestions", proposing to implement a system of crop rotation and fallow, with a focus on pilot projects in areas with groundwater funnels, heavy metal pollution, and severe ecological degradation. The 13th Five Year Plan for Agricultural Science and Technology Development proposes to carry out ecological planting models and technologies such as intercropping and rotation fallow for land cultivation. Notice on the Pilot Work of the 2019 Farmland Rotation and Fallow System, proposing a "technical route for fallow areas". The Fifth Plenary Session of the 19th Central Committee of the Communist Party of China passed the "Proposal of the Central Committee of the Communist Party of China on Formulating the 14th Five Year Plan for National Economic and Social Development and the Long Range Objectives for 2035", proposing to promote the recuperation of grasslands, forests, rivers and lakes, strengthen the protection of black soil, and improve the system of crop rotation and fallow. The report of the 20th National Congress once again emphasizes the establishment of a sound fallow and rotation system for arable land. Therefore, it is evident that the central government attaches great importance to the system of fallow and fallow cultivation. However, at the legal level, only Article 36 of the Land Management Law and Articles 27 and 54 of the Soil Pollution Prevention and Control Law involve the system of fallow and fallow cultivation, and the legal protection and supervision system of the system of fallow and fallow cultivation is lacking. At the national level, there are no relevant laws and regulations on the implementation of fallow crop rotation system yet; At the local level, there are also no sound local regulations and policies; The implementation of the fallow crop rotation system may lead to a vacuum between policies and laws. To ensure the effective implementation of the fallow crop rotation system,

corresponding legal support and maintenance must be provided to ensure consistency between policies and laws, as well as the effectiveness of policy implementation. In addition, it is necessary to establish comprehensive implementation rules and operational procedures, as well as establish unified industry standards and norms, to ensure the effective implementation of the fallow crop rotation system. In addition, the management of fallow cultivation requires the use of legal means to resolve conflicts of interest between the government, local authorities, and farmers, ensuring the effectiveness of fallow cultivation management and the sustainability of ecological efficiency of cultivated land. Secondly, farmers lack awareness and spontaneity towards fallow farming. In 2016, China implemented a pilot project of land rotation and fallow cultivation, and the implementation measures and rules for fallow cultivation in pilot areas were relatively complete. However, research has shown that farmers have a weak concept of implementing rotation and fallow cultivation. Farmers lack awareness and spontaneity of fallow farming. On the one hand, due to the top-down fallow model, many farmers do not have a comprehensive understanding of fallow policies, procedures, etc., but they still carry out fallow due to policy regulations, and very few farmers actively or voluntarily participate. On the other hand, traditional and backward agricultural knowledge also restricts the actual effectiveness of crop rotation and fallow. Some farmers believe that the so-called fallow farming refers to not plowing or planting, allowing the land to recover its fertility independently within a certain period of time. (Jiang, 2018) This traditional fallow farming method is called “abandoned fallow”. However, scientific crop rotation and fallow require a series of maintenance measures to be taken during the fallow period, such as loosening soil, planting green manure, irrigation, etc., in order to protect and improve land productivity.

*3.4 Inadequate Implementation of Laws and Regulations for the Prevention and Control of Farmland Pollution*

Firstly, the current laws and regulations on the prevention and control of farmland pollution are scattered. In order to achieve higher agricultural output, farmers invest too much in the application of fertilizers and pesticides, which not only has a direct impact on crops, but also causes large-scale non-point source pollution of farmland, bringing serious impacts. The extensive application of fertilizers and pesticides can lead to the release of organic and harmful substances in the soil, thereby affecting the normal growth and development of crops, thereby affecting food security, damaging ecosystem diversity, threatening water safety and human health, and even causing serious environmental pollution, which has a huge impact on agricultural ecosystems. Since entering the new century, China’s grain production has achieved continuous growth, with a total grain production of 1373.1 billion catties in 2022, reaching a historic high. However, the continuous increase in grain production is inseparable from the high input of pesticides and fertilizers. Since 2000, the amount of agricultural chemical fertilizers and pesticides used in China has been continuously increasing, showing a continuous upward trend. In addition, the situation of non-point source pollution in farmland is severe due to the indiscriminate disposal of agricultural film and other waste materials. In this context, although various levels of government in China have taken various measures to prevent and

