

Review

# Value Objective, Game Analysis and Approach to Rule of Law for Comprehensive Supervision of Agricultural Natural Resource Assets in China

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**Abstract:** The establishment of the Ministry of Natural Resources and the Ministry of Agriculture and Rural Affairs of China marks the integrated installation of centralized and unified supervision of agricultural natural resource assets. It is of great practical significance to explore comprehensive systems of supervision of agricultural natural resource assets with the aim of super-ministry system restructuring; this could provide support for the development of new quality agricultural productivity. This paper mainly discusses the value objective and the approach of the rule of law concerning comprehensive supervision of agricultural natural resource assets in China with the aim of super-ministry system restructuring and codification. It combines a normative analysis of law with an economic analysis to address the current laws and regulations concerning the supervision of agricultural natural resource assets and summarize the existing problems of the supervision system. From the perspective of game equilibrium, the paper explores the reasonable expected utility of multiple entities under comprehensive supervision of agricultural natural resource assets. The results show the following: (1) The value objective of comprehensive supervision of agricultural natural resource assets should include process-oriented, multi-participation asset accretion and technological innovation. (2) Different supervision departments have different objectives and interests with respect to taking risks. (3) From the perspective of game equilibrium, an effective balance between development and use and comprehensive supervision of agricultural natural resource assets calls for a reconstruction of the structure of rights (powers) and for practical systematic selection. Therefore, this research recommends that efforts to improve the legal systems of comprehensive supervision of agricultural natural resource assets in China should take comprehensive supervision legislation as an approach to solving the issues and should also take comprehensive central and local cohesion as realization mechanisms, highly integrated and coordinated in legislation, while allocating to various institutions responsibility for the efficient use of agricultural natural resource assets, and the protection of rural green ecological environment, to promote the revitalization of rural ecology, and the security of agricultural resources.

**Keywords:** agricultural natural resource assets; comprehensive supervision; process-oriented; game equilibrium; comprehensive legislation



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## 1. Introduction

### 1.1. Background

A report of the 20th National Congress of the Communist Party of China emphasizes the importance of “pursuing green development and promoting harmony between humanity and nature”, and “taking a holistic and systematic approach to the conservation and improvement of mountains, waters, forests, farmlands, grasslands, and deserts”. The agricultural ecosystem comprises various natural resource assets, including mountains,

water bodies, forests, fields, lakes, grasslands, and sand, each exhibiting different ecological characteristics. It represents a complex structure and multifunctional biological communities, characterized by mutual interconnectivity, transformation, and influence, embodying a holistic and systematic natural phenomenon [1]. In 2018, China established the Ministry of Ecology and Environment, the Ministry of Agriculture, and the Ministry of Natural Resources and its affiliated National Forestry and Grassland Administration. The reform of the supervision system for agricultural natural resource assets in China is trending towards a departmental consolidation approach. With the institutional restructuring of Chinese state sectors, comprehensive supervision of agricultural natural resource assets has become an inherent goal. Compared to decentralized supervision, comprehensive supervision exhibits differences in supervision subjects and methods. Comprehensive supervision promotes the protection and governance of natural resource assets through a systematic approach that considers all natural resource assets within the entire ecological system as supervision subjects. This method has also been referred to by some scholars as “unified management” [2] or “integrated management” [3]. However, the current supervision system for natural resource assets in Chinese agriculture remains predominantly agency-driven, employing a decentralized supervision approach across various categories of natural resource assets. Given the externalities associated with natural resource assets, on 14 April 2019, the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council issued the “Guiding Opinions on Coordinating the Advancement of the Reform of the System of Property Rights of Natural Resources Assets”. This document mandates the engagement of the People’s Congress, administrative bodies, auditing institutions, and judicial systems as well as social oversight to ensure dynamic and effective supervision and management throughout the entire process of market transactions involving natural resource assets. The aim is to enhance the legal supervision system governing these assets and to establish multifaceted supervision synergy.

### 1.2. Literature Review

Currently, research on the supervision system governing natural resource assets in agriculture is abundant. The research characteristics are distinctive in different disciplines and different regions.

First, from the perspective of research discipline, existing research mainly focuses on two perspectives: law and economics. Legal scholars focus on sorting out the ownership system of natural resource assets [4], natural resource asset-management systems [5], legal governance [6], and local protection of natural resource assets [7]. Some researchers have attempted to establish a property rights system for natural resource assets based on the idea of “separation of ownership rights, contractors’ rights, and land management rights”. They want to clarify the relationship of rights, responsibilities, and interests among the owners, agents, and users of natural resource assets, among other things [8]. This perspective rarely delves into the specific arguments regarding the ownership system and supervision system of agricultural natural resource assets. Economists focus on analyzing global effects of resource use on biodiversity [9], coordinated development of resources’ multi-function spaces [10], the impact of agricultural productivity on natural resource extraction by rural households [11], the productivity effect of reallocating agricultural resources [12], the comprehensive utilization of agricultural resources and the green development of the agricultural sector [13], and temporal and spatial evolution characteristics and influencing factors of agricultural resource and environment efficiency [14], among other things. This approach has led to success in achieving specialization in managing agricultural resources. Research by Jin et al. (2023) introduced different viewpoints and methods with respect to land for high-quality development [15]. But most studies rely on economic methods for quantitative analysis, with a notable lack of qualitative research on the evolution of supervision systems for agricultural natural resource assets.

Second, from the perspective of the research region, the related research from abroad is more cross-cutting and comprehensive, which is reflected in the role and impact of

the utilization of agricultural natural resource assets on other industries and ecosystems, comparing different supervision systems in many countries or regions, comprehensively analyzing global challenges [16], and predicting the future trend of industrial development. The research of domestic scholars in China is more refined and localized, which is reflected in taking a certain province or an economic belt or a certain city in China as an example [17–20], verifying the theoretical hypothesis by field investigation. With the addition of the Chinese characteristics of national or collective ownership of agricultural natural resource assets, research proposals are mostly devoted to the improvement of legal systems or implementation mechanisms in China, to improve the voice of China in the field of global agricultural development. From the perspective of existing research domestically and abroad in China, the trends are as follows: (1) the research perspective shifts from a single perspective to an interdisciplinary perspective; (2) the research subject shifts from a unit subject to a multiple subject; (3) the research content shifts from a single subject to a diversified one; (4) the research method shifts from offline to a new model of network governance.

### 1.3. Methods

#### 1.3.1. Literature Analysis

By analyzing the relevant literature domestically and abroad in China, this paper systematically reviews and consolidates the basic theoretical literature mainly from the China National Knowledge Internet (CNKI) and Multidisciplinary Digital Publishing Institute (MDPI). The key points are as follows: firstly, this paper analyzes the legal attributes and economic attributes of agricultural natural resource assets, and compares the different views of domestic and foreign scholars on the supervision system of agricultural natural resource assets. Secondly, combining with the actual situation of China and the existing new pattern of social governance, we explore the value objective of the comprehensive supervision legal system of agricultural natural resource assets, and explore the driving force of the construction of relevant texts in practice. Thirdly, through the collection and collation of relevant literature, the theoretical achievements of the research on the comprehensive supervision system of agricultural natural resource assets are summarized, which lays a literature and theoretical research foundation for further research.

#### 1.3.2. Normative Analysis

Through the structured approach of “discovering problems—analyzing problems—solving problems”, standardized analysis is conducted. The existing laws and regulations and judgment cases and other materials mainly come from Peking University Law Internet. The key points are as follows: first, investigate and study the current supervision legal system of agricultural natural resource assets in China, sort out the content of existing laws and regulations in China, and summarize the existing problems of the supervision legal system of agricultural natural resource assets. Second, conduct normative analysis of the construction of the legal system, and focus on the construction of a more efficient supervision legal system and the optimization of mechanisms; the approach of the rule of law is standardized, such as making suggestions on comprehensive supervision legislation and central and local comprehensive coordination and connection.

