

Legal Regulation of Invasive Alien Species from the Perspective of Ecological Safety

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Abstract: The invasion of alien species has had a serious impact on China's ecological security, socio-economic development, and public health. Effectively preventing the invasion of alien species legally is a major challenge facing China. However, China still faces difficulties in the legal regulation of invasive species. This paper proposes the establishment of legislative objectives for ecological security, the creation of a catalog of alien species, the expansion of inspection and quarantine scope, and the optimization of risk assessment institutions by summarizing the experiences of relevant legal systems at home and abroad.

Keywords: Ecological security, Alien species, Invasion, Legal regulation

1. Introduction

Ecological security, as a crucial component of national security, is the fundamental prerequisite for human survival and development. Ecological issues not only affect human health but also directly impact the economic development of a country and the long-term stability of society. The invasion of alien species, as a global ecological issue, has seriously affected the ecological security, economic development, and human health of invaded areas. In response, China has formulated a series of laws, regulations, and rules related to the prevention and control of invasive alien species since the beginning of the 21st century. This paper analyzes the current status and deficiencies of China's legal work on preventing and controlling invasive alien species, providing insights for improving the legal system for the prevention and control of invasive alien species in China.

2. Overview of the Invasion of Alien Species

2.1. Alien Species and Invasion of Alien Species

Alien species are those that exist outside their natural distribution range and, as defined by the International Union for Conservation of Nature (IUCN) in the "Guidelines for the Prevention of Biodiversity Loss Due to Biological Invasion," refer to species, subspecies, or lower taxonomic groups that, once introduced, can reproduce and survive in a local environment beyond their natural range.

Alien species invasion refers to the introduction or natural spread of species that do not originally belong to a specific area due to intentional or unintentional human activities. This leads to the

establishment of self-sustaining populations in natural or semi-natural ecosystems, causing adverse effects on ecological security, biodiversity, and even human health. [1]

2.2. Hazards of Invasion of Alien Species to the Ecological Security of China

While alien species have brought economic benefits to some extent to countries and regions, the impacts and hazards resulting from the invasion of alien species are immeasurable. The harm caused by invasive organisms to ecological security is primarily manifested in the following aspects:

Firstly, the invasion of alien species disrupts biodiversity. For example, in the early 20th century, Yunnan Dianchi, in an effort to control water pollution, extensively planted water hyacinth. However, due to the astonishing reproductive capacity of water hyacinth, it threatened other aquatic organisms, leading to a decrease in their numbers and even extinction, thereby disrupting local biodiversity.

Secondly, the invasion of alien species leads to frequent ecological disasters, causing significant economic losses. Economic losses can be categorized into direct and indirect losses. For instance, invasive species such as pine wilt nematode and ragweed invade forests and farmlands, resulting in economic losses from reduced crop yields and damage to forestry. Indirect economic losses include annual expenditures for clearing and controlling invasive alien species in disaster-stricken areas.

Finally, the invasion of alien species pollutes the ecological environment and jeopardizes human health. For example, the red imported fire ant, as a highly toxic alien species, can cause a series of toxic reactions and easily induce bacterial infections when humans are bitten, posing a threat to life. Several cases of fatalities due to red imported fire ant bites have been reported both domestically and internationally.

3. Current Status of Legal Regulation on the Invasion of Alien Species

3.1. Current Status of Alien Species Inspection and Quarantine System

The invasion of alien species is closely related to the inspection and quarantine of animals and plants. The legislative purpose of the "Customs Law of the People's Republic of China on Import and Export Animal and Plant Quarantine" is primarily to protect the production of agriculture, forestry, animal husbandry, and fisheries, promote the prosperity of foreign economic trade, and prevent the entry and exit of harmful organisms. Strict quarantine measures must be implemented. Simultaneously, this law explicitly prohibits the entry of certain species. Applications must be submitted in advance, and quarantine approval procedures must be completed for the import and export of quarantined goods. The "Frontier Health and Quarantine Law" establishes frontier health and quarantine agencies at ports, airports, land borders, and national border crossings, responsible for the quarantine, monitoring, and health supervision of incoming and outgoing individuals, transportation, and luggage and items carrying infectious diseases.