control non-point source pollution of farmland, they have also achieved certain results. However, in practice, due to insufficient technical means and capital investment, the dispersion, latency, difficulty in detection, and difficulty in supervision of farmland non-point source pollution control have led to insignificant prevention and control effects, and strict implementation of pollution prevention and control measures is difficult. The problem of farmland non-point source pollution still exists in large quantities, and prevention and control work faces challenges. Faced with the current severe pollution situation, controlling non-point source pollution of farmland is an important measure to ensure China's food security and sustainable agricultural development, as well as an important guarantee for maintaining national security and social stability. At present, a legal system for soil pollution prevention and control has been formed with the Soil Pollution Prevention and Control Law as the core. Although there are many laws and regulations related to the prevention and control of farmland pollution, there are also barriers to departmental laws. Firstly, the prevention and control of pollution on cultivated land has its particularity, and the Soil Pollution Prevention and Control Law only provides special provisions for the prevention and control of soil pollution on agricultural land in the "risk control and restoration" section, while other parts are general provisions. The particularity of pollution prevention and control on cultivated land has not been specifically realized. In addition, there are many sources of pollution in farmland, often involving different management agencies such as environmental protection, agriculture, and water management. The power boundaries of each agency have not been clearly defined due to the lack of unified legislation. In such situations, the phenomenon of power struggle and buck passing is not uncommon. This situation has led to a chaotic management system for farmland pollution and poor enforcement effectiveness. At the local legislative level, local regulations can be formulated to prevent and control farmland pollution. However, there is still a lack of unified legislation on farmland pollution in China, which can easily lead to defects such as arbitrary legislation and weak operation in local farmland pollution prevention and control.

The second issue is the imperfect construction of the standard system for environmental pollution of cultivated land. At present, the requirements for the prevention and control of farmland pollution in China are becoming increasingly high, and existing standards are difficult to meet the needs of farmland pollution prevention and control. Firstly, due to the lack of risk control values for individual basic projects, it is impossible to implement control measures for this type of pollutant in farmland. The Agricultural Land Standard specifies risk screening values for 8 basic projects, but only provides risk control values for 5 projects, without involving risk control values for the three basic projects of copper, nickel, and zinc. Not fully considering the migration and accumulation effects of these metal elements in soil may pose potential hazards to the soil environment. If the pollutant content in cultivated land is high, and the value is higher than the screening value corresponding to that pollutant, and the pollutant content is less than or equal to its corresponding control value, the operator can adjust the agricultural production method and plant other types of agricultural products to ensure that the agricultural products are not contaminated and improve the quality and safety of agricultural products. If the pollutant

content in a piece of farmland exceeds the reference value of relevant pollutants, the agricultural products grown on that plot cannot be consumed. From this, it can be seen that due to the uncertainty of project risk control values and the uncertainty of pollutants in cultivated land, relevant entities are unable to implement effective control over them, which in turn cannot guarantee food security and the ecological health of cultivated land. Secondly, there are few types of organic pollutants in the standard. The probability of using pesticides and fertilizers in agricultural production in China is increasing year by year. According to data released by the Ministry of Ecology and Environment, the fertilizer utilization rate of China's three major grain crops, rice, wheat, and corn, was 40.2% in 2020, and the pesticide utilization rate was 40.6%. These organic pollutants have become important pollutants in China's farmland. Due to the widespread use of pesticides and fertilizers, they can enter the environment through bio-accumulation, bio-accumulation, and pathways such as atmosphere, water, and soil, thereby causing toxicity to human health. In addition, these organic pollutants may also cause cancer, carcinogenicity, induce various diseases, and pose a huge threat to human survival and development.

