APPLICATION OF PRECAUTION PRINCIPLES IN ENVIRONMENTAL PROTECTION AND MANAGEMENT IN GENETIC ENGINEERING FEEDS THAT OCCURRED DUE TO DEVELOPMENT OF TECHNOLOGY

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ABSTRACT

Aims: *The application of the precautionary principle in genetically engineered feed (GM), especially those with new characteristics such as resistance to pests, diseases, herbicides, or product quality improvement is produced through genetic engineering technology. In principle, the management and utilization of GM feed and feed ingredients is carried out through a precautionary approach. In this regard, it is necessary to have a risk assessment system. In 2005, the Ministry of Environment (KLH) has issued Government Regulation No. 21 of 2005 concerning the Biosafety of Genetically Engineered Products. In its implementation, Government Regulation Number 21 of 2005 is based on a precautionary approach in order to realize environmental security, food and feed security by considering religious, ethical, socio-cultural and aesthetic principles as well as preservation. This precautionary approach is in accordance with the Cartagena Protocol on Biosafety which Indonesia has ratified with Law Number 21 of 2004 concerning Ratification of the Cartagena Protocol on Biosafety.*

Keywords: Application of Principles, Environmental Protection and Management, Genetic Engineering Feed, Technological Development

INTRODUCTION

The living environment is the unity of space with all objects, forces, conditions, and living things, including humans and their behavior, which affect nature itself, the continuity of life, and the welfare of humans and other living creatures. Based on the definition of the environment given by Law Number 32 of 2099 concerning Protection and Management of the Environment (UUPPLH-2009), it can be seen that the environment is a system that includes the entirety of biological and non-biological diversity, all of which affect human life and welfare as well as other

living things, (Law Number 32 of 2099 concerning Protection and Management of the Environment (UUPPLH-2009).

The 1945 Constitution of the Republic of Indonesia (UUD NRI) expressly guarantees that a good and healthy environment is a human right of all Indonesian people. This provision is contained in Article 28H of the 1945 Constitution of the Republic of Indonesia which states;

"Everyone has the right to live in physical and spiritual prosperity, to live and to have a good and healthy living environment and to have the right to health services." This shows that the environment is very essential for human life so that the right to the environment is placed in the framework of human rights.

The provisions of Article 28 H paragraph (1) and Article 33 paragraph (3) and (4) of the 1945 Constitution of the Republic of Indonesia are the basic norms in the protection and management of natural resources in Indonesia. Article 33 paragraphs (3) & (4) of the 1945 Constitution of the Republic of Indonesia state that:

(3) The earth and water and the natural resources contained therein shall be controlled by the state and used for the greatest prosperity of the people.

(4) The national economy is organized based on economic democracy with the principles of togetherness, efficiency with justice, and sustainability, environmental insight, independence and by maintaining a balance of progress and national economic unity. The right to the environment then underlies the formation of other laws and regulations, namely UUPPLH-2009.

The protection and management of the environment which is the obligation of the state, government, and all elements of society is important as an effort to prevent pollution and environmental damage. These efforts are carried out through planning, utilization, control, supervision, and law enforcement actions. Environmental management provides economic, social and cultural benefits and needs to be carried out based on the principles of prudence, environmental democracy, decentralization, as well as recognition and respect for local wisdom and environmental wisdom, so that the Indonesian environment must be protected and managed properly, (La Ode Angga, Latupono Barzah, Hamid Labetubun Muchtar Anshary & Fataruba Sabri, 2020).

In the rapid development of technology, at the time the UUPPLH-2009 came into effect, the principle of the best practical facilities, the best technical facilities, was stated in the provisions of Article 10 letter b which stipulates that in the context of environmental management, the Government is obliged to utilize and develop environmentally friendly technology. The Government's obligation to utilize and develop environmentally friendly technology is the embodiment of the principle of the best practicable means ('the best technical mean') which is also reflected in the provisions of its articles.

Article 63 paragraph (1) letter v UUPPLH-2009 firmly stipulates the duties and authorities of the Government to coordinate, develop, and socialize the use of environmentally friendly technology in the context of environmental protection and management. The government's obligation based on the provisions of Article 63 paragraph (1) letter v UUPPLH-2009 is the embodiment of the best practical means of the best technical means ('the best technical mean'). the best technical means ('the best practicable mean "I" the best technical mean") is also stated in the provisions of Article 63 paragraph (2) letter p which stipulates the duties and authorities of the provincial government to develop and socialize the use of environmentally friendly technology in the context of protection and environmental management.

The precautionary principle has been recognized and has been discussed in international law since the 1980s. Before entering the international realm, the precautionary principle was first applied in German environmental law in the early 1970s, known as Vorsorgeprinzip which means foresight (knowledge into the future) or speaking care (caution). This principle is also the

justification for prevention and control programs on a large scale, through the application of technology to minimize the possibility of pollution.

The precautionary principle is evident in international documents, one of which is that there is no damage threshold for carrying out precautionary measures. Before any action is taken to prevent certain risks, a threshold must be determined in advance with reference to the potential damage from an activity, when this threshold violates a preventive action must be taken or better.

There are several expressions or terms that refer to a threshold. The most common is "serious irreversible damage", compared to other terms such as "probable damage effect" or "damage or harm to humans or the environment. It can be seen immediately that the threshold level is defined in a specific broad and deep sense, with regard to this, the easier the threshold is to be violated, the stronger the spirit to apply. It is thought that the threshold can also explain that it can explain the ordinary, which applies to certain threats that are considered to be of extraordinary magnitude.