#### 1.3.3. Economic Analysis

The utility analysis of the construction of the supervision legal system of agricultural natural resource assets is carried out with the paradigm of law and economics, regarding the individuals who make legal choices as “rational economic persons”, taking the principle of fair trade and ecological balance as the goal of value pursuit. The combined verification of law science and economics can guarantee the scientific and practical nature of the legal system. Agricultural natural resource assets have legal, economic, and ecological attributes. The legal system design of ownership and supervision should consider “legal rationality”, “economic rationality”, and “ecological rationality”. Under the process of super-ministry

system restructuring in China, the objective system for comprehensive supervision of agricultural natural resource assets is unclear, and the benefit game and goal differences exist among the subjects; in addition, the construction of a concrete system also lacks comprehensive special legislation and cohesive mechanisms. Based on this, under the background of super-ministry system restructuring in China, this paper intends to construct an objective system for comprehensive supervision of agricultural natural resource assets by using the game theory analysis method. From the perspective of game theory equilibrium, this paper also studies the reasonable expected utility of multi-parties in the comprehensive supervision of agricultural natural resource assets, and proposes the normative structure of the legal system of the comprehensive supervision of agricultural natural resource assets in China, to bring into full play the effect of comprehensive supervision of agricultural natural resources and assets and promote the revitalization of rural ecology, and protect the safety of agricultural resources.

## 2. The Value Objective of Comprehensive Supervision of Agricultural Natural Resource Assets in China

Defining the concept related to comprehensive supervision of agricultural natural resources, sorting out the laws and supervisions related to the existing supervision system, and recognizing the reform trend in the supervision of agricultural natural resources and the objective system of comprehensive supervision is the premise for the normative construction of a legal system for comprehensive supervision of agricultural natural resources.

### 2.1. Supervision Concept and System Status Quo of Agricultural Natural Resource Assets

#### 2.1.1. Agricultural Natural Resource Assets and Their Characteristics

China currently has seven normative documents involving the “comprehensive supervision of agricultural natural resource assets”; none have been elevated to the status of law or department regulation. They specifically include the following: the “Regulation on Comprehensive Management of Agricultural Natural Resources of Zhejiang Province” in 2004; the “Regulation on Comprehensive Management of Agricultural Natural Resources of Hubei Province” in 2007; the “Implementation Opinions on Promoting the Application and Development of Land and Resources Big Data” issued by the Ministry of Land and Resources in 2016; the Ministry of Land and Resources issued the “13th Five-Year Plan for Science and Technology Innovation Development of Land and Resources” in 2016; the National Administration of Surveying and Mapping and Geographic Information issued the “13th Five-Year Plan for the Development of Surveying, Mapping and Geographic Information Technology” in 2016; the General Office of the Ministry of Land and Resources issued the “Implementation Plan of the Ministry of Land and Resources” in 2016; the General Office of the Ministry of Land and Resources issued the “Notice on the Selection of the Third Batch of the High-level Innovative Scientific and Technological Talents Training Project in Land and Resources” in 2017. Most normative documents only treat the comprehensive supervision of natural resources as an important field of scientific and technological innovation and theoretical exploration.

Only Hubei Province and Zhejiang Province have formulated local regulations on comprehensive supervision of agricultural natural resources in China. Article 2 of the local supervision of the said two provinces defines agricultural natural resources as land, water, forest, biology, climate, and other natural resources related to the production activities of crop farming, animal husbandry, forestry, and fisheries. However, there is no unified conclusion in the academic community about the connotation of “agricultural natural resource assets”. Based on a semantic interpretation, it can be regarded as a composite designation formed by the three elements of “natural resources”, “assets”, and “agriculture”. This concept comprises three distinct hierarchical levels of progression: “natural resources”, “natural resource assets”, and “agricultural natural resource assets”. The conception is fundamentally defined by the essence of “assets” within the scope of “natural resources” and is specifically limited to the agricultural industry. Its characteristics can be summarized

as follows: first, the industrial attributes are confined to agriculture, including sectors such as crop cultivation, livestock, forestry, and fisheries; second, the ecological attributes are restricted to natural resources such as land, water, forests, biodiversity, and climate; third, the essential attributes focus on economic characteristics manifesting in property relations, such as profitability, controllability, and measurability [21].

### 2.1.2. Conceptual Elements of Comprehensive Supervision

Article 4 of “Regulation on Comprehensive Management of Agricultural Natural Resources of Zhejiang Province” in China points out that “the principle of combining comprehensive management with professional management shall be adopted for agricultural natural resources”, but the concept and scope of “comprehensive management” are not defined. Article 2 of the “Regulation on Comprehensive Management of Agricultural Natural Resources of Hubei Province” in China clearly defines comprehensive management as “to conduct comprehensive investigation, monitoring, assessment, zoning, and planning of agricultural natural resources and to coordinate and supervise the development, utilization, and protection of agricultural natural resources”. The components of the conceptual framework may encompass the following five aspects: firstly, the objective element, which includes sustainable development, process orientation, and participatory management, among others; secondly, theory elements, such as the systematic idea of the integrated development, and new thinking on the great land perspective, great resources perspective, great geology perspective, and great ecology perspective; thirdly, subject elements, such as government agencies (departments of natural resources, environment, and urban and rural administration), non-government organizations, research institutions, communities, and other stakeholders; fourthly, object elements, such as agricultural natural resources, nature reserve or protected areas, natural ecological community, biological community, ecosystem structure; finally, nature elements, such as management methodologies, cognitive approaches, strategies for natural resource management, etc. The conceptual elements of the above five aspects are interrelated and influence each other. For example, the objective elements of participatory management determine the increase of subject elements such as communities and social public; the renewal of theory elements such as great resources and great ecology also provide the principal direction for the protection of object elements such as ecosystem and biodiversity. Overall, the objective elements play a guiding role, the theory elements provide principled guidance, the subject elements show a diversified development trend, the object elements are gradually diversified, and the nature elements act as a foothold, and co-constitute the conceptual category of comprehensive supervision, so that it has the characteristics of openness and integration.

### 2.1.3. Laws and Supervisions on Supervision Systems of Natural Agricultural Resource Assets in China

At present, agricultural natural resource assets are still subject to individual legislation mainly based on the categories of natural resources in China, which specify the supervision of the exploitation, utilization, management, and costs of the agricultural natural resource assets. For example, the Constitution and the Civil Code of China regulate the state ownership or collective ownership of agricultural natural resource assets. Articles 57 to 66 of the “Agriculture Law” of China (2012 Amendment) stipulate “agricultural resources and protection of the agricultural environment”. Articles 2 to 11 of the “Contracting of Rural Land Law” of China (2018 Amendment) stipulate the ownership and the rural land contract-management system. Articles 6 to 9 of the “Fisheries Law” of China (2013 Amendment) stipulate the department in charge of fishery administration as well as its institutions for the supervision and administration of fisheries. Articles 28 to 37 are specific provisions for the protection of fishery resources and fishing. Articles 38 to 49 deal with liability for violation of the Act, etc. Other legal provisions on the supervision of agricultural natural resource assets are scattered in separate laws, such as the “Use and Management Law of Sea Areas”, “Mineral Resources Law”, “Renewable Energy Law”, “Grassland Law”,

“Water Law”, “Coal Law”, “Land Management Law”, “Forest Law”, etc. Concerning the conservation of agricultural genetic resources, such as the provisions outlined in Chapter II of the “Animal Husbandry Law” of China (2022 Revision) concerning the protection of livestock and poultry genetic resources. Provisions on the security of human genetic resources and biological resources are outlined in Chapter VI of the “Biosecurity Law” of China (2024 Amendment); provisions on the protection of germplasm resources are outlined in the supervision on the “Regulation on Protection of New Varieties of Plants” of China (2014 Revision), etc. In addition, some economic laws and supervisions contain relevant provisions on the supervision and administration system regarding the ownership of rights, development, and utilization of agricultural natural resource assets, as well as supervision objectives and the labor division among supervision bodies. For instance, the “State-Owned Assets of Enterprises Law” of China, the “Circular Economy Promotion Law” of China (2018 Amendment), and the “Cleaner Production Promotion Law” of China (2012 Amendment) all contain provisions regarding the enhancement of resource-use efficiency.

The relationship between the laws and regulations of supervision of agricultural natural resource assets in China are as follows: the Constitution and the Civil Code play the fundamental role, the Agricultural Law plays the overall coordinating function, the other separate laws and regulations in the field of agricultural natural resources act as the backbone, the legal supervision of various agricultural natural resource assets advance at a synchronized and harmonious pace, and some economic laws and regulations provide institutional guarantees, which together constitute the legal system for the supervision of agricultural natural resource assets in China. To be specific, first, the Constitution, as the fundamental law of China, is in the highest legal hierarchy; all legal provisions that conflict with the Constitution are invalid. Second, the Civil Code, as the first code in China, is also the basic law in the civil field, and its ownership is also a principal provision. Third, the Agricultural Law, as the basic law in the agricultural field, puts forward overall requirements for the utilization of agricultural resources and the protection of agricultural environment as well as specific supervisory agencies. Fourth, individual laws such as the Rural Land Contract Law, the Fishery Law, the Animal Industry Law, the Water Law, and the Grassland Law play a supervisory role in the supervision of various types of agricultural natural resource assets under the requirements of the above three laws. Fifth, the relevant provisions of some economic laws and regulations play a role in promoting and guaranteeing the high-quality development of agricultural natural resource assets without violating the above legal provisions.