Thirdly, the legal responsibility is unreasonable. The current Law on the Prevention and Control of Farmland Pollution has unreasonable provisions on legal liability. Firstly, the legal responsibility of administrative agencies in preventing and controlling farmland pollution has been overlooked. The current laws on the prevention and control of farmland pollution have detailed provisions on the legal responsibility of polluters, but the legal responsibility for illegal and derelict acts of administrative entities is insufficient, resulting in the phenomenon of "failure to follow the law, lax enforcement, and failure to investigate violations" in the law enforcement process, greatly reducing the effectiveness of administrative agencies in law enforcement. Secondly, the administrative penalty measures are unreasonable. The current laws on the prevention and control of farmland pollution mostly impose administrative penalties on illegal activities that pollute farmland, mainly including fines, orders for correction, confiscation of illegal gains, etc., to ensure effective protection of farmland resources. However, there are also situations where administrative penalty measures are unreasonable and the punishment effect is poor. Taking fines as an example, for intentional and malicious illegal pollution of farmland, the amount of punishment is too low and obviously cannot play a sufficient deterrent role. There are few regulations on measures to restore the soil environment of cultivated land, but the remediation of contaminated soil has a long cycle, high difficulty, and high technical requirements, making it difficult to complete in a short period of time. Therefore, legal regulations should be improved. Thirdly, criminal responsibility is unreasonable. Farmland pollution, as a serious environmental problem, has the characteristics of long-term latency and concealment. During a period of time after the subject of the behavior has committed farmland pollution, the consequences of farmland pollution are difficult to manifest and the consequences of pollution are difficult to prove in the short term. The crime of polluting the environment is a result offense, and the prerequisite for assuming criminal responsibility is that the act causes significant environmental pollution

consequences. This also means that many behaviors that seriously pollute farmland do not constitute environmental pollution crimes and therefore do not bear criminal responsibility if no major pollution accidents have occurred, or if no major pollution accidents have occurred. Such regulations are obviously unreasonable, with unreasonable legal responsibilities, unclear rights and responsibilities, and difficult measures to implement. They cannot fully punish related crimes and are not conducive to the smooth and orderly implementation of farmland pollution prevention and control work.

## 4. The Pathto Improve the Legal System of Ecological Protection of Farmland under the Background of Food Security

Protecting arable land resources in accordance with the law is a necessary path for China to achieve sustainable development. Currently, the legal system for protecting arable land resources in China is not systematic enough, especially the lack of legislation on ecological protection of arable land. The existing legal system has not yet formed a good constraint on ecological protection measures for arable land, such as fallow rotation, damage and pollution of arable land resources. Therefore, it is necessary to improve the legal system for ecological protection of farmland from multiple aspects to ensure the effective promotion of ecological protection of farmland.

### *4.1 Timely Strengthen the Systematic Legislation on Ecological Protection of Cultivated Land*

One is to improve the legal system for ecological protection of cultivated land. At present, the laws and regulations on farmland protection are mainly reflected in the Land Management Law, the Implementation Regulations of the Land Management Law, the Land Reclamation Regulations, and the Basic Farmland Protection Regulations, covering multiple aspects. However, the provisions on farmland protection are still relatively scattered and lack systematicity, which cannot effectively solve the new situations and problems that arise in farmland protection work. As a precious and special arable land resource, the Black Soil Protection Law can provide certain reference for the formulation and development of arable land protection laws. However, to establish a systematic framework for arable land protection, a more targeted legislative system needs to be constructed. 1.8 billion mu of arable land is the foundation of national food security, and it must be taken as the bottom line to strengthen overall protection. Efforts will be made to enhance the intensity of farmland control and resolutely curb the trend of continuous reduction in the quantity and quality of farmland. We need to scientifically delineate the red lines for arable land and permanent basic farmland, establish and improve a balance system for arable land occupation and compensation, and ensure that the quantity, quality, and production capacity of supplementary arable land are equivalent to those of non-agricultural construction arable land. Actively promote the construction of high standard farmland, strictly control the scale of non agricultural construction occupying farmland, actively carry out the transformation of high standard farmland and the development and utilization of unused land suitable for agriculture, and effectively improve the quality of farmland. Take measures to guide farmers to reasonably transfer their land management rights and promote the large-scale development of

