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The legal system of eco-agriculture development under the background of climate change in China

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ABSTRACT

Ecological agriculture (eco-agriculture) is not only a necessary approach to the sustainable development of agriculture, but also provides a solution to cope with the climate change in the area of agriculture. The development of the eco-agriculture is largely dependent on the advanced theories and technologies, but the perfect legal system is also an integral part to safeguard and promote its development. As a large agriculture production and greenhouse gas emission country, it is important for China to develop the eco-agriculture to transform the mode of agricultural production. Based on the actual conditions, China can learn from the developed countries' mature legal systems and experience to perfect its legal institutions to support the eco-agriculture development.

KEYWORDS

Climate change; Eco-agriculture; Sustainable development; Legal guarantee.



INTRODUCTION

In recent years, the global warming, extreme weather and other natural disasters brought grave disasters to human beings. It is the common goal of the mankind to cope with the global climate change and prevent the deterioration of the environment. Agricultural production is an important factor of causing the climate change, it's the second largest sources of greenhouse gas (GHG) emitter and the GHG discharged from agricultural accounted for 13.5% of global anthropogenic emissions^[1]. Due to the advantages, the eco-agriculture is not only the choice of sustainable development of agriculture, but also provides a solution for addressing the climate change. As a large agricultural country, China's agriculture production is mainly dependent on the traditional mode and thus caused great damage to the environment. Therefore, it is an inevitable choice for China to develop the eco-agriculture in future.

The concept of the eco-agriculture was first put forward by American soil scientist W.Albrecht in 1971^[2]. It's an alternative type of agriculture to the traditional "oil agriculture" or "industrial agriculture", which caused less harm or damage to the natural resources and the eco-environment.

Eco-agriculture, under the guidance of the coordination development thoughts of the environment and economy, is a kind of multi-level, multi-function and adjustment measures to local conditions production. Its development is based on the principle of ecology theory and the utilization of the biological and engineering measures^[3]. Through the comprehensive and systematic ways of production, it can reduce the GHG emission, increase the agriculture carbon sequestration and then mitigate the climate change.

SIGNIFIANCE: FROM THE PERSPECTIVE OF ADDRESSING CLIMATE CHANGE

Agriculture and climate are closely interrelated and interdependent. Climate change has a profound impact on the agricultural production and vice versa^[4]. Under the background of addressing the climate change world widely, it is common issues for all countries to identify the amount and the emission ways of agricultural GHG and then work out the measures to reduce the discharges.

The impact of traditional agriculture to climate change

The traditional agriculture is highly dependent on the chemical fertilizer and pesticide, thus caused great damage to the environment. It influenced the climate by reducing the absorption and increasing the discharge of carbon and non-carbon dioxide GHG^[5].

First of all, the traditional agriculture reduced the absorption of carbon dioxide. The mode of the traditional agriculture caused the deforestation, grassland degradation, desertification and other destruction of ecosystem and all of those lead to the reduction of the botany absorption of CO₂ through photosynthesis.

Secondly, the traditional agriculture increased the discharge of CO₂. (1) the burning and decomposition of the destructed forest and grass would discharge a large amount of the CO₂; (2) the changed usage of the land increased the amount of carbon in the atmosphere. For example, as the agricultural land changed into the non-agricultural land, the agricultural and non-agricultural land's conversion in themselves, all of these changes can increase the content of carbon in the atmosphere; (3) the inadequate use of fertilizer intensified the greenhouse effect. For example, when apply the carbonate bicarbonate in soil, its dissolution and absorption process will produce a large amount of CO₂ and the volatilization of carbon in the process of fertilizer application will also produce CO₂^[6].

Lastly, the traditional agriculture is a source of non-carbon dioxide GHG. The methane fermentation from paddy fields and plants; nitrous oxide released from farmland soil; methane and nitrous oxide produced from the process of excreta disposal are all the discharge of traditional agriculture.

Therefore, the traditional way of agricultural production have pressured a comprehensive impact on global climate change. It is an urgent and significant topic to explore the transformation of traditional agriculture to achieve the sustainable development of agriculture itself and mitigate its adverse impact on the global climate.

Environment-friendly eco-agriculture

The modern way of eco-agriculture production is mainly dependent on the regulatory mechanism of nature itself and the biological measures to maintain soil fertility and then promote the growth of plants, the process minimize the use of the chemical fertilizer and pesticide, etc^[7]. Therefore, it has the function of reduce GHG emission and sequester carbon to mitigate the climate change.