#### 2.1.4. Current State and Problems of Supervision Systems of Natural Agricultural Resource Assets in China

In the supervision legal system of agricultural natural resource assets in China, the action mechanism of different laws and regulations is positive and negative. First, the above laws and regulations are not clearly defined in terms of legislative purpose and normative content, which are related or overlapping. For example, the provisions of Article 57, paragraph 1, of the Agricultural Law deal with the protection of energy environment and agricultural natural resources. As far as arbitrary norms are concerned, they can complement each other and jointly protect each other, playing a positive role together. While as far as mandatory norms are concerned, they easily cause repeated law enforcement due to the cross of supervisory departments or supervisory responsibilities, which would increase supervisory costs. Second, there is a major contradiction in the supervision legal system of agricultural natural resource assets itself, that is, the contradiction between economic development and ecological protection. On the one hand, some departmental laws focus on economic development; without the loss of resources, there is not enough for development; other departmental laws focus on environmental protection and resource conservation; the two are in conflict. On the other hand, ecological protection is for the sustainable and stable reuse of agricultural natural resources, and the continuous innovation and progress of technology is the inherent requirement of sustainable economic development.

High-quality economic development could in turn reduce the negative impact on the ecological environment through technical measures and improve the utilization efficiency of agricultural natural resource assets, and the two are coordinated.

Although the legal system for the supervision of agricultural natural resource assets in China has been formed, the laws and supervision systems are still scattered in the process of the super-ministry system restructuring in China, and there are still some problems such as legislation lag, cross supervision, and lower legal level. Specific supervision systems still need to be improved and perfected. Currently, the legal system for the supervision of agricultural natural resource assets in China is short of a proclamation in the legal system for comprehensive supervision of agricultural natural resource assets. The laws and supervisions governing the exploitation, utilization, supervision, and management of agricultural natural resource assets are relatively scattered, the regulatory standards for various natural resource assets are different, and the institutional arrangements are inconsistent, which is not conducive to the realization of a comprehensive supervision system of agricultural natural resource assets under the conception of super-ministry system restructuring in China. Second, under the current regulatory system, the supervision of various agricultural natural resource assets lacks concentration. Different competent departments are specified in separate laws governing various natural resources, and various regulatory authorities and their duties and responsibilities are unclear, giving rise to cross-supervision. As a result, there is a lack of unified and systematic coordination between the development, utilization, and protection of agricultural natural resource assets. Thirdly, based on the lag of legislation, the current laws and supervision of China on agricultural natural resource assets cannot cover the entire scope of agricultural natural resources. With the progress of society and the development of science and technology, the cognitive ability of natural resources has gradually improved. The existing legislative framework on agricultural natural resource assets is inadequate to address all the emerging resource types anticipated in the future, leading to potential regulatory gaps. In addition, the revision of the “Legislation Law” of China has resulted in a significant expansion of the scope of the subjects enjoying the local legislation and the authority to legislate (including environmental protection). For example, the protection and management of coastal wetlands. In terms of local legislation, there are only two local regulations, the supervision of Lianyungang City on Coastal Wetland Protection and the supervision of Yancheng City on Yellow Sea Wetland Protection. In terms of central legislation, the “Administrative Measures for the Protection of Coastal Wetlands (Draft for Comment)”, formulated by the former State Oceanic Administration (SOA), is still in the public input process. In addition, departmental rules and local supervision represent different interests. There are also differences in the provisions on specific protection-management agencies and law enforcement supervision and inspection subjects. These reasons make it difficult to achieve the purpose of comprehensive supervision of coastal wetland resource assets [22].

## *2.2. Value Objective of Comprehensive Supervision Under the Framework of Super-Ministry System Restructuring in China*

The value objective model of comprehensive supervision of agricultural natural resource assets should be designed based on the requirements of the central government of China, it observes the laws and supervisions, and the reality of the supervision of agricultural natural resource assets in China, this also absorbs experience of framework design in international integrated natural resource management to promote the realization of the theory of the rule of law in ecological civilization [23]. The system structure of comprehensive supervision of agricultural natural resource assets is a combination of several factors, including laws and systems of supervision of agricultural natural resource assets and relevant supporting systems for supervision of resources assets. Its function is, through a clear definition of property rights, to realize the transformation from the ownership of agricultural natural resource assets to the right to use resource assets in the sense of private law. It promotes the reasonable utilization of agricultural natural resource assets, as well

as maintenance and increment of value, to realize ecological justice while maintaining fair trade.

Under the macro-guidance of the reform of the super-ministry system restructuring, the strategy of rural revitalization, and a holistic view of national security in China, the comprehensive supervision of agricultural natural resource assets should be process-oriented and should involve multiple participation, asset accretion, and technical innovation.

The first aspect is process-oriented. Comprehensive supervision of agricultural natural resource assets is a fundamental process by examining the availability of agricultural natural resources within a specific region and utilizing these assets, rather than on singular factors or commodities. Its orientation is comprehensive supervision for the process of market transactions of agricultural natural resource assets, so it enables resource managers to evaluate from a holistic perspective the impacts of various natural or social disturbances on the ecosystems and core populations of these agricultural natural resources.

The second aspect is multiple participation. Comprehensive supervision of agricultural natural resource assets involves multiple stakeholders. The effective operation of a comprehensive supervision system faces three challenges: firstly, how to promote a flexible mechanism that is viable, conducive to reconciliation, and recognized as legitimate; secondly, how to coordinate the competing interests of different entities such as local, national, and international organizations; thirdly, how to include more stakeholders in natural resource-supervision activities. There is a common thread that connects these three challenges, which involves empowering the public with oversight capabilities and establishing robust organizational structures. This approach is intended to cultivate their confidence and skills to actively manage the agricultural natural resources upon which they depend for their livelihoods.

The third aspect is to ensure the preservation and appreciation of agricultural natural resource assets. Comprehensive supervision of agricultural natural resource assets pays attention to the ecological environment and the market stage of the social economy, emphasizing the importance of viewing agricultural natural resource assets as one of the critical material components in the development process of the market economy. The interplay and collaborative advancement of natural capital with social capital, human capital, and other elements contribute positively to the preservation and appreciation of agricultural natural resource assets, ensuring the security of national resources assets.

The fourth aspect is technical innovation. It is a technical requirement for advancing rural revitalization on all fronts and industrial revitalization in agriculture that we should invigorate the seed industry and support the development of agricultural science, technology, and equipment. By leveraging information technology and participatory techniques, entities develop innovative approaches aimed at enhancing ecosystem resilience, facilitating multiscale collaboration, and reconciling the diverse needs of multiple stakeholders. Advancement in technology is driving the development of simulation technologies and other model types, signifying a breakthrough in our capacity to address complex system issues. This progress contributes to our understanding of the changing mechanisms within agricultural natural resource ecosystems and enhances our ability to predict the potential outcomes of various regulatory schemes.

The comprehensive supervision of agricultural natural resource assets is conducted through the following methods to achieve multi-objective compatibility and trade-offs. First, it is important to expand and refine the objective dimension. As human understanding of nature evolves and technology advances, supervision objectives have expanded from environmental, economic, and social dimensions to encompass areas such as resources, politics, culture, military affairs, and so on. Based on the specific natural geographical area (such as ecological zones) and the various entities involved, the value objectives of comprehensive supervision exhibit both an expandable dimension in terms of natural resources and a transformation that evolves from material to the spirit, and from the tangible to the intangible in the services provided by these resources. Second, it is essential to specify and refine the degree of the objectives. The comprehensive supervision of agricultural natural



resource assets further specifies and refines the objectives of each dimension through an understanding of the managed entities. For instance, the integrity of agricultural ecosystems can be specifically categorized into ecosystem structure, composition, processes, and connectivity. Different levels of ecological integrity can be determined based on factors such as landscape characteristics, external pressure sources, vegetation structure, and scale. This categorization allows for the establishment of a “scale” for the objectives, which can not only measure the targets but also indirectly indicate the direction for achieving those targets. Third, it is essential to propose management tools that can balance various objectives. Currently, the concept of integrating diverse goals across political, environmental, economic, social, and cultural dimensions has gained widespread acceptance. When a natural resource-management or planning scheme is confronted with various conflicting objectives, determining which management techniques to employ for effective trade-offs becomes the central issue for the comprehensive supervision of agricultural natural resources. Given the characteristics of such supervision, it is paramount to utilize tools for ecosystem-based assessments or for the valuation of agricultural natural resource assets to compare the ecological and economic benefits resulting from different scenarios.