agriculture. Actively promote the registration and certification of rural land rights, establish and improve the system for the transfer of land contracting and management rights, and establish a regulatory mechanism for the registration and certification of land contracting and management rights. We need to strengthen the government's assessment of the responsibility for protecting arable land, strengthen the main responsibility of rural collective economic organizations, and ensure that they have a responsibility to protect and fulfill their duties. Intensify the protection of arable land, implement the "field chief system", layer by layer strengthen responsibilities, and implement land law enforcement and supervision. We need to strengthen the main responsibility of rural collective economic organizations, guide farmers to use land in accordance with laws and regulations, and safeguard land rights and interests. Strengthen the implementation of farmland protection responsibilities and use control in the process of contracted management, and ensure national food security.

The second is to strengthen the coordination of legislation on ecological protection of cultivated land. In order to improve the legal level of farmland protection work and further improve the legal system of farmland protection, it is necessary to strengthen the coordination of legislation on farmland ecological protection when formulating farmland protection laws. Firstly, we must always adhere to the stability, scientificity, and operability of the law, balance the basic concepts of environmental protection and sustainable development, respect the original intention and purpose of the law, incorporate it into the existing legal system as a whole, use systematic interpretation methods to regulate it, ensure the legitimate rights and interests of farmers in the protection of farmland ecology, and ensure that the law complies with the principles of farmland protection. Secondly, by formulating the Law on the Protection of Cultivated Land, clarifying the connotation of cultivated land, administrative law enforcement subjects, and boundaries of power exercise, we ensure that the utilization and protection of cultivated land are effectively protected by law, thereby providing comprehensive legal protection for government, enterprises, and farmers, promoting modern agricultural development and rural construction, and achieving sustainable development of rural economy and ecological civilization. Finally, it is necessary to strengthen the interconnection between laws. When constructing legislation for ecological protection of farmland, it is necessary to consider the functional transformation between different land types, fully recognize the relationship between existing laws and regulations, to ensure the operability of the legal system for ecological protection of farmland, and make necessary adjustments according to the actual situation to adapt to new situations and changes. Therefore, in the process of formulating legislation for ecological protection of cultivated land, it is necessary to strengthen the connection with existing laws and regulations. Legislation should also adhere to the concept of ecological civilization. Advocating ecological civilization is to link human development needs with the survival and development of the biological world. As an important component of the natural ecological giant system, the utilization layout of cultivated land is the main spatial carrier for ecological civilization construction. The scientific and orderly layout of national land space is of great significance for achieving green development and meeting the needs of life and consumption.

Therefore, we should adhere to the overall cognitive view of "mountains, rivers, forests, fields, lakes, and grasses" as a community of life, establish new concepts for ecological management of farmland, and promote sustainable utilization of farmland. At the same time, through the mutual adaptation between the multifunctional integration of cultivated land and the construction of ecological civilization, regional ecological security and high-quality socio-economic development can be achieved. The results of the "three adjustments" show that China's ecological construction has achieved positive results, and the achievements must be consolidated. In response to the unstable ecological construction pattern in certain regions, it is necessary to further strengthen management, enhance ecological construction, and increase efforts to implement protection measures. We must adhere to the strictest ecological environment protection system, build a more stable ecological environment, and achieve sustainable development. Therefore, strengthening the ecological protection of cultivated land is a key measure for green development based on the logic of ecological security strategy, a basic condition for ensuring China's food security and food safety, reflecting the advancement of laws with the times, respect for scientific laws, and compliance with social development needs. It is also a strategy for implementing natural resource management and sustainable utilization under the background of socialist ecological civilization. (Fang, 2020)