Eco-agriculture can reduce the discharge of GHG. For example, the rice-fish eco-agriculture pattern can improve soil redox ability and reduce the emission of methane; the rural biogas reduced the release of methane in the process of organic fertilizer processing. According to calculations, from 2010-2050, the replacement of biomass and coal with biogas can reduce the discharge of CO₂ around 307.77-4592.80 million tons annually^[8]. Meanwhile, the use of organic fertilizer can reduce the dependence on nitrogen in eco-agriculture production and reduce nitrous oxide emissions^[9].

At the same time, the eco-agriculture has a significant role in carbon sequestration. For example, the conservation tillage way of eco-agriculture, such as returning cultivated land to forests, returning grazing land to grassland, reducing tillage and no-tillage measures, returning straw to field, etc., can increase the carbon storage of the farmland and then mitigate the climate change and ameliorate the eco-environment.

In addition, the development of eco-agriculture can bring a series of environmental and additional benefits^[10]. First, the eco-agriculture can improve the productivity of the soil and increase the yield of the crops; Second, many eco-agricultural production measures can maintain the organic materials and physical characteristics of the soil and then improve the quality of water and air; Third, the recycle use of the crops' straw and other things can improve the farmers income and prevent their pollution to the environment.

GUARANTEE: SOUND LEGAL SYSTEM

The development of eco-agriculture is mainly an idea and technical problem. The advanced ideas and mature technologies are the prerequisites of the eco-agriculture development. But the perfect legal system is the basis of guaranteeing the development of eco-agriculture^[11]. Depending on the perfect eco-agriculture guarantee legal system, the developed countries' eco-agriculture has made great achievements.

The developed countries' eco-agriculture legal system and the experience

1 Overview

Within the developed countries, the United States of American, Germany and Japan have typically established their own eco-agriculture legal system, effective management system and supporting measures to safeguard their own eco-agriculture development.

(1) America

The United States of America has perfect agricultural legal system to safeguard the healthy development of its agriculture. *The Agricultural Law, the Agricultural Adjustment Act* and a series of special laws constitute its agricultural legal system.

The United States's eco-agriculture laws are mainly reflected in its organic agriculture prescriptions. *The Organic Food Product Act*, which was promulgated in 1990, stipulated clearly about the organic food's production procedure, national standards, certification procedures, etc. In 2000, the Agriculture Department of the United States enacted *the Organic Agriculture Ordinance*, which defined the definition, applicability and other characteristics of organic agricultural products and listed the allowed and prohibited matters in the process of organic agricultural production. Meanwhile, the United States has enacted some special laws to regulate the production, distribution and use of the chemical and pesticide products, such as *the Federal Insecticide, Fungicide Law, etc.*. In addition, some states of the USA have enacted special organic agriculture laws to guarantee the development of the eco-agriculture, such as, the Alaska and Hawaii have made special fertilizer laws^[12]. All of these laws and regulations constitute the eco-agriculture legal system of the USA.

The development of organic agriculture in the United States also dependent on the overall organic agriculture compensation policies. Such as, *the United States Agricultural Law* (1956) stipulated *the Soil Bank Program* to encourage the landowner to shift the land from agricultural use for short or long term; In 1961, the United States made *the Feed Grain Emergency Plan* to reduce the output of feed grain; The United States *Food Safety Act* (1985) has two plans to reduce the agricultural pollution: *the Agricultural Conservation Program* and *the Protection Commitment Program*, both of them made powerful impetus to the development of eco-agriculture in the United States.

(2) Germany

As one of the main member of the European Union, Germany's agricultural laws and policies are the reflection of the EU's *Common Agricultural Policy*. Its agricultural laws and regulations mainly include: *the Seed Law, the Species Protection Law, the Fertilizer Utilization Law, the Land Resources Protection Law, the Natural Resources Protection Law, the Plant Protection Law* and *the Water Resources Management Ordinance, etc.*

The development of its eco-agriculture have to comply with the above laws. In addition, Germany enacted some special laws and regulations relating to the eco-agriculture, such as: *the Farming Eco-Agriculture Regulation (1991), the Aquaculture Industry Ecological Management Regulation (1994), the Ecological Labeling Method Law (2001), the Eco-Agriculture Law*. As the basic law of the development of the eco-agriculture, *the Eco-Agriculture Law* stipulates clearly and rigorous about the use of the fertilizer, the way and period of farming, etc.. The law expanded the mode of the cleaner production from industry to the field of agricultural production. It has a significant meaning to the environment protection, food safety and the sustainable development of the agriculture.

