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Study on the Precautionary Principle in International Environmental Law

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Abstract: *Environmental problems have attracted more and more international attention, and the governance of the environment has become more and more important. The international community has put forward the principle of precautionary approach to environmental problems, which is a breakthrough in the traditional way of environmental governance. The article will start from the basic theory of risk prevention principle in international environmental law, first understand its basic meaning, then focus on how the principle is embodied in international environmental law, study the core elements of the principle, and finally explore the possibility of the application of the principle in the field of environmental protection in our country, and devote ourselves to deal with environmental problems.*

Keywords: *risk; risk prevention principle; international environment*

1. Introduction

With the rapid development of social economy and the improvement of people's living standards, the continuous development of technology has made environmental problems away from traditional models, and some new environmental problems have emerged one after another. In the face of complex environmental problems, we must adopt more scientific and technological means to carry out environmental governance. Some environmental problems will produce serious and irreversible damage if they occur. In the risk society, risk prevention and remediation are equally important, so we must be able to grasp the overall situation of environmental problems in the prevention process. People in today's society are more aware of risks, and when facing possible damages, they often focus on taking preventive measures in advance. Risk prevention principle since become the basic principle of international environmental law, has been the focus of international discussion. Next, this article starts with the basic theory of the principle of risk prevention and gradually delves into its inherent meaning.

2. Basic theory of the precautionary principle

2.1. Background of the precautionary principle

Risk in environmental law refers to events that may cause damage to the environment, and the principle of risk prevention in the field of environmental protection refers to taking scientific preventive measures in advance based on the actual situation for possible adverse situations in the field of environmental protection. This can prevent problems before they occur, and regardless of whether the final environmental problem occurs, protective measures can be taken in advance to reduce the degree of environmental damage to a certain extent.

The results of environmental degradation have the characteristics of hysteresis and irreversibility, and the principle of risk prevention is proposed based on these characteristics. As soon as it was proposed, it was listed by many environmental jurists as one of the fundamental principles of international environmental law.[1] The principle of risk prevention has always been highly popular in the international environmental field. If we want to delve into the connotation of this principle, we must understand how various international environmental treaties stipulate the principle of risk prevention. By comprehensively grasping the content of the risk prevention principle in the treaty, we can better grasp the inherent significance of this principle.

From the origin, the precautionary principle first arose from the concept of "vorsorgeprinzip" in

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German environmental law in the 1960s, and gradually developed into regional environmental treaties,[2] The core content of "vorsorgeprinzip" is "long-term planning for avoiding environmental damage, detecting environmental and health hazards through comprehensive surveys and studies, and taking action before obtaining conclusive evidence of the damage. Action is taken before definitive evidence of damage is available."[3] In the 1980s, Germany had long proposed an attempt to apply the precautionary principle in the international environmental field, and its advocacy was certainly echoed, culminating in 1984 in the Second International Conference on the Protection of the North Sea. After this meeting, the London Declaration was issued, which explicitly stated the precautionary principle as follows: "To protect the North Sea from the harmful effects of the most dangerous substances, it is necessary to take precautionary measures to control the entry of such substances, even in the absence of absolutely clear scientific evidence of causation." The London Declaration thus became the first document at the international level to set out explicitly the precautionary principle of risk. The establishment of the precautionary principle is mainly aimed at the development of the concept of the frequent occurrence of major environmental problems in the international arena, under which, in the face of major environmental problems, we should, under preliminary judgment, make scientific predictions of possible hazards and analyze the causes of the events, so as to take reasonable measures to prevent the hazards and to minimize the extent of damage to the environment. This approach is the most important one in the field of international environmental law. This approach is a breakthrough in the field of international environmental law, and although it entails certain costs, it is a good thing for the establishment of a systematic environmental governance system.

2.2. Trends in the development of the precautionary principle

From the background of the emergence of the precautionary principle, the principle is not clearly stipulated at the beginning of the international environmental protection. When the human activities have more and more influence on the environment, the risk of environmental damage is getting bigger and bigger, in the process of enjoying the benefits of the environment, we must also take some precautions to try to ensure the integrity of the environment, do not cause any damage to the equilibrium of the environment. The principle of precautionary risk management has been developed to the present day. Up to now, the precautionary principle has been applied to many international environmental fields, such as international marine protection, atmospheric environmental protection and international biological resources protection. The application of the precautionary principle in these fields can improve the precautionary principle to be more comprehensive, so that there can be a clear standard to take environmental protection measures in the subsequent environmental problems.