*4.2 Establish a Sound Legal Mechanism for Ecological Protection of Arable Land*

One is to fully leverage the multifunctional protection and interest coordination mechanism of cultivated land. Firstly, it is necessary to establish a broad range of values for cultivated land and improve the evaluation index system for the value of cultivated land resources. In addition to providing food and important agricultural products, cultivated land also has multiple functions such as ensuring employment, soil and water conservation, maintaining biodiversity, landscape and cultural support. The non social value of cultivated land protection is included in the government decision-making framework, mainly reflected in the social security and ecological construction of cultivated land, in order to achieve the goal of effectively utilizing land resources and protecting the ecological environment. Secondly, by exchanging resources between regions, we can compensate for the opportunity costs paid by land protectors. At the same time, strict restrictions should be imposed to avoid the occurrence of abnormal situations such as improper protection of farmland for profit and occupation of farmland for development, reduce the huge social costs of farmland protection, and achieve balanced development of interests among all parties, forming a balance between the benefits of protecting farmland and the costs of occupying farmland. Finally, in order to optimize the functional allocation of arable land, arable land, as an important component of the rural regional system, has dual attributes of resources and assets. Attention should be paid to the coupling relationship between the characteristics of arable land and regional socio-economic development. Macroscopically speaking, in the developed eastern coastal areas with high levels of economic development and productivity, the main focus should be on leveraging the ecological and cultural functions of cultivated land; In the central region where agriculture is an important industry, the focus should be on improving production

functions; In the western regions where the ecological environment is fragile and the level of economic development is relatively low, most farmers still rely on arable land for livelihood. Therefore, based on strengthening ecological design, emphasis should be placed on the social security function of arable land.

The second is to improve the ecological compensation mechanism for cultivated land areas. Farmland protection is the foundation for ensuring food production security and plays an important role in ensuring sustainable growth of food production. Corresponding institutional mechanisms and policy systems should be established. (Li, 2020) In order to ensure the safety of cultivated land in the main production areas, the country should take measures to strengthen the protection of cultivated land. Therefore, it is necessary to accelerate the construction of a compensation legal system for the protection of cultivated land in the main production areas of grain, improve the income level of grain farmers, and safeguard their legitimate rights and interests. Specifically, first of all, it is necessary to clearly define the compensation subject, clarify the compensation object and compensation standards, and formulate relevant regulations to determine the source and operation mode of compensation funds. Secondly, it is necessary to determine the specific usage method and operation mechanism of compensation funds to ensure the effectiveness of farmland protection compensation. Finally, it is necessary to improve the supervision and management system, formulate corresponding laws and regulations to regulate the use and distribution of compensation funds, and use an effective supervision and management system to ensure the effective use of compensation funds for farmland protection. In addition to expanding the sources of compensation funds, the government also needs to strengthen the supervision of farmer participation in standard formulation and fund operation to ensure the effective implementation of compensation measures for farmland protection. In short, only by improving and strengthening the legal system for protecting and compensating cultivated land in major grain producing areas can we truly achieve effective protection and sustainable utilization of cultivated land resources by the country, and to some extent, promote the development of China’s agriculture and rural economy.

*4.3 Improve Legal Measures for Ecological Control of Cultivated Land*

One is to promote the transition from returning farmland to forests and grasslands to crop rotation and fallow cultivation. At the end of the last century, China began implementing the policy of returning farmland to forests and grasslands in response to the problem of unreasonable utilization of arable land, especially in mountainous areas and the blind expansion of arable land in the transitional zone between agriculture and animal husbandry. This policy was piloted in 1999 and quickly began to work within China. The White Paper “Twenty Years of Returning Farmland to Forests and Grasslands in China (1999-2019)” shows that over the past twenty years, China has accumulated over 515 million mu of farmland to forests and grasslands. Returning farmland to forests and grasslands has produced significant ecological effects in water source conservation, wind and sand prevention, carbon and oxygen fixation, and has also promoted the adjustment of agricultural industry structure and helped