### **3. The Game Analysis of Comprehensive Supervision of Agricultural Natural Resource Assets in China**

The establishment of a robust regulatory framework for agricultural natural resource assets is crucial for enhancing the efficiency of market transactions involving these assets, as well as for maintaining the stability of the trading order within the market. Based on the varying interests of market participants and their distinct strategic choices, a dynamic trading order for agricultural natural resource assets is established. If realization is made both in the expected utility of all parties and societal expectations, then the market transactions related to resource assets would reflect a cooperative game. Conversely, if this achievement fails, it will lead to a non-cooperative game, which can easily trigger unfair competitive practices and undermine the stability of market transaction order. So, game-theoretic analysis of comprehensive supervision of natural resource assets in agriculture revolves around action decision-making between individual interests and social interests, which is essential in achieving a balanced game equilibrium and catering to the diverse interests of various market participants.

#### *3.1. The Discrepancies in Objectives and the Interest Game Among Various Regulatory Agencies*

During the supervision of natural resource assets in agriculture, variations in supervision objectives emerge across different supervision bodies due to their distinct domains of authority. This divergence is evident not only between various departments at the same administrative level but also among regulatory agencies at different hierarchical levels, predominantly reflecting the negotiations among competing interests. The differentiation in the supervision objectives for agricultural natural resource assets, specifically illustrated by the conflicts of interest among various regulatory agencies, manifests in the following two aspects.

Firstly, different regulatory agencies at the same level exhibit variations in their supervision objectives concerning agricultural natural resource assets, driven by their respective departmental interests. The development, utilization, and conservation management processes of similar agricultural natural resource assets often involve multiple regulatory subjects. In the specific performance of planning duties or exercise of regulatory powers, due to the diversification of supervision objectives and supervision priorities, each regulatory department represents different interests, resulting in overlapping powers or supervision loopholes, resulting in a deadlock in the development and utilization of agricultural natural resource assets. The establishment of the Ministry of Natural Resources and the Ministry of Agriculture and Rural Affairs of China has greatly improved the status quo of target differentiation and guided the balance of interests among different regulatory authorities at the same level. However, from the perspective of implementation effect, the

solution of the problem only stays at the value guidance level; it is just in the aspect of unifying the supervision objectives of resources assets; it has not yet substantially solved the problem of overlapping powers of different regulatory departments. Therefore, the relevant administrative regulatory departments of agricultural natural resource assets should have a more thorough understanding of the characteristics of different types of natural resource assets as well as their links and impacts, and realize the overall coordination of the interests and regulatory objectives of various regulatory departments at a higher level from the perspective of the integrity of rural ecosystems and agricultural natural resource assets as well as the coordination of comprehensive supervision, to maximize the effectiveness of comprehensive supervision of agricultural natural resource assets.

Secondly, the differentiation of supervision objectives among various tiers of supervision agencies primarily manifests as a struggle of interests between the central and local governments. As the property rights holder of natural resource assets, the state should earnestly fulfill the ownership functions and improve the efficiency of market allocation and supervision. The state should entrust them to the central government, and the State Council should exercise ownership on behalf of the state. Because of the complexity of the natural ecosystem and the diversity of agricultural natural resources, the ministries and commissions of the State Council and the local governments become the agents of the central government. Then the local government may authorize other departments or organizations to exercise the power of supervision and administration. Through the agency by a mandate by multi-level government departments, the exercising of the rights of asset supervision and administration of agricultural natural resources results in overlapping duties, especially top-down entrustment, and authorization. In the end, it is often impossible to verify the specific agent. Meanwhile, when power agents in different regulatory links conduct supervision activities over agricultural natural resource assets, they tend to act according to the maximization of their interests, and their objectives may run counter to the original intention of the client so that short-term opportunistic individual behaviors of agents would occur. Using fishery resources as an example, the supervision objectives of the central government are strategic and encompass broad, long-term goals that focus on sustainable development and inter-generational equity. In contrast, local governments typically pursue short-term regional objectives focused on local development and economic profit. This approach often neglects the sustainability of agricultural natural resource asset development and utilization, leading to a singular pursuit of local revenue, which can easily result in the "tragedy of the commons".

It is important to note that the differentiation in supervision objectives between the central government and local authorities would also give rise to the following two dilemmas. One issue is that the supervision scope of central and local government departments concerning agricultural natural resource assets remains ambiguous. The exact job of supervision is unclear. Second, in recent years, the central government of China has successively promulgated several normative documents on the reform of government institutions, the reform of the market-oriented allocation of rural factors, and the reform of the property rights system of natural resource assets. However, the priority of the application of these normative documents to each other is relatively vague. Because of the lack of specific implementation plans, under the guidance of this situation, with local practical measures it is difficult to truly achieve the central system reform goals. Therefore, the regulatory authority and benefit distribution of agricultural natural resource assets between the central and local governments should be very clear, and the specific work items should be exactly divided, so that the supervision objectives of agricultural natural resource assets are consistent between different institutions at the same level or between different regulatory bodies at different levels, so that it can implement and achieve the comprehensive supervision of agricultural natural resource assets of various policies and mechanisms.

### 3.2. Reasonable Expected Utility of Comprehensive Supervision from the Perspective of Game Equilibrium

According to the legal economist Posner, maximizing wealth is the ultimate goal of legal pragmatism. Here, wealth includes tangible and intangible assets, not only the simple figures or money, but also the collection of all the valuable assets that can be evaluated in the whole process of social development. The “reasonable expectation” of a person in the legal sense is like the “rational economic man” in the economic sense. Assuming that both organizations or enterprises developing and utilizing agricultural natural resource assets and the pluralistic bodies supervising and administering activities related to the utilization of natural resource assets are “reasonable persons”, both sides would then define their different “reasonable expectations” of the agricultural natural resource assets based on their respective interests. The former aims at maximizing economic effectiveness, while the latter aims at balancing interests and stabilizing society. Based on the outcomes derived from the mutual benefit game, subsequent actions or inactions can be taken by the equilibria established within the game theory context.

Assuming that the supervision subjects carry out comprehensive supervision of agricultural natural resource assets with a probability of ‘ $a$ ’, the probability of maintaining the status quo is ‘ $1 - a$ ’. Due to the implementation of comprehensive supervision over agricultural natural resource assets, the positive utility for fair market transactions is represented as ‘ $U$ ’, while the associated negative utility from the same supervision is denoted as ‘ $U_1$ ’. The expected utility of the regulatory entity regarding the comprehensive oversight of agricultural natural resource assets is expressed as ‘ $E(g)$ ’.

Assuming the probability of an organization or enterprise developing and utilizing the exploitation of agricultural natural resource assets is ‘ $b$ ’, the probability of not engaging in exploitation is therefore ‘ $1 - b$ ’. The utility of agricultural natural resource assets when unexploited is ‘ $R$ ’, while the surplus utility generated by an organization or enterprise through the exploitation of these resources is ‘ $R_1$ ’. The detrimental effects resulting from resource exploitation activities are denoted as ‘ $R_2$ ’. The expected utility of agricultural natural resource asset development and utilization organizations or enterprises is denoted as ‘ $E(s)$ ’.

Formulate a utility-based game model for different rights (power) subjects concerning agricultural natural resource assets, based on the aforementioned assumptions. The primary characteristic lies in the assumption that the participants in the game cannot fully comprehensively understand information and knowledge of each other, meaning that there exists uncertainty of information during the game. In the context of dynamic games involving expected utility, the choices of different entities regarding agricultural natural resource assets are sequential. If one party takes action first, the other party would adjust its strategic decisions based on the specifics of that initial action.

The fundamental pathways of the game-theoretic interactions among various rights (power) subjects regarding the exploitation and comprehensive supervision of agricultural natural resource assets are illustrated in Figure 1.