In today's society, the development of science and technology is also a factor in the establishment of the precautionary principle. Firstly, because of the development of science and technology, the measures taken for environmental protection are more technological, the effective and precise measures can be taken to deal with environmental problems; secondly, the development of the environment enables humans to better understand the environment, and therefore more accurate measures can be taken on environmental problems; finally, environmental problems must be prevented in advance to minimize damage to the environment.

In conclusion, there is no doubt that the precautionary approach has been established as a fundamental principle of international environmental law.

3. Embodiment of the precautionary principle in international environmental law

3.1. Responding to climate change

In the United Nations Framework Convention on Climate Change, the content of the precautionary principle is worthy of our attention. The precautionary principle is explicitly put forward in Principle III of the Convention, which indicates that the precautionary principle is one of the basic spirits of the Convention, and that the expression of the principle is basically a restatement of the Rio Declaration. The Convention provides for the precautionary principle as follows: "Parties must take precautionary measures to anticipate, stop or, to the extent possible, control climate change and mitigate its adverse effects. Where there is a threat of 'serious or irreversible harm', the lack of adequate scientific evidence should not be used as an argument against taking appropriate measures, but it should also be taken into account that policies and measures taken in response to climate change must be cost-effective so as to secure global benefits at the least cost." On the other hand, the application of the principle of

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precautionary approach is also very important. When using science and technology to detect environmental problems, such as the phenomenon of environmental risks, it is necessary to integrate a series of data monitored and utilize them to prevent environmental problems.

In the application of the principle of risk prevention to solve environmental problems, it is necessary to adopt professional organizations and personnel for the analysis and processing of monitoring data, so the training of professionals and professional organizations to join the environmental protection is very important. Science throughout the environmental issues will be able to grasp the environment as a whole, so as to do a timely stop.

3.2. Responding to atmospheric environmental protection

The principle of risk prevention has long been applied to the field of atmospheric environmental protection. 1985, the existence of the ozone layer is in fact a factor to protect the earth's environment, but in recent years, its continuous depletion has made the atmospheric environment in an unstable state, and a lot of hazardous substances have already affected the health of human beings. Therefore, the international community has adopted the Vienna Convention for the Protection of the Ozone Layer, which in its preamble mentions "risk prevention measures" including the phasing out of the production and use of fluorocarbons and other ozone-depleting substances, and sets out a specific timetable.[4] The principle of risk prevention is also explicitly stipulated in the subsequent Montreal Protocol, and thus the principle has become increasingly important in international environmental protection.

3.3. Responding to waste pollution

Waste pollution is a more and more serious problem in modern society, with the continuous development of the economy, the improvement of living standards of the population makes the consumption level increase, but also therefore produce waste garbage situation is also more and more common in daily life. Therefore, the principle of risk prevention should be applied to the problem of waste pollution and measures should be taken in advance to minimize the damage to the environment. In response to the problem of waste pollution, the international community has adopted a number of treaties that clearly stipulate the principle of risk prevention, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Disposal and the Bamako Convention on the Ban of the Import of Hazardous Wastes into Africa and the Regulation and Control of Transboundary Movements of Hazardous Wastes in Africa, among others. The adoption of these treaties has consolidated the position of the precautionary principle in the field of international environmental governance.

3.4. Response to the protection of biological resources

In order to protect the earth's biological resources, the international community adopted the Convention on Biological Diversity in 1992. This is a legally binding international convention, the purpose of which is to protect the endangered plants and animals on the earth, the protection of animal and plant resources can make the ecosystem a virtuous cycle. The Convention has formulated a systematic legal system for the conservation of biodiversity, not only advocating the establishment of protected areas for biological resources, but also suggesting that environmental management should be emphasized in the protected areas, and that the protected areas should be managed in a way that is conducive to the protection of the environment. This kind of targeted protection will make the conservation of biological resources more efficient.

The Convention on the Conservation of Migratory Species of Wild Animals (CMS) aims to protect wildlife migration. Migratory movements of wild animals are a natural phenomenon in the animal world, and when humans intervene in the conservation of species, they should also protect their natural activities and prohibit the hunting of migratory animals.

4. Core elements of the precautionary principle of risk

4.1. Severity of the risk

The precautionary principle emphasizes that measures may be taken to prevent the threat of serious or irreversible harm, even in the absence of a clear and sufficient scientific basis and causal relationship.