farmers lift themselves out of poverty and become prosperous, resulting in significant social and economic benefits. Ultimately, it has made important contributions to increasing forest carbon sinks, responding to climate change, and participating in global ecological governance. The systematic return of farmland to forests and grasslands has fundamentally reversed the trend of farmers in mountainous areas destroying forests and reclaiming land to increase arable land, and basically solved the ecological problems caused by the unreasonable use of arable land in mountainous areas and the agricultural pastoral transitional zone. (Song, 2022) Currently, due to the outflow of young and middle-aged labor in mountainous areas, the phenomenon of abandoned farmland is frequent. In addition, the coexistence of "non grainification" and "non agriculturalization" of cultivated land in plain areas has intensified the pressure on food security. As a result, the pressure on grain production in some cultivated land has increased, leading to high-intensity continuous cropping and severe soil overdraft, resulting in many problems such as land degradation, soil pollution, soil erosion, and excessive consumption of water resources. The utilization and protection of cultivated land is facing significant transformation pressure. In this context, crop rotation and fallow can efficiently integrate and optimize resource allocation, becoming a new approach to ecological protection of cultivated land.

The second is to strengthen the ecological protection of cultivated land in the main grain producing areas. Firstly, strictly control the scale of construction land. With industrialization and urbanization, a large amount of high-quality farmland has been occupied. Compared with other regions, the main grain producing areas have more abundant arable land resources. The scale of construction land should be strictly controlled, land should be used intensively, and the phenomenon of attracting project investment with cheap land should be resolutely eliminated. Develop corresponding management measures, strictly control the occupation of farmland for construction according to the characteristics of different regions, ensure the long-term sustainable use of high-yield and high-quality farmland, and achieve sustainable agricultural development. (Yuan, 2017) Secondly, we will continue to promote the construction of high standard farmland, optimize and integrate related projects, scientifically and reasonably arrange the construction schedule, and coordinate the crop planting structure and layout. We will continue to promote the construction of high standard basic farmland, and strengthen the construction of farmland infrastructure and soil improvement in accordance with the requirements of "no reduction in quantity and improvement in quality". Improving the quality of farmland and consolidating the foundation of high-yield soil can not only increase grain production capacity, but also enhance the disaster resistance of farmland. In the process of constructing high standard farmland, special attention should be paid to improving soil and enhancing basic soil fertility. (Guo, 2020) Thirdly, improve the technology promotion system for protecting the fertility of cultivated land. On the one hand, it is necessary to continuously increase the development efforts of soil conservation technologies, develop soil conservation technologies with low costs, significant results, and easy acceptance, and form corresponding technical specifications. On the other hand, we will carry out detailed investigation and remediation pilot work on soil pollution, and establish and improve relevant monitoring and

evaluation systems. Build a technical system, service system, and support system for the protection and improvement of farmland quality, and strengthen scientific research and technology promotion and application.

The third is to establish strict legal measures for crop rotation and fallow. Firstly, establishing a fallow crop rotation system and enhancing its legal status is a systematic project that cannot be achieved solely through the efforts of one party. At the legal and regulatory level, it should be incorporated into laws and regulations, and coordinated with land property rights systems, land management systems, and systems such as returning farmland to forests and grasslands, to form a complete policy system. At the same time, it is necessary to gradually establish sound policies, such as establishing effective compensation mechanisms, appropriate subsidies, and strengthening supervision and inspection of farmland protection work. In addition, it is necessary to adjust the local government's grain production target assessment system to ensure the effective implementation of the fallow crop rotation system. Only in this way can the fallow rotation system truly play a role, benefit farmers, and improve the agricultural environment and food security. Secondly, fully mobilize the awareness of fallow farming among farmers. The state can leverage the support of grassroots governments, village committees, and village social organizations to increase the promotion of fallow cultivation, eliminate concerns among farmers about the deprivation of arable land, and explain the economic accounts of farmers before and after fallow cultivation. At the same time, the government should provide re employment training for farmers who engage in fallow farming, improve their professional skills, increase their economic income, and provide social security for the elderly population of fallow farmers to meet their living needs. In addition, the government should establish a dedicated department for fallow management to manage and supervise fallow. Through these measures, on the one hand, it can promote the smooth implementation of fallow land, and on the other hand, it can also make farmers aware of the importance and necessity of ecological protection of cultivated land.