(3) Japan

The development of eco-agriculture in Japan was initiated in the nineteen seventies of the twentieth century.

There are four basic laws that concerning the eco-agriculture in Japan: *the Basic Law of Food, Farming and Rural; the Sustainable Agriculture Law; the Compost Quality Management Law* and *the Food Waste Recycling Law*. After the review of *the Agriculture Basic Law* in 1999, *the Basic Law of Food, Farming and Rural* was enacted which bears the philosophy of the modern philosophies, the core aims of this law is to achieve the sustainable development of agriculture, rural revitalization, assure the safety of the food and play the multiple functions of the agriculture in rural areas. *The Sustainable Agriculture Law* (1999) is matching with *the Agriculture Basic Law*, its aim is to promote the implementation of sustainable agricultural production standardization law. *The Compost Quality Management Law* was enacted in 2001, it is a matching law of *the Sustainable Agriculture Law* and is an important part of *the Fertilizer Ban Law*. *The Food Waste Recycling Law* which was enacted in 2000 and stipulated the recycling of the food resources.

2. Experience

Throughout the analysis of the US, Germany and Japan's eco-agriculture legal system, we can conclude the following common experience:

First, sound legal system. The developed countries paid great attention to the construction of legal system to safeguard the eco-agriculture development. Basically, they formed the eco-agriculture legal system like this: the core is the basic agriculture law, the pillar is the eco-agriculture department law and then supplemented by the ecological law.

Second, perfect supporting measures. Perfect supporting measures can promote the implementation and enforcement of laws and regulations. The developed countries laid down the perfect supporting measures for the enforcement of the laws.

Third, efficient management system. The efficient management system is the key to enforce the laws and achieve the effects.

Fourth, effective incentive measures. Due of the weakness of the agricultural industry, most of the developed countries adopted the fiscal, financial, tax and other incentive measures to promote the development of the eco-agriculture.

The eco-agriculture legal system in China

In China, the term of "eco-agriculture" was first introduced at the First National Agricultural and Eco-Economic Symposium in 1980. The development of the eco-agriculture in China has experienced the theoretical discussion and debate stage in late seventies and early eighties of the nineteen centuries; the research stage at the middle of eighties and the early nineties of the nineteen centuries; and then the law and policy guidance and propulsion stage.

1 Achievements

At present, China regulates the eco-agriculture mainly by the government papers and policies.

The first eco-agriculture normative article, named *the Opinions of Develop Eco-Agriculture, Strength Eco-Environmental Protection Work*, was issued in 1985 which specified the concrete requirements for the eco-agriculture development.

In 1993, *the National Leading Team of the Eco-Agriculture County Construction* was founded by seven departments of the State Council and *the First National Eco-agricultural County Construction Conference* was held, then the development of eco-agriculture was first put in the government work agenda and the development of eco-agriculture is written into *the China Twenty-First Century Agenda*. This marked the development of eco-agriculture brought into the behaviors of the government in China.

In 1994, the Ministry of Agriculture issued *the Eco-agriculture Demonstration Area Construction Technical Specifications (Trial)*, it is the unified technical standardization specifications concerning the construction of national eco-agriculture demonstration area, from then on the construction of eco-agriculture demonstration zone embarked on a systematic and standardized track in China.

In 1997, the Annual Congress of the Communist Party of China proposed the development of eco-agriculture once again, "vigorously develop the eco-agriculture" has been included in "the People's Republic of China National Economic and Social Development the 9th Five-year Plan" and "Vision 2010 Plan", the development of eco-agriculture as one of the important measure to implement the strategy of sustainable development of China's policies have been established.

In 2002, the revised *Agriculture Law of the People's Republic of China (Agriculture Law)* stipulated in its article 57 that China should develop eco-agriculture, protect and improve the eco-environment. In addition, the issue of *the National Technology Standard of Eco-agriculture* was a momentous measure to promote the standardization of the eco-agriculture.

In China, some of its provinces, cities and counties also made the regional or local eco-agricultural support and promotion policies and measures with the local characteristics and encouraged farmers to transform from traditional agriculture to eco-agriculture. So far, China's eco-agriculture basically developed into institutionalized and standardized track^[13].

2 Drawbacks

In China, the relevant eco-agriculture law have laid the good foundation for the outstanding achievements of the eco-agriculture development, but there are still some problems that hindered the long-term and sustainable development of the eco-agriculture.