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[5] How to determine the severity of the risk before taking preventive measures is a difficult issue, and the refinement of the generalized criteria of the principle. The criteria of "serious or irreversible damage to the environment", is of the utmost importance for the establishment of the criteria for the application of the principle of risk prevention.[6] As to the seriousness of risk, some international law conventions stipulate "serious or irreversible threat of damage", while some other international treaties stipulate "possible threat of damage". Either way, the severity of the risk required for the application of the precautionary principle is the same, with the only difference being the degree of risk required, i.e., the threshold.

Different environmental problems are required to meet different thresholds, i.e., different degrees of risk, some environmental problems will cause serious and irreversible damage if they occur, so we have to take more stringent precautionary measures to avoid its occurrence and the expansion of the loss before it occurs; while the environmental problems with relatively small damage can be deferred to the application of the principle of precautionary risk, which can minimize unnecessary waste of resources and only when it is really going to occur. Waste, and preventive measures will be taken only when it is really going to happen damage. Thus, the severity of the impact on the environment also leads to different criteria for the application of the precautionary principle of risk.

The main role of thresholds lies in determining the prerequisites for the application of the precautionary principle, while at the same time being able to prevent the abuse of the precautionary principle. The specific application is as follows: first, the monitoring of environmental problems can grasp the environmental changes in advance, and if abnormal factors are found, the monitored data can be analyzed and processed to identify the risk coefficient of the environmental problems; second, the application of the precautionary principle requires the adoption of scientific measures. After the scientific processing of environmental monitoring data, the data are analyzed to determine whether they meet the criteria for the adoption of precautionary measures, and then the dynamics of the environmental risks can be more scientifically grasped. The adoption of scientific measures can be adjusted according to the level of risk of the environmental problem.

4.2. Scientific uncertainty

Scientific uncertainty as an inherent component of scientific prediction has been greatly emphasized in the theory and practice of environmental decision making.[7] Lack of knowledge, limited human understanding and inaccurate grasp of the environmental situation all lead to scientific uncertainty. Previous methods of dealing with environmental problems tended to monitor them comprehensively and accurately, but when environmental problems do occur, they may not wait for the action of scientific decision-making to cause irreparable damage, and it is unbearable to human beings. It is also widely recognized that full certainty in decision-making is beneficial to the social order as opposed to limited certainty.[8]

There is much to be said for the high level of science required to deal with environmental problems in the past, but in the face of the complexity of current environmental problems, serious and irreversible damage may be caused without precise and adequate scientific preparation. On the one hand, in order to avoid lagging behind in the measures taken for environmental problems, we have to take relatively adequate preparations based on the existing situation when the science is not as adequate as it should be. On the other hand, the society is more and more aware of the risk prevention, especially under the influence of some environmental problems, we must avoid the risks that may occur in the future, and now the level of science and technology has been greatly improved, the use of scientific and technological means to solve the environmental problems is our urgent responsibility. The application of science and technology will make the risk prevention measures are more effective and efficiency will be higher.

Scientific uncertainty as a central element of the precautionary principle has been a controversial topic. The degree of scientific certainty is not standardized in the field of environmental issues, and therefore the use of precautionary measures to solve environmental problems can only be analyzed on a case-by-case basis. In the face of different environmental problems require a different degree of risk, which will cause different degrees of environmental damage, the existence of a variety of different factors also means that there can not be a uniform application of the universal standard. Contemporary understanding of the uncertainty of the objective world is the main scientific basis of probability theory, and the probability of prediction depends on the possible events of the division of categorization. The "division-dependent" character of probability requires the precise division of possible events and the definition of the set of possible events before subsequent mathematical calculations can be made. Since

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environmental problems have become increasingly complex and unmanageable, we cannot predict the consequences of what may happen, so we cannot achieve complete certainty even by utilizing probability theory. However, risk prevention organizations still need to assess and measure uncertainties in order to determine the structure of preventive measures and the degree of prevention.[9]

4.3. Cost-effectiveness

Risk prevention measures are taken before an environmental hazard occurs and, to a certain extent, are scientifically sound and costly in terms of resources, regardless of whether or not the damage occurs. Often, an action is only feasible if the benefits outweigh the costs. Environmental problems are not simply environmental problems, but are also essentially measured in terms of their economic benefits. A risk prevention measure is only worthwhile if the environmental benefits that can be obtained from it outweigh the resources expended in taking it. Therefore, the application of the precautionary principle also takes into account the measurement of cost-effectiveness.