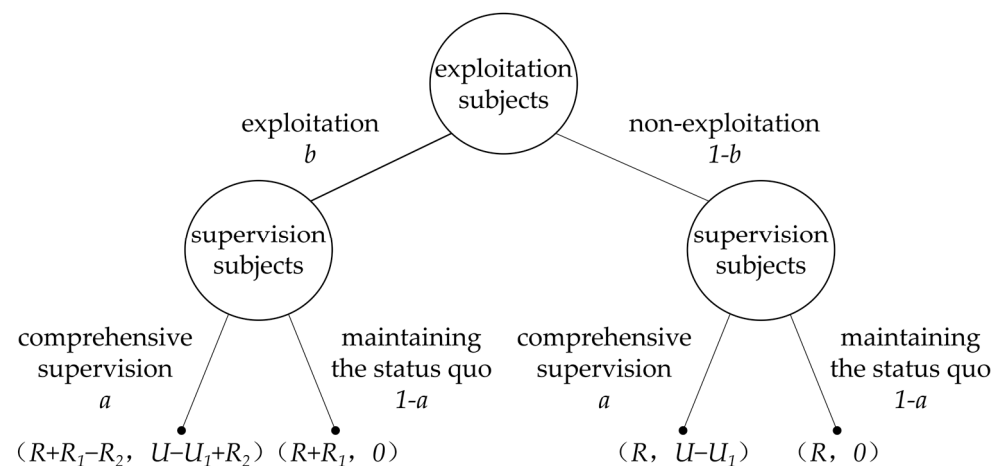
Based on the analysis of the game tree in Figure 1, the expected utility values for different behavioral strategies of both the natural resource-extraction entities and the regulatory bodies in agriculture can be derived.

The expected utility of entities or companies engaged in the exploitation of agricultural natural resources is:

$$\begin{aligned} E(s) &= b[a(R + R_1 - R_2) + (1 - a)(R + R_1)] + (1 - b)[aR + (1 - a)R] \\ &= b(R + R_1 - aR_2) + (1 - b)R \\ &= b(R_1 - aR_2) + R \end{aligned} \quad (1)$$

From this, the first-order partial derivative of the expected utility concerning ‘ $b$ ’ is obtained:

$$\frac{\partial E(s)}{\partial b} = R_1 - aR_2 \quad (2)$$



**Figure 1.** Game tree of exploitation of agricultural natural resource assets and comprehensive supervision.

Setting Equation (2) to zero:

$$a = \frac{R_1}{R_2} \quad (3)$$

Consequently, the expected utility of the regulatory entity implementing comprehensive supervision is:

$$E(g) = a[b(U - U_1 + R_2) + (1 - b)(U - U_1)] + (1 - a)[b \cdot 0 + (1 - b) \cdot 0] \\ = a(bR_2 + U - U_1) \quad (4)$$

From this, the first-order partial derivative of the expected utility concerning 'a' is obtained:

$$\frac{\partial E(g)}{\partial a} = bR_2 + U - U_1 \quad (5)$$

Setting Equation (5) to zero:

$$b = \frac{U_1 - U}{R_2} \quad (6)$$

Consequently, the probability of a unit or enterprise opting to exploit agricultural natural resource assets under conditions of incomplete information is derived:

$$b = \frac{U_1 - U}{R_2} \quad (7)$$

The likelihood of the regulatory entity implementing comprehensive supervision is:

$$a = \frac{R_1}{R_2} \quad (8)$$

This indicates that the exploitation of agricultural natural resource assets by organizations or enterprises and the decision-making regarding the adoption of a comprehensive regulatory strategy by regulatory authority would fluctuate based on the variations in the strategic behavior of counterparts and anticipated utilities; the two sides affect each other. Typically, the state usually uses legal frameworks and supervision to regulate the selection of the exploitation strategy of the organizations or enterprises. This macro-regulatory approach is relatively stable, resulting in 'U' and 'R<sub>2</sub>' often appearing static.

Based on Equation (8), if the surplus utility 'R<sub>1</sub>' generated from the exploitation of agricultural natural resource assets by an organization or enterprise increases, under the condition of maintaining 'R<sub>2</sub>', the likelihood of comprehensive supervision over agricultural natural resource assets by regulatory entities would consequently increase. In light of the enhanced comprehensive supervision exerted by the governing entities, due to the early

stage of comprehensive supervision, the specific supervision system is not sound, and the resulting negative utility ' $U_1$ ' would increase. With the gradual improvement of the legal system of comprehensive supervision of agricultural natural resource assets, in addition to the innovation of regulatory means and tools that have improved the efficiency of comprehensive supervision, the negative utility of ' $U_1$ ' is gradually reduced. Under the condition that the comprehensive legal system for the supervision of agricultural natural resource assets is perfect, the regulatory entity would opt to maintain the current status quo.

The exploitation of agricultural natural resource assets by an entity or enterprise brings ecological or economic risks as well as excessive profits, so the regulatory entity thus began to strengthen comprehensive supervision. Under this increasingly effective supervision, the exploitation strategy of agricultural natural resource assets by entities or enterprises may go loose. ' $b$ ' and ' $a$ ' are used to depict that the probability of exploitation of agricultural natural resource assets by entities or enterprises initially rises and subsequently declines, and the probability of comprehensive supervision by regulatory entities ascends. At this point, two equilibrium strategies have been established: the first is  $(b, a)$ , referring to (exploitation of agricultural natural resource assets, comprehensive supervision); the second is  $(1 - b, a)$ , indicating (non-exploitation of agricultural natural resource assets, comprehensive supervision).

Through the analysis of reasonable expected utility of comprehensive supervision from the perspective of game equilibrium, the author believes that the role of the market and the government in optimizing the allocation of agricultural natural resource assets should be integrated, and the two complement each other. In the case that the market itself cannot determine the optimal exploitation rate of agricultural natural resource assets, the government can carry out macro-control by improving the relevant legal system, among which the optimization of the supervision legal system of agricultural natural resource assets is of great significance. In addition, the effectiveness of the decision concerning the supervision system of agricultural natural resource assets can be further verified based on investment theory logic. In essence, the supervisory behavior of agricultural natural resource assets is like the saving decision in economic capital theory, which shifts the focus of decision-making behavior from the present to the future. The use of agricultural natural resource assets for production purposes is like lending decisions in economics, which shift the focus of decision-making from the future to the present. Conservation of agricultural natural resource assets for sustainability purposes is like investment decisions in economics, which maintain the available value of a product or service from the present into the future. Of course, supervisory decisions vary depending on the type of agricultural natural resource assets.

### 3.3. Economy and Expected Benefits of Comprehensive Supervisory Decisions

Jian (2006) proposed that the economic analysis of law should focus on transaction costs [24]. Transaction costs have important meanings of redistribution and intergenerational equity [25].

#### 3.3.1. Economy of Comprehensive Supervisory Decisions

The legislative cost of supervision legal system of agricultural natural resource assets, in terms of composition, includes time cost, economic cost, institutional cost, procedural cost, opportunity cost, supervision cost, and many other aspects. The comprehensive supervision model is based on the comprehensive supervision legislation of agricultural natural resource assets, and the economy of the comprehensive supervision decision-making of agricultural natural resource assets based on a systematic and complete special law on the supervision of natural resource assets is embodied in the following three stages.

First, the formulation of laws in the preparatory stage of legislation should have theoretical and practical bases. Social research should be carried out through searching domestic and foreign materials to demonstrate the necessity of legislation, to adapt to the

social reality. Both comprehensive legislation and decentralized legislation have time cost and economic cost at this stage.

Second, both the general basic law in the comprehensive legislation and the multiple special laws in the decentralized legislation in the law-formulation stage must strictly follow the legislative procedures, solicit public opinions through the legislative hearings such as expert demonstration meetings, and integrate the amendment suggestions of all social strata, which has procedural costs.

Third, the implementation of a system in the implementation stage of the law requires high operating costs, coupled with the imperfection of relevant supporting systems, which further reflects the key role of cooperation and coordination between formal and informal statutes [26]. (1) In order to ensure the correct implementation of the law and the full play of its role, it is necessary to strengthen the supervision of the implementation of the law from many aspects, and there are supervision costs in the comprehensive legislation and decentralized legislation at this stage. (2) Because the comprehensive legislation model is guided by policy planning, its legislative process is more systematic, and its fixed cost is higher. However, decentralized legislation is prone to the phenomenon of gradually increasing disorder, and there are many variable factors, which will inevitably bring about the rise of institutional cost in the implementation stage of law. (3) Due to the lack of legislative planning guidance in decentralized legislation mode, it is usually adapted to the situation that has happened, the normative content and technical tools are limited, there is a lack of long-term consideration, and the foresight for possible practical problems in the future is lacking. More responsive decentralized legislation or provisions need to be formulated to make up for legal loopholes or to clarify them through judicial interpretation, resulting in opportunity costs. Therefore, the economy of comprehensive supervisory legislation is higher than that of decentralized supervisory legislation.