First, the imperfection of policies and the legal system

China has't established the eco-agriculture promotion legal system on the national level. At present, China's eco-agriculture is mainly guided by the administrative norms and management, the policies are mostly stipulated in red head files, work reports and meeting documents of different levels of governments. In addition, the service system is incomplete in China, such as, the corresponding supporting system, industrial and technology supporting policy of the eco-agriculture are insufficient.

Secondly, the imperfect of the management regime

At present, China adopted a mode of decentralization, sectional supervision system on the eco-agriculture and its products. For example, both of the organic food and green food are in the category of eco-agriculture, but they belong to different management departments: organic foods are supervised by the State Environmental Protection Administration, the green foods are supervised by the Ministry of Agriculture. This is obviously adverse to the development of the eco-agriculture and need to be changed.

Third, the unscientific of the supporting technologies and standards

Although China promulgated *the National Eco-agriculture Construction Technical Specification* in 1994, but its disadvantages and shortcomings is exposed with the progress of science and technology, such as, the complicated authenticate process; the unclear boundaries of the certificate standards; the lack of the “pollution-free agricultural products, green food and organic food” certification system, etc.. All of these shortcomings are the hinderance of the healthy development of the eco-agriculture.

Fourth, the incomplete of the incentives measures

China’s eco-agriculture development incentives are incomplete and the farmers’ enthusiasms of the development of eco-agriculture is low. In China, there are many places, which are formally awarded as the Eco-Agricultural Zone, but without correspond matching funds and policies to support their development, the farmers lack enthusiasms to develop the eco-agriculture. At the same time, the insufficient propaganda of the eco-agricultural resulted in the consumers lack of the knowledge of the ecol-agriculture either, it is another factor of the lag development of the eco-agriculture in China.

STRATEGIES: PERFECT THE LEGAL SYSTEM

Based on the basic situations, China should follow the characteristics and principles of the eco-agriculture, absorb the legislative experience from the western countries actively and hold the principle of the coordinate development of the agriculture and the environment^[14].

Perfect the legal regime

China has formed a certain scale of eco-agriculture laws, but with the development of eco-agriculture, the legal security requirements are still far away. China should perfect its legal regime from the aspects of enact the relevant laws, set the relevant technical specifications and standards.

1 Enact the relevant laws

The perfect eco-agriculture legal regime should include the eco-agriculture basic law, relevant supporting regulations and the local legislations.

First of all, China shall enact the eco-agriculture basic law. *The People's Republic of China's Eco-Agriculture Law* has been put on the legislative agenda of the National People’s Congress (NPC)^[15]. The law enshrined the guiding ideology, overall objectives, basic principles and concrete measures to develop the eco-agriculture in China.

Secondly, the formation of interrelated laws and regulations should be accelerated. (1) The legislative body should revise the existing laws and regulations to make them reflect the ideas of eco-agriculture from the legislative purpose to the concrete articles. The emphasis should be on *the Agricultural Law, the Cleaner Production Promotion Law, the Law of Seed, the Law of Primary Products Quality Security, the Agricultural Technology Promotion Law, etc.*; (2) China should consummate the eco-agriculture related laws. For example, it is necessary to enact *the Soil Pollution Prevention Law, the Genetic Resources Protection Law, the Rural Environmental Protection Law*, and so on, to form the sound legal supporting mechanism.

Lastly, Guided by the national eco-agriculture laws, China shall fully considered the actual situations of different places. The local governments with the full play of their initiatives shall enact corresponding local legislations and policies to promote the local eco-agriculture development.

2 Complete technology and standard systems

With the continuous progress of science and technologies, the eco-agriculture technologies have been updated, so it is necessary for China to learn and absorb the international eco-agriculture technologies and certification specifications, food safety and market access standards of eco-agriculture to advance its production data systems, production base standards, technical standard systems and product standard systems, than provide the full range of technical support for the eco-agriculture development.

Perfect the management regime

The management of the eco-agriculture is a systematic and comprehensive work, it involves the department of agriculture, forestry, water conservancy, science and technology, environment protection, etc.. In order to ensure the overall arrangement, China shall establish a regime which is dominated by the agriculture administrative department and cooperated by the relevant administrative departments according to their own responsibilities.

First, the central government shall set up a coordinate board to enact the strategies and basic principles and policies to development the eco-agriculture. The board shall guild the national eco-development and coordinate the relationship of different departments^[16].

Second, the agriculture department shall have the dominant position in the management of the eco-agriculture development. It has the overall and concrete responsibilities and authorities to manage the development of the eco-agriculture.