3.2. Current Status of Alien Species Catalog System

After joining the World Trade Organization, China's foreign trade has further developed, leading to an increasing number of alien species entering the country through ports. In response, China has adjusted its list of quarantine pests affecting plants. In 2007, the General Administration of Quality Supervision, Inspection, and Quarantine, together with the Ministry of Agriculture, jointly formulated the "Catalog of Quarantine Pests for Imported Plants." This catalog significantly increased the types of quarantine pests without distinguishing between Class I and Class II, facilitating better operation and control of quarantine work. As a crucial component of China's alien species catalog system, the government has successively released four batches of the "List of Alien Species Invasions in China" in 2003, 2010, 2014, and 2016, totaling 71 alien species. In 2022, the Ministry of Agriculture and

Rural Affairs, in accordance with Article 18 of the "People's Republic of China Biosecurity Law," collaborated with several departments, including the Ministry of Natural Resources and the Ministry of Ecology and Environment, to formulate the "List of Key Management of Alien Invasive Species."

3.3. Current Status of Alien Species Risk Assessment System

Since the 1990s, relevant principles and content of the alien species risk assessment system have gradually been incorporated into other related laws and regulations through legislative activities at the central level. For example, in 2002, the General Administration of Quality Supervision, Inspection, and Quarantine issued the "Regulations on the Management of Risk Analysis for Imported Plants and Plant Products" and the "Regulations on the Management of Risk Analysis for Imported Animals and Animal Products," both of which apply to the risk analysis of imported plants, plant products, and other quarantine items, as well as imported animals and animal products, respectively. These regulations established the principles to be followed in risk analysis, the initiation of risk analysis, and specified the specific procedures for initiating risk assessments for alien species. In 2021, the newly revised "Animal Epidemic Prevention Law," Article 15, established the national animal disease risk assessment system. It requires the competent agricultural and rural departments to collaborate with relevant departments such as health to conduct risk assessments for animal diseases. Additionally, effective prevention and control measures for animal diseases are formulated and announced.

4. Challenges in the Legal Regulation of Alien Species Invasion in China

4.1. Incomplete Inclusion in the Alien Species Catalog System

The catalog system is the foundation for preventing the invasion of alien species. As mentioned earlier, China has made certain progress in its alien species catalog system, but some shortcomings still exist.

Firstly, the currently published lists of invasive alien species only include those that have posed threats to ecosystems, neglecting species with potential threats. This limitation hinders effective preventive measures. For example, according to Article 5 of the "Law of the People's Republic of China on Inspection of Import and Export Goods," inspection agencies inspect goods listed in the catalog. This system confines inspection to goods explicitly listed in the catalog, lacking clear categorization and supervision of goods that may carry the risk of invasive alien species.

Secondly, there is a lack of reasonable classification for invasive alien species. Most catalogs classify species based on external morphology, such as the "List of Key Management of Alien Invasive Species," which categorizes invasive species into plants, insects, and fish. The "National Catalog of Quarantine Pests for Agricultural Plants" classifies quarantine pests into insects, nematodes, bacteria, and weeds. However, this classification method tends to overlook the extent of damage invasive alien species can cause to the ecological environment, hindering the catalog's effectiveness in warning and preventing the invasion of alien species.

4.2. Narrow Scope of Alien Species Inspection and Quarantine

The current deficiencies in the inspection and quarantine system hinder its effectiveness in preventing the invasion of alien species, requiring urgent resolution.

Firstly, the legal adjustment scope of the inspection and quarantine system is too limited. For example, the "Customs Law of the People's Republic of China on Inspection and Quarantine of Import and Export Animals and Plants" specifies the applicable scope as infectious diseases of animals, parasitic diseases, dangerous plant diseases, insects, weeds, and other harmful organisms. The "Plant

Quarantine Regulations" focus on diseases, insects, and weeds that are highly dangerous and can spread with plants and their products. [2]

Secondly, China's international cooperation on health quarantine at ports with organizations such as the World Health Organization and countries engaged in navigation primarily focuses on responding to international public health emergencies and developing core capacities at ports. There are shortcomings in international joint prevention and control of the invasion of alien species.

4.3. Lack of Alien Species Risk Assessment Institutions

China currently lacks a comprehensive system for risk assessment of alien species. The provisions related to the risk assessment of alien species are scattered across various laws and regulations, with relatively broad and generalized stipulations. For instance, the "Management Measures for Alien Species" explicitly state that approving authorities should regularly review and assess species, prohibiting the entry of those posing invasion risks. However, specific details regarding the assessment process are not further specified. The most detailed regulations can be found in the "Technical Guidelines for Environmental Risk Assessment of Alien Species," issued by the former Ministry of Environmental Protection. Nevertheless, its evaluation scope is limited to planning and construction projects that may pose ecological threats from alien species, rendering it unable to comprehensively address the issue of invasive alien species.