### 3.3.2. Expected Benefits of Comprehensive Supervisory Decisions

In theory, the expected benefits that can be obtained from the operation of the legal system usually include the resolution of the conflicts of specific legal norms, the sound trust and recognition of the legal system, and the trial guidance of judicial practice. Due to the diversity and publicity of agricultural natural resource assets, the plurality of supervisory decisions involves agents; the conflicts of interests are complex; the field involved is universal; the expected benefits of supervision decision-making of agricultural natural resource assets should include the integration of the legal system as a whole; the legal norm system is integrated in all fields; the broad concerns of the public are integrated and coordinated, which is mainly reflected in the two aspects of legal benefits and social benefits.

First, in terms of legal benefits, although the existing decentralized supervisory decisions can reap benefits such as immediacy in responding to real needs and comprehensive professionalism in the content of regulations, the supervisory laws and regulations in the field of various agricultural natural resource assets are not easily unified, and are unable to meet the overall consistency of the legal system and the widespread recognition of the public. Decentralized regulation is prone to unclear provisions about supervisory responsibility. The phenomenon of cross-enforcement by different authorities has led to a game between regulators and actors, which means the comprehensive supervision decision can integrate the opinions and resources between different departments, stably promote the specific implementation of the supervision policy of agricultural natural resource assets, and coordinate the interest balance of multiple entities in the supervision system of agricultural natural resource assets while maintaining the integrity of the legal system.

Based on the practical needs of resource conservation and ecological protection, some places in China have launched comprehensive legislative activities on the supervision of agricultural natural resource assets. At present, Zhejiang Province, Liaoning Province, and Hubei Province have issued special local legislation on the comprehensive supervision of agricultural (natural) resources. These local laws and regulations reflect the interests of a local unified response to environmental changes, but the hierarchy of local legislation is

low, and still needs to be guided by systematic and complete supervision and management law of agricultural natural resources. As the practical basis for comprehensive legislation and comprehensive supervision of agricultural natural resource assets, this kind of local legislation in advance will, to a certain extent, reverse the specialized legislative process of agricultural natural resource assets and their comprehensive supervision at the central level, and provide representative opinions of the grassroots for central legislation and practical data on the application of laws and regulations, which can save the cost of comprehensive legislation of the central government, and maximize the expected benefits at the same time.

Second, in terms of social benefits, the comprehensive supervisory decision on agricultural natural resource assets is the product of the integration of economic production maximization and social sustainable development and other objective functions. It is also the basis for the optimal choice ownership to improve the allocation efficiency of agricultural natural resource assets from the perspective of resource economics to seek the maximization of social production [27]. However, the agricultural natural resource assets in China, as a complex interconnected ecosystem, are based on the application purposes of various resource assets. Due to the difference between application purposes, claims of right and industry supply progress on the various natural resource assets fields, if the ownership of agricultural natural resource assets is unclear or improperly allocated, it would cause value divergence and conflicting interests among different industries, which is not conducive to the sustainable development of agricultural natural resource assets.

Otto (2018) believes that based on the dual content of human life, including individual life and ethnic life, law, as a system to regulate human life, also has a dual objective: on the one hand, it constructs and guarantees the common life of society, and on the other hand, it defines and protects the scope of individual life [28]. The public law that focuses on the overall social situation should also consider individual justice, while the private law that focuses on individual rights and interests should also safeguard social welfare. The social functional objective of the comprehensive supervision of agricultural natural resource assets is to clearly define the property rights of agricultural natural resource assets, rationally coordinate the different needs of interests between mining subjects and regulatory subjects on different types of natural resource assets, regulate the illegal behaviors of over-exploitation of agricultural natural resource assets, achieve the maximum profit of economic production, and promote seeking a balance between the sustainable development of the economy and agricultural ecosystems.

#### **4. The Legal Approach of Comprehensive Supervision of Agricultural Natural Resource Assets in China**

Currently, the issues surrounding natural resource and environmental challenges are increasingly severe; it requires appropriate government intervention to establish an external order in response to the failure of the endogenous market system [29]. To maintain the stability of the market order of agricultural natural resource asset competition, safeguard national interests, and promote the sustainable development of the rural economy and society in China, it is necessary to formulate an exogenous order that corresponds to the endogenous order and regulate agricultural natural resource asset development and utilization through the rule of law.

##### *4.1. Comprehensive Supervision Legislation and Its Core Contents*

The perfection of the legal system for comprehensive supervision of agricultural natural resource assets is the foundation for ensuring the steady implementation of various regulatory policies and measures. To promote the super-ministry system restructuring of natural resource assets and solve the deep-seated problems existing in the stage of ownership and transaction of agricultural natural resource assets, it must promote the construction of the legal system of comprehensive supervision of agricultural natural resource assets. Finally, it can take a holistic and systematic approach to the conservation and improvement of mountains, waters, forests, farmlands, grasslands, and deserts. It is

necessary to accelerate the legislative process of comprehensive supervision of agricultural natural resource assets in China, establish a long-term mechanism conducive to the sustainable development of the agricultural ecological environment, and conduct dominant and comprehensive supervision of several elements in the life community such as mountains, water, forests, land, lakes, grass, and sand.

#### 4.1.1. The Implementation Plan of Comprehensive Supervision Legislation

Firstly, special legislation concerning the comprehensive supervision of agricultural natural resource assets should be issued as soon as possible, and the improvement and revision of laws and supervision concerning single categories of natural resource assets should be steadily promoted [30]. The codification of the “Civil Code” of China marked the beginning of the era of codification in China, so moderate codification is a possible choice for legislation of natural resources. Based on existing laws and supervision, China should take the implementation of the “Yangtze River Protection Law” of China and the “Yellow River Protection Law” of China as an opportunity to speed up specialized legislation for the comprehensive supervision of agricultural natural resources. There is also a need to move forward on the drafting of comprehensive laws such as the “Comprehensive Supervision and Management Law of Agricultural Natural Resources Assets”, the “National Parks Law”, and the “Nature Reserves Law”, or provide a separate chapter there of a comprehensive supervision system of agricultural natural resource assets in the “Natural resources editor” of the “Ecological environment code”. Then, the legislative branches of China revise the single laws and supervisions concerning various natural resource assets promptly and speed up the issuance of the supporting rules, specific systems, and supervisions for comprehensive supervision [31].

Specifically, in the hierarchy of law, all kinds of existing laws and regulations on agricultural natural resource assets stipulate the supervisory authorities and their scope of responsibilities, and stipulate that they and other relevant departments jointly carry out supervision work in accordance with the law, but there is no explicit term for the comprehensive supervision of agricultural natural resource assets, which should be modified and improved accordingly. In the hierarchy of administrative regulations and departmental rules, administrative regulations on various types of agricultural natural resource assets should be improved, and comprehensive supervision norms should be formulated for resource fields that have not yet formulated administrative regulations, so as to make up for the lack of specific implementation rules in comprehensive supervision of this resource field. In the hierarchy of local regulations, all localities should formulate comprehensive supervision regulations of agricultural natural resource assets in line with local characteristics according to the direction and guidance of central legislations, and further improve the comprehensive supervision legal system of agricultural natural resource assets.

Secondly, it is required to promptly identify and provide remedies to address problems, such as the low legal rank of the current unified right confirmation or registration system and the lack of certain regulatory subject functions. Basic legal systems such as the “rights bundle” of the property rights of agricultural natural resources and the valuation of agricultural natural resources and assets should be explicit legislation particularly, so that there is a legal basis for comprehensive supervision. Meanwhile, the legislation adds relevant legal provisions on the diversified governance of natural resource assets, through legislative authorization or administrative authorization; social subjects, such as collective economic organizations, villagers’ meetings, social welfare organizations and other social subjects are entitled to participate in supervision. We would combine the planning and coordination at the central level and the initiation of pilot programs at the local level and give full play to the initiative of multi-subject supervision and the enthusiasm of participation in supervision by diversified subjects in the legislation, law enforcement, and judicature of comprehensive supervision of agricultural natural resource assets. In addition, it optimizes the systems and mechanisms for social public participation in supervision. To force the course of the legislation on basic natural resource law or agricultural natural



resource supervision and administration law of China, the local experiences and current prominent problems in supervising agricultural natural resource assets in China should be systematically summarized. It should establish a sound multi-governance system of laws and supervisions for the comprehensive supervision of agricultural natural resource assets to ensure the coherence of the legal system for natural resources and environmental protection in China.