*4.4 Establish a Sound Legal Protection System for the Prevention and Control of Farmland Pollution*

One is the implementation of a strict legal system for the prevention and control of farmland pollution. To ensure the effective implementation of laws on the prevention and control of farmland pollution, a legislative system for farmland pollution prevention and control that reflects the characteristics of the farmland environment and public opinion should be established to ensure the effective implementation of farmland pollution prevention and control work. On the basis of current relevant laws and regulations, combined with practical needs, determine the basic principles and measures for preventing and controlling farmland pollution, adhere to the principle of prioritizing farmland protection and the best protection technology, and establish a sound system for preventing and controlling farmland pollution. Firstly, effective measures should be taken to prioritize the protection of arable land, and risk control measures should be taken for arable land with high pollution risks to prevent further pollution and avoid contamination of unpolluted arable land. At the same time, it is necessary to treat and restore already contaminated arable land to ensure soil environmental quality. Secondly, improve the

ecological compensation system for non-point source pollution control of farmland. Against the backdrop of increasingly severe non-point source pollution on farmland and the lack of effective pollution control measures, the country should promptly introduce systematic ecological compensation policies for the control of non-point source pollution on farmland, clarify compensation objects, formulate reasonable compensation standards, clarify compensation methods, and supervise compensation effects, in order to build a sound ecological compensation policy for the control of non-point source pollution on farmland. Establish an effective ecological environment protection mechanism to enable farmers to better utilize arable land resources, reduce pollutant emissions, improve the ecological environment, and provide more development opportunities for them. Once again, clarify the responsibilities of relevant parties. From the perspective of ecological civilization construction, establish the concept of green development legislation, clarify the responsibilities of the government, producers, and farmers, and incorporate abstract responsibilities into legal provisions, truly exerting the positive role of the law in preventing and controlling non-point source pollution of farmland. It can also provide legal protection for improving the quality of cultivated land, protecting the ecology of cultivated land, achieving environmentally friendly agricultural production, and ensuring food security. Finally, strengthen the supervision and inspection of the use of agricultural inputs, the disposal of agricultural inputs after use, and the disposal of agricultural inputs after disposal, and investigate and punish illegal activities in accordance with the law; Regularly carry out soil environmental quality monitoring work, grasp the real-time dynamics of soil environmental quality, and provide strong support for improving soil environmental quality.

The second is to improve the ecological environment standard system for cultivated land. Firstly, the adherence to the principle of strict standards. According to the provisions of the Soil Pollution Prevention and Control Law, local legislation should be based on ensuring the quality and safety of agricultural products and human health when formulating risk control standards for farmland soil pollution. Projects that are stricter than national standards can be formulated to maintain the quality and safety of farmland in the local area. In addition, when formulating more specific standards for risk control of cultivated land, the characteristics of cultivated land in different regions should be fully considered, and targeted standards should be formulated to achieve refined management of cultivated land in different regions. This can not only meet the control of soil pollution risks in different regions, but also be used for the improvement of national standards. Secondly, supplement the basic project risk control value. At present, China's Agricultural Land Standards stipulate risk control values for 8 basic projects and risk screening values for 5 basic projects. However, with the extensive use of chemical and organic fertilizers in agricultural production, the content of elements such as copper, zinc, and nickel in cultivated soil continues to increase. Even though copper, zinc, and nickel are metal elements required for crop growth, excessive amounts can have adverse effects on crop growth, causing heavy metal accumulation and leading to crop pollution, seriously endangering crop safety. Therefore, when formulating the basic project risk control values, adjustments should also be made according to the

actual situation to ensure the applicability and scientificity of the standards. Suggest supplementing the basic project risk control values in the Agricultural Land Standards to maintain the ecological security of cultivated land.