Furthermore, China has yet to establish a dedicated risk assessment institution for alien species. Instead, various functional departments have set up their own risk assessment institutions within their jurisdiction. Due to a lack of effective coordination mechanisms between these departments, there are disparities and inadequacies in policy execution, hindering the efficient response to the escalating trend of invasive alien species.

5. Path to Enhancing Legal Regulation of Alien Species Invasion

5.1. Establishing the Legislative Purpose of Ecological Security

The legislative purpose serves to manifest the inherent value of the law and reflects the goals and issues the legislation aims to address. Therefore, before establishing the legal framework for preventing and controlling the invasion of alien species, it is essential to clearly define scientifically sound legislative objectives.

In this regard, the author proposes that the concept of "protecting ecological security, biodiversity, and promoting sustainable social development" should be incorporated into the legislative objectives for preventing the invasion of alien species. Only by elevating the legislative purpose to the national level and anchoring it in the entirety of the ecosystem can we effectively control and manage the issue of alien species invasion, safeguard biodiversity, and promote the balanced and stable development of the ecosystem. [3]

5.2. Implementing Categorized Management and Establishing an Alien Species Classification Catalog

The current classification of alien species in China is unreasonable, making it challenging to accurately understand and identify various types of alien species.

Therefore, China can actively learn from Japan's classification management under the "Invasive Alien Species Act" and adopt the categorization proposed by the Global Invasive Species Programme (GISP), which includes a Black List, Grey List, and White List to classify alien species. [4] The "Black List" comprises species known or potentially threatening to the environment, requiring strict restrictions on their introduction. The "Grey List" includes species lacking sufficient scientific

evidence of harm, and if assessed to pose an acceptable invasion risk, they can be introduced with appropriate measures. The "White List" consists of species that essentially lack invasion potential and may not be subject to restrictions on introduction. However, these lists are not static and can change and be updated based on research progress. This dynamic adjustment ensures that these lists remain synchronized with new scientific discoveries and promptly address issues of potential ecological imbalance caused by invasive alien species.

5.3. Building a Joint Prevention and Control Mechanism, Expanding the Scope of Inspection and Quarantine

The current inspection and quarantine system in China has a relatively limited adjustment scope, primarily focusing on infectious diseases and pest control, such as microorganisms. To ensure border security and border control, there is an urgent need to further expand the objects and scope of inspection and quarantine. In addition to known dangerous invasive alien species, strict inspection and quarantine measures should be applied to those with potential risks. It is crucial not only to rigorously implement inspection and quarantine for intentionally introduced alien species but also to inspect and quarantine unintentionally introduced alien species through channels such as packaging, containers, and transportation.

Simultaneously, a joint prevention and control mechanism should be established to create a monitoring, assessment, and early warning system for the ecological security of harmful alien species and invasive alien species.

5.4. Implementing the Principle of Risk Prevention, Establishing Risk Assessment Institutions

In establishing the risk assessment system for invasive alien species, the concept of risk prevention must be integrated into various aspects of law formulation, policy execution, and preventive and control measures. [5] The scope of risk assessment for invasive alien species should be expanded to include all such species, aiding in the accurate identification of potential risks and the adoption of corresponding preventive and control strategies.

Moreover, to scientifically assess invasive alien species, it is imperative to establish a specialized risk assessment institution. This will help overcome the challenges of fragmented responsibilities and narrow interests within different departments, enhancing overall work efficiency and preventing limitations due to narrow considerations.

6. Conclusion

In the current severe situation of invasive alien species, there is an urgent need to strengthen China's efforts in preventing and controlling the invasion of alien species. By thoroughly examining the shortcomings in legal regulation and proposing reasonable legal foundations and improvement pathways, we can provide robust support for preventing and controlling the invasion of alien species. Only through a comprehensive legal framework, efforts such as establishing the legislative purpose of ecological security, implementing categorized management and establishing an alien species classification catalog, and implementing the principle of risk prevention by establishing risk assessment institutions, can we better confront the challenges posed by the invasion of alien species.

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