Thirdly, it is necessary to improve the safeguard measure of comprehensive supervision legislation of agricultural natural resource assets. It is important to establish the distribution base map and dynamic database of agricultural natural resource assets rights, organize the national information system and big data platform of supervision and management of agricultural natural resource assets, disclose supervision and service information in a timely manner and in accordance with the law, guarantee good information sharing, and provide information support for the assessment of the legal utility of comprehensive supervision of agricultural natural resource assets. It is also important to improve the evaluation index system for the development and utilization level of agricultural natural resource assets, establish a regular evaluation system for the investigation and utilization level, cooperate with colleges and universities or research departments to enhance public participation, and form research reports on the analysis of evaluation results on an annual basis, providing material basis and professional suggestions for the timely revision of comprehensive supervisory laws and regulations.

#### 4.1.2. The Proposed Suggestions of Comprehensive Supervision Legislation

If the comprehensive legislation on the supervision of agricultural natural resource assets only takes the original separate laws of various natural resource assets as decentralized chapters, it is simply combined without substantial adjustment, and there is no difference with the current situation of decentralized supervision of individual legislation of various categories of natural resources. It is important to grasp the role of various separate laws on agricultural natural resource assets in the supervision legal system of agricultural natural resource assets, as well as the relationship with other laws and regulations. In essence, various separate laws on agricultural natural resource assets act as the control valve to achieve the objective of the legal system, through the comprehensive supervision legislation of agricultural natural resource assets to deal with the contradictory relationship between ecological environment protection and sustainable economic development. It is important to transform the policy concept of “Lucid waters and lush mountains are invaluable assets” into the realization mechanism of the comprehensive supervision legal system of agricultural natural resource assets to avoid the integration of invalid laws. The market economy is the total factor economy. Only by smoothing out the differences of every factor of production and restoring its capital attribute can there be growth and development of the capital economy [32]. Therefore, the legislation for comprehensive supervision of agricultural natural resource assets is proposed to be named the “Comprehensive Supervision and Management Law of Agricultural Natural Resources Assets”, the core feature of this law should be process-oriented, which distinguishes it from the traditional legislation for decentralized supervision of natural resource assets.

Firstly, in the aspect of legislative purposes and principles, under the guidance of externality theory and public trust theory, comprehensive regulatory legislation should be based on the concept of rural ecological revitalization and implement the principles of sustainable development and green ecology. The comprehensive supervision of agricultural natural resource assets should be targeted at process orientation, multi-party participation, asset appreciation, and technological innovation. In the process of developing and utilizing agricultural natural resources, it should pay attention to the balance of interests among the pluralistic market players and between economic development and ecological protection [33].

Secondly, in terms of the content of rights and obligations, to solve the situation of unequal rights and obligations, the public and other market subjects should, when exer-

cising supervision and administration over the process of the exploitation and utilization of agricultural natural resource assets, prevent the damage to the agricultural ecological environment caused by the abuse of rights (powers). There should also be a provision for the obligation to safeguard national interest and maintain “ecological rationality”. For example, the damage to the agricultural ecological environment caused by the abuse of the supervision rights of social subjects and the credit information of units and individuals should be recorded in the credit file.

Thirdly, in the arrangement of chapters, to avoid policy conflicts between different regulatory authorities and reduce repetitive regulation and multi-regulatory authorities, the corresponding entity department should be based on the different stages of the participation of agricultural natural resource assets in market transactions. From the process-oriented perspective, it should stipulate various functions of supervision and management and stress in some respects. In the determination of rights, which means the transformation from resources to assets, we should clarify the composition and ownership of the “bundle of rights” of the property rights of agricultural natural resource assets as well as the exercising subject on behalf of such rights. Relevant provisions are important concerning the need to refine the scope of registration and registration of the specific process to improve the unified registration of the authority of the legal system. In the market flow stage, the following provisions should be included to ensure the fairness of transactions on the market: compilation and implementation of space plans, administrative licensing or examination and approval authorities and procedures for exploitation of agricultural natural resource assets, the levying subjects and procedures for taxes or fees related to development and utilization, periodic behaviors of subjects and processes in valuations of resource assets, as well as the public’s right to know and the method of public participation in supervision. The stage of judicial practice consists of improper behavior in the process of exploitation and utilization of agricultural natural resource assets and their handling and punishment, audits of natural resource assets, preparation of the balance sheet of natural resources, natural resource public interest litigation, as well as the legal responsibilities of multiple regulatory subjects in the above two stages of right confirmation and transaction.

#### *4.2. Multilayer Linking Mechanism of Comprehensive Coordination Between Central and Local*

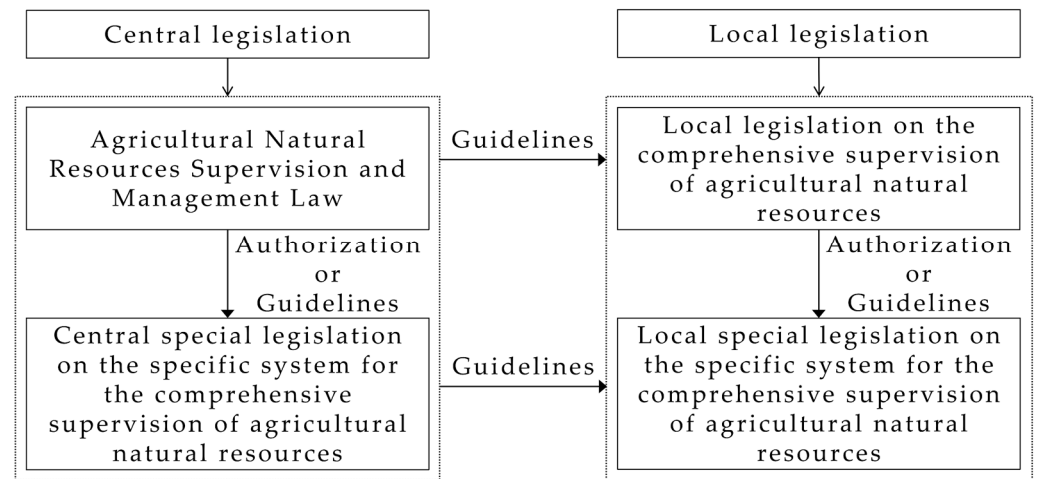
The comprehensive supervision of agricultural natural resource assets crosses the international, national, and local levels; therefore, it cannot be realized independently only by central legislation or local legislation. Only by linking the macro-guidance of central legislation with local legislation tailored to local conditions and matching the needs of diversified governance can we effectively respond to the challenges of natural ecological environment change.

##### *4.2.1. The Design of a Multilayer Linkage Mechanism of Comprehensive Coordination Between Central and Local*

The perfection of the comprehensive supervision legal system of agricultural natural resource assets in China should focus on the design of a multilayer linkage mechanism of comprehensive coordination between central and local, as in Figure 2. Central legislation guides local legislation; the separate legislation on the supervision and management of agricultural natural resource assets authorizes or directs the special legislation for specific systems while taking the integrity and openness of legal norms and the feasibility of legislation into account.

First, this mechanism should give full play to the coordinating and guiding role of central legislation. To cope with the complex and changing ecological environment system, special legislation on the comprehensive supervision of agricultural natural resource assets has been formulated on time, and specific guiding opinions have been issued to guide local special legislation and coordinate the interest balance between economic value and ecological value. Through the formulation of relevant management methods and supporting mechanisms, the current policy and strategic characteristics of agricultural natural resource

asset spatial planning in China need to be highlighted, the standards and models of spatial planning are unified, and the potential vicious contradictions between different levels of planning are resolved, and the mutual constraints between different levels of planning are allowed.



**Figure 2.** Relational graph of central and local legislation of comprehensive supervision of agricultural natural resource assets.

The coordinating and guiding status of the central legislation is mainly embodied in the overall unity and principal guidance to avoid the loss of agricultural natural resource assets from the source. Firstly, the comprehensive unity of the central agricultural natural resource asset comprehensive regulatory legislation can realize the coordinated allocation of agricultural natural resource assets in different stages of market transactions, different types of agricultural natural resource assets, and different distribution regions from the national perspective. In addition to mandatory obligations, it can also provide incentives in many aspects such as circular economy and clean production to promote the transformation of energy structure and leave space and time for the sustainable development of green agriculture in China. Secondly, the principle guiding the nature of the central agricultural natural resource asset comprehensive supervision legislation is conducive to comprehensively considering the national development strategy and guiding the development, utilization, protection, and supervision of agricultural natural resource assets from a fundamental principle. The central element establishes the basic policy of the state for the supervision of agricultural natural resource assets at the macro level and promotes the preservation and appreciation of agricultural natural resource assets on the premise of maintaining the ecological attributes of natural resource assets to realize the sustainable development of rural economy and society.