The third is to strictly enforce the legal responsibility for ecological protection of cultivated land. The current legal liability regulations for farmland pollution cannot effectively control and manage the destruction and pollution of farmland. Therefore, the urgent need to control farmland pollution cannot be fully met, and the severe situation of farmland destruction and pollution is becoming increasingly out of control. To solve this problem, diversified solutions are needed. Firstly, it is necessary to urge administrative agencies to assume corresponding legal responsibilities. Make clear provisions in the law on the specific legal responsibilities that relevant administrative agencies should bear in the prevention and control of farmland pollution, in order to urge administrative agencies to strictly enforce the law. In addition, if pollution behavior occurs due to the inaction of the administrative department, the administrative department should also bear the corresponding legal consequences and supplementary responsibilities. The second is to strictly enforce administrative responsibility. The current administrative responsibility for farmland pollution in China is relatively light, and there is a contradiction between it and the serious situation of farmland pollution. Therefore, administrative responsibility should be further strictly enforced. For example, in the case of difficulty in restoring contaminated farmland, when determining the compensation amount, full consideration should be given to increasing compensation to cope with the cost increase caused by long-term restoration. From the perspective of restoration costs, it is recommended to increase the punishment for soil pollution and increase the cost of illegal activities. The third is strict criminal responsibility. The existing criminal law stipulates that the crime of polluting the environment is a result offense, but due to the lag and concealment characteristics of farmland pollution, the actual harm results are not easily discovered in a timely manner. Based on this, the result offense should be changed to an abstract dangerous offense. The act of discharging and accumulating environmental pollutants does not require actual harmfulness, but objectively has the possibility of causing major environmental pollution accidents, and the perpetrator needs to bear corresponding criminal responsibility. By strictly enforcing legal responsibilities, punishing environmental violations and crimes, and leveraging the general social preventive effect of laws on farmland pollution prevention and control, we can promote the healthy development of farmland pollution prevention and control.

## References

Fang, B. (2020). China’s arable land protection system in the context of ecological civilisation: Generative logic and contemporary revelations. *Land Science Dynamics*, *5*(1), 9.

Guo, X. Y. (2020). Mechanisms affecting the overdraft of arable land in China and countermeasures for its management. *Rural Economy*, *3*(3), 32.

Jiang, J. L. (2018). Research on Constraints and Countermeasures of Implementing Fallow Ploughing

System in China. *Journal of Southwest University (Social Science Edition)*, *3*(3), 54.

Kong, X. B. (2020). Strategies and paths of arable land protection in China in the context of ecological civilisation. *China Land Science Dynamics*, *16*(1), 2.

Li, Z. (2020). Research on the ecological security of the main grain producing areas. *Study and Exploration*, *8*(4), 90.

Song, W. (2022). Promoting the All-round Transformation of Cultivated Land Protection in the New Era. *China Land Science Dynamics*, *11*(1), 25. https://doi.org/10.3390/land11081184

Wu, Z. L. (2018). Interlaw Integration and Institutional Interaction of "Cultivated Land Protection"-Centred on the Synergistic Regulation of Tax and Environmental Laws. *Journal of Nanjing University of Technology (Social Science Edition)*, *11*(4), 3.

Xue, X. D. (2021). Analysis of the spatial correlation between the ecological footprint of arable land and food security in major grain producing areas. *Ecological Economy*, *15*(8), 94.

Yuan, H. B. (2017). Research on the protection of arable land quality and sustainable development of agriculture in the main grain-producing areas of Northeast China. *Economy Vertical and Horizontal*, *13*(11), 109.

Zhang, F. L. (2016). Current status and impact of soil acidification in Chinese farmland. *Democracy and Science*, *6*(2), 26.

Zhang, F. R. (2021). Clarifying the Connotation of Ecological Protection of Cultivated Land. *Qinghai Land and Economic Strategy*, *11*(5), 37.

Zhao, G. Q. (2018). How to integrate and coordinate ecological construction and arable land protection. *Resource Guide*, *13*(7), 18.