Third, the government should define the responsibilities of the relevant departments and the obligations to cooperate with the agriculture department clearly. For example, the department of the forestry, water conservancy, planning, finance,

science and technology, environmental protection should participate in the eco-agriculture management work according to their respective duties and scope of their authorities.

Perfect the safeguard regime

The safeguard regime plays an important role to promote the development of eco-agriculture. Considering the necessity of developing the eco-agriculture, China should establish the compensation regime and use the combination of financial, fiscal and taxation tools to support the eco-agriculture development.

1 Establish the compensation regime

The development of eco-agriculture is at the expense of economic benefits in exchange for ecological benefits. Due to the public nature of ecological benefits which was created by the eco-agriculture, it must be compensated from the economic way^[17].

The following factors have to be considering when China establishing its eco-agriculture compensation regime. First, The establishment of organize and manage institution. The leading board should be set up to fully responsible for the administration and coordination in the State Council. In addition, an experts advisory committee should be established to provide the relevant policy and technical advice. At all levels of local governments, the corresponding departments should be established to perform the specific functions. Second, define the compensation object. Ecological compensation should be inclined to the National Eco-agriculture Experimental Zone, provincial eco-agriculture key support areas and agricultural resources and other vulnerable ecological regions. Third, the compensation principles, standards and methods shall be stipulated, so that the policy can be operational. Fourth, strength the assessment, supervision and management of compensation to ensure the achievement of the compensation interests. The compensation funds could be mainly organized by the government and supplemented by the way of folk financing; the way of compensation should combine the financial compensation and technology, one-time compensation and installment compensation together.

Of course, the eco-agriculture compensation regime is a systematic and complicated project, it involves many departments and links and related to the financing and use of the ecological protection funds and other aspects. The government should co-ordinate arrangement and elaborate organize to ensure the effective implementation of the eco-agriculture compensation system.

2. Adopt the economic incentives

As we known, agriculture is a weak industry in nature, its development is largely depend on the government support, especially the economic incentives, so does the eco-agriculture. Government incentives for eco-agriculture should mainly include three aspects: financial support, fiscal measures and tax preferential measures.

(1) Financial Support

From the aspect of the financial support: First, the government can issue the eco-agriculture financial and credit support loans to provide sufficient fund for the development of the eco-agriculture. Second, the government can provide the soft loans for the produce, process and sell of the eco-agriculture products or the policy bank can give concessional loans directly. Third, the government can participate in the eco-agriculture insurance, such as, pay parts of the premium or insured the eco-agriculture products as the applicant to improve the farmers' abilities to resist natural disasters.

(2) Fiscal Measures

It is a common practice to provide the fiscal support measures for the development of the eco-agriculture in developed countries. Learned from their experience, China shall establish the following measures: First, the government should fully consider the high cost, long period and externality of environment interests to the development of the eco-agriculture and provide the transformation subsidies from the perspective of improve the farmers' enthusiasms and relief their burden. Second, the government should provide technology subsidies to promote the spread of the advanced technologies, such as, the use of the organic fertilizer. Third, the government should provide the insurance subsidies for the qualified eco-agriculture project to relief the farmer's burden and strength the ability to resist the disasters.

(3) Tax preferential measures

It is a necessary and effective way to adopt the tax deduction and exemption measures to support the eco-agriculture development. China shall amend its *Tax Law* to stipulate referential measures to produce and consume the eco-agriculture products. First, the law can reduce or exempt the taxes from the eco-agriculture income to attract the fund to invest the eco-agriculture production; Second, the law can levy heavy taxes on environment adverse products, such as pesticides and chemical fertilizers and other chemical products, thus the technological innovation, the use of clean substitute products can be stimulated^[18]. Third, the law should reduce or exempt the consumption taxes to the individuals and organizations so that the price of the ecological products will low and more and more consumers can afford to buy the products.

CONCLUSION

The development of agricultural are facing the historical mission of transform the way of production and management, that is, the agriculture should realize the connotative development to transform the traditional agriculture to eco-agriculture. The eco-agriculture is not only the key to the sustainable development of the agriculture, but also the important strategy to achieve the energy conservation and emission reduction goal.

At present, the development of the eco-agriculture is at the crucial stage in China, the comprehensive legal system has a safeguard role for the healthy development of the eco-agriculture. This paper analyzed the necessity and feasibility of the eco-agriculture development in the context of climate change and discussed the strategies to perfect the eco-agriculture legal system, that is perfect the relevant laws, establish the relevant technologies and standards, adopt the corresponding ecological compensation and economic incentives and other measures, etc..

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