Second, this mechanism gives full play to the refining and complementary role of local legislation. Guided by the Basic Law on natural resources at the central level, with legislation on the comprehensive supervision of agricultural natural resource assets as the core, supplemented by special laws and regulations on specific supervision systems, and considering the stability and flexibility of legislation at the central and local levels, a coordinated and unified legal system for the comprehensive supervision of agricultural natural resource assets would be established. Taking climate resources as an example, the competent Department of Natural Resources of the central government of South Korea has the responsibility to support local governments, and the national adaptation plan adopted by it also requires local governments to develop and implement local adaptation plans [34].

The refining and complementary status of local legislation is mainly embodied in the following two aspects: Firstly, to reflect the local characteristics as the focus. Local agricultural natural resource asset comprehensive supervision legislation should be an important embodiment of local characteristics and local realistic needs. For example,

in energy-rich provinces such as Shanxi Province, legislation should focus on energy-use control; in the western ecologically fragile provinces, emphasis should be placed on ecosystem protection and environmental change assessment, and risk early warning should be issued in time. Secondly, local joint legislation is the way. To prevent the “localization” or “fragmentation” of local legislation on the comprehensive supervision of agricultural natural resource assets, local legislatures in a certain region can jointly legislate through regional legislative coordination committees or joint meeting systems. A multi-party consensus was formed through joint meetings on the same interest demands in the coordinated development of the regional economy [35]. For example, the Pearl River Delta, Beijing–Tianjin–Hebei, and other regions in China can adopt regional collaborative legislation for the comprehensive supervision of natural resource assets. Compared with local interests, regional cooperative interests are more consistent with national interests and social interests, reducing the friction cost caused by legislative differences, and more conducive to the improvement of comprehensive supervision efficiency of agricultural natural resource assets and government governance efficiency.

#### 4.2.2. The Implementation of the Multilayer Linkage Mechanism of Comprehensive Coordination Between Central and Local

There is still a gap in legal practice in the multilayer linkage mechanism of central and local comprehensive coordination, although the “Yangtze River Protection Law” of China in 2020 and the “Yellow River Protection Law” of China in 2022 provide a legal basis for regional collaborative legislation. The provisions on regional cooperative legislation in Article 83 of the “Legislative Law” of China strengthen the legal status of regional cooperative legislation and officially confirm it. However, the provisions on regional cooperative legislation in Article 83 of the “Legislative Law” of China are vague. So, the bottom line should be satisfied with the “Constitution” and other laws, and the implementation of national policies should be guided; to limit the scope of vague expressions such as “the need for regional coordinated development” and “regarding regions” and so on, the specific scope should be clarified in the norms formulated by regional collaborative legislation to clarify the scope of authority of local legislatures.

First, we address implementing multilayer comprehensive supervision in the longitudinal section. The connecting mechanism takes the basic law on the supervision of agricultural natural resources as the center; the central legislation guides the local legislation. The specialized legislation authorizes or guides the regulatory documents of various specific systems for the comprehensive supervision of agricultural natural resource assets. Central and local legislation can effectively leverage their respective functions and roles, complementing and coordinating with one another harmoniously. Local regulations or government rules play an important role in the longitudinal aspect of the comprehensive supervision of agricultural natural resource assets, which can serve as an important link between the basic law of agricultural natural resources or the law of natural resource supervision and management, and connect the comprehensive laws or administrative regulations of supervision, and can also serve as an important guide to the implementation rules of various special supervision systems in the administrative region. It should be noted that the formulation or amendment of laws and regulations at different hierarchies should follow the basic principles of the “Legislative Law” of China, and the lower law should not contradict the upper law. The central and local multilayer linkage mechanism should be implemented within the scope of authorization. Meanwhile, the cross-filing and post-evaluation mechanism of the central and local comprehensive cooperative legislation should be established [36] to promote the realization of the comprehensive supervision system of agricultural natural resource assets.

Second, we address implementing multilayer comprehensive supervision in the cross section. The regulation of agricultural natural resource assets has the characteristics of cross-control fields, and strong demand of cross-field integration. The multilayer linkage mechanism of comprehensive coordination of agricultural natural resource assets between

central and local should also respond to such integration needs, and it is suggested that cross-sections can be carried out between various supervisory agencies and various law departments. It is important to integrate and connect comprehensive collaborative legislation, and to play the control function, providing a guaranteed mechanism for the comprehensive supervision of agricultural natural resource assets. Multi-department comprehensive coordination includes not only collaborative supervision between the legislative organs, judicial organs, and administrative organs in the same local government, but also the collaborative legislation between different local legislatures. At present, the status of administrative organs as the main body of cooperative legislation is not stipulated in the “Legislative Law” of China and the “Organic Law of Local People’s Congresses and Local People’s Governments at Various Levels” of China. In the practice of regional cooperative legislation, the possibility of administrative organs participating is high [37]. At the same time, it is also necessary to explore feasible schemes for the collaborative legislation of legislative bodies at different levels in practice, such as provincial legislative subjects and district-level municipal legislative subjects. Therefore, when legislative subjects at different levels cooperate in legislation, the scope of legislative authority could be determined according to the actual legislative needs. Generally, the legislative subject with lower legislative authority should prevail. In special cases, the legislative authority could be enhanced through authorized legislation of the “National People’s Congress” of China.

## 5. Conclusions

Improving the legal system for the supervision of agricultural natural resource assets is a requirement for the construction of ecological civilization systems and an inherent requirement for the implementation of the rural revitalization strategy of China [38]. Douglas North pointed out that the demand generated by the new institutional norms lies in the fact that the provisions on people’s rights and obligations and production and business activities in the existing institutional norms can no longer meet the needs of social development and people’s living standards. In addition, agricultural natural resource assets are externality and irreplaceability [39]. On the one hand, the development and utilization behavior of any resource asset in the living community would have an impact on other elements in the ecosystem. In the absence of comprehensive regulation of the use of agricultural natural resource assets, this impact would manifest itself as the external diseconomy or negative externality. On the other hand, the irrational development and utilization of agricultural natural resource assets, such as arbitrarily filling lakes and seas, blasting mountains, and indiscriminate deforestation, if the rural ecological environment system is damaged, would often cause difficulty with respect to repairing and irreplaceable consequences. Therefore, given the current regulatory duplication, conflict and lag, and other problems, the supervision of agricultural natural resource assets urgently needs to pay attention to “common sharing and co-governance”, emphasize “reasonable and sustainable use”, and build a “fair trading market”. To promote the preservation and appreciation of agricultural natural resource assets, maintain fair trading in the resource market, and improve the co-governance of multiple entities, we would design comprehensive legislation on the supervision of agricultural natural resource assets, improve the comprehensive coordination mechanism between central and local governments, provide an operable comprehensive supervision path for the advancement of super-ministry system restructuring in China, and provide a legal guarantee for Chinese-style modernization featuring harmonious coexistence between man and nature.

Combined with the possible shortcomings of this paper, future studies can be improved from the following aspects: First, this paper proposes to formulate a special comprehensive supervision law on agricultural natural resource assets, but some countermeasures and suggestions still lack stronger pertinence and operability. Future studies can combine field research, conduct empirical data research, and combine quantitative and qualitative analysis to improve the operability of legislative suggestions. Second, this paper focuses on solving the problem of collaborative legislation and comprehensive supervision among

the subjects of public power, but the realization of the comprehensive supervision system of agricultural natural resource assets also requires the participation of multiple subjects, such as industry organizations and the public jointly. Further discussion can be carried out concerning the design of the public participation mechanism and the co-governance model of multiple subjects in various stages of supervision, legislation, law enforcement, and justice. Thirdly, this paper analyzes the legal system of comprehensive supervision of agricultural natural resource assets from three aspects, value objective, game analysis, and approach of rule of law, but the optimization and improvement of this system also includes many contents, such as the regulation of the trading market of property rights of agricultural natural resource assets and the establishment of an agricultural natural resource asset-evaluation system. Due to limited space, such issues are targets that can be further studied in this field in the future to further improve the comprehensive supervision legal system of agricultural natural resource assets in China.

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