However, environmental risks are inherently limited by the level of human cognition and the degree of scientific development, and there is a great deal of uncertainty in the cost-benefit analysis of environmental problems, which cannot be eliminated within a short period of time. Therefore it is difficult to fully comply with the cost-benefit analysis of economic theory in the field of the environment. However, we must recognize that environmental protection is a very important issue for the whole human life, and we cannot measure environmental problems only by cost-benefit theory, and no matter how much the cost is, it cannot be compared with the irreversible damage caused by the environment. Therefore, we cannot only focus on cost-benefit measurements when applying the principle of risk prevention, and we have to analyze the environmental problems comprehensively and then take preventive measures.

Cost-benefit analysis is only a simple reference for the precautionary principle, but not a decisive factor, and cost-benefit analysis in international environmental issues has certain difficulties and cannot be fully applied.

5. Exploring the possibility of the application of the precautionary principle in China

5.1. The current state of the environment in China

At the present stage, China is facing three major aspects of environmental pollution: first of all, atmospheric pollution. The main pollutants in our atmosphere are ammonia nitrogen, sulfur dioxide and nitrogen oxides. The source of these pollutants is closely related to our daily life. For example, industrial production, oil and mineral extraction, coal-fired power generation, automobile emissions, garbage incineration without measures, etc.; Secondly, water pollution. We must all know that our planet is surrounded by water, it seems that water resources are very rich, but we can really use the water resources only accounted for a very small part of the human race. Ocean water does not work directly for us, what we need is fresh water resources. Finally, soil pollution. There are many reasons for soil pollution, such as human production activities in daily life and indiscriminate logging of trees. Ultimately, it will lead to a decrease in vegetation coverage and soil erosion. Pesticides are mostly persistent organic pollutants, once infiltrated into the soil, it is difficult to degrade naturally. Heavy metal pollution is mainly caused by the mining of ores and the discharge of heavy metal-containing waste water from manufacturing enterprises.

Our environment is actually very fragile, and people's production activities directly affect the quality of the environment. Therefore, we need to raise environmental awareness and protect the environment.

5.2. Risk prevention principle embodied in China's environmental protection

China's current environmental protection is based on the principle of "prevention as the mainstay, prevention and treatment combined". It is not difficult to see, which in fact already contains the spirit of risk prevention, but carefully analyzed, there are still some differences between the two. In China, some of the administrative regulations on environmental protection have actually embodied a certain spirit of risk prevention. For example, Article 18 of the Cleaner Production Promotion Law stipulates that "new construction, alteration and expansion projects shall carry out environmental impact assessment, and analyze and demonstrate the use of raw materials, resource consumption, comprehensive utilization of

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resources, and the generation and disposal of pollutants." Another example is that Article 12 of the Regulations on the Safe Management of Hazardous Chemicals stipulates that "new construction, alteration and expansion projects for the production and storage of hazardous chemicals shall be subject to a review of safety conditions by the supervisory and management departments of production safety".

There is both a link and a difference between the principle of "prevention first, prevention and treatment combined" and the principle of risk prevention. The biggest similarity may be that both stipulate the content of environmental prevention, for the occurrence of environmental problems are advocated to take preventive measures; and the first difference between the two is that the degree of risk is different, China's environmental protection measures on the degree of risk is not required, even in daily life are required to pay constant attention to environmental problems, regardless of the urgency of the occurrence of environmental problems. On the other hand, the precautionary principle requires a certain degree of environmental risk, that is, "may cause serious or irreversible damage" or "may cause damage", which is higher than the risk factor required by the principle of environmental protection in China. Either level of risk is higher than that required by our environmental protection principles. Secondly, although the principle of environmental protection in China involves preventive measures, it pays more attention to the prevention of such problems after the fact, whereas the principle of precautionary approach emphasizes the prevention of environmental problems before the fact.

6. Conclusions

At a time when international environmental problems are becoming more and more serious, the principle of precautionary approach has been introduced at the international level, as it is not possible to restore the environment at all by relying only on remedial measures after the occurrence of environmental damage. The precautionary principle originated in the field of marine environment and has been applied to the whole international environment. The heat of environmental protection has never abated, which is the highest degree of attention to environmental issues, if a certain type of environmental problems are closely related to our lives,we must take certain measures in the environment of the preventive links in order to effectively avoid the destruction of the environment. This reflects the increasing importance attached to environmental protection at the international level.

At present, risk prevention measures are widely used in many international environmental fields. We must grasp the basic content of the risk prevention principle, analyze its applicable conditions and core elements, so that when dealing with real environmental problems, we can directly apply the risk prevention principle to protect the environment. When facing the environmental governance problems in China, we must learn some advanced treatment methods from other countries and apply them to the environmental problems in our country. The environmental problems affect the whole body in one hair, so we must pay attention to the environmental governance, which is the responsibility that every country can not shirk.

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