Article 2f UUPPLH-2009 explains what is meant by the precautionary principle stating: "That uncertainty regarding the impact of a business and/or activity due to limited mastery of science and technology is not a means of delaying steps to minimize or avoid threats to pollution and/or or environmental damage".

These principles develop along with the rapid development of technology, often the principles of these technological developments bring unexpected negative (harmful) impacts on public health and the environment. The potential hazards resulting from technology and human activities in the context of developing and implementing this technology are not only launched locally but also globally because new products resulting from technological sophistication have been distributed by multinational companies and therefore can endanger the health and physical integrity of the entire world and the planet (air, atmosphere, climate, plants, animals and humans) irreversibly.

Some examples of potential dangers from technological developments include: consuming genetically modified foods; use of growth hormone in livestock rearing; the "mad cow" disease (mad cow), the HIV-contaminated blood scandal that took place in France; and health related to the presence of phthalates in PVC (Polyvinyl Chloride) children's toys, (Roberto Andono, 2004). However, there are also potential dangers posed by technological advances that have emerged or are expected to emerge in recent years. For example in the biomedical field, it is predictable about the potential dangers of reproductive technology such as ICSI (intra cytoplasmic sperm injection) which is thought to cause infertility in the unborn child; (French National Advisory Committee on Ethics, 2002), xenotransplantation, is the use of animal organs for the purpose of transplantation in humans that can cause new diseases that cannot be controlled (US Public Health Service, 2001); human cloning using nuclear transfer technology, which according to data on animal cloning, can pose health risks to cloned offspring: as well as the possibility of modifying human genes through germ line interventions that can cause permanent damage to future generations, (UNESCO International Bioethics Committee , 2003).

Genetically Engineered (GM) products, especially those with new characteristics such as resistance to pests, diseases, herbicides, or product quality improvement through genetic engineering technology. PRG plants have been widely cultivated and marketed in various countries. PRG plants are not only used as food ingredients but also for animal feed, which is known as PRG feed. In principle, the management and utilization of PRG feed and a feed ingredient is carried out through a precautionary approach.

In this regard, a risk assessment system is needed. In 2005, the Ministry of Environment (KLH) has issued Government Regulation No. 21 of 2005 concerning the Biosafety of Genetically Engineered Products. In its implementation, Government Regulation Number 21 of 2005 is based on a prudent approach in realizing environmental security, food and feed security by considering

the application of religion, ethics, socio-culture and preservation and preservation. This precautionary approach is in accordance with the Cartagena Protocol on Biosafety which Indonesia has ratified with Law Number 21 of 2004 concerning Ratification of the Cartagena Protocol on Biosafety. In order for the circulating GM feed to meet safety requirements, an assessment must be carried out in accordance with standard procedures and standards. Therefore, guidelines have been produced that regulate the types of GM feed and requirements, procedures for application and assessment, procedures for assessing and providing recommendations for the safety of GM feed and feed ingredients.

Observing the potential dangers to public health and the environment at large that may arise from technological developments and human activities as mentioned above, it is necessary to apply precautionary principles in the development of technology in genetic engineering. This prudence is not seen as unwillingness to act or lack of courage to face new challenges, but on the contrary, prudence for users of public policy is needed to make the right decision regarding a particular product or activity where there is a suspicion that the product or these activities contain potential dangers for the wider community but at the same time the danger is not yet known because there is no scientific evidence, (Wingspread Statement, 1998).

The precautionary principle as the basis for delaying environmental action caused by the uncertainty of scientific evidence initially, international agreements to take an action (can be conservation, management action, etc.), based on scientific evidence. One example is found in Article 44 paragraph (4) of the Paris Convention for the Prevention of Marine Pollution from Land-Based Sources 1974 which states that: "...if scientific evidence has determined that serious harm can be created...and if urgent action is need". As technology develops, the precautionary principle rejects the concept that environmental actions must await scientific evidence. This can be seen in the 15th Principle of the Rio Declaration on Environment and Development which states that: "…lack of scientific certainty should not be used as an excuse to delay cost-effective actions to prevent environmental degradation." Some similar formulations are also found in other international treaties, such as:

a) The Preamble to the Convention on Biological Diversity, which states that "…where there is a threat of significant reduction or loss of biological diversity, the lack of full scientific certainty should not be used as a reason to delay action to avoid or minimize such action. threat."
b) Article 6 (2) of the Straddling Stock Convention, which states that "…the absence of adequate scientific information shall not be used as an excuse to delay or fail to take conservation and management action."
c) Decision made by the Ninth Conference of the Parties to the Convention on International Trade in Endangered Species, which stated that "...scientific uncertainty should not be used as an excuse for failing to act in the best interest of species conservation.

Based on the formulation of the precautionary principle in several international instruments above, it can be seen that this principle does not create an affirmative duty to take preventive action. Even if a country does not take certain environmental actions for other reasons, it should not use the "uncertainty of scientific evidence" as an excuse not to act.

From the above case, this is the background for the study because in one of these cases it is also a manifestation of the need to apply the precautionary principle in technological activities that are developing rapidly with unexpected negative impacts on public health and the environment. Observing the potential dangers to public health and the environment at large that may arise from technological developments and human activities as mentioned above, it is necessary to be careful for public policy makers.

This prudence is not seen as unwillingness to act or lack of courage to face new challenges, but on the contrary, prudence for users of public policy is needed to make the right decision regarding a particular product or activity where there is a suspicion that the product or these

activities contain potential dangers for the wider community but at the same time the danger is not yet known because there is no scientific evidence, (Wingspread Statement, 1998).

The negative impact of technology on public health and the environment is difficult to make the precautionary principle in seeing the negative impact very important to note. Based on the background and legal issues mentioned above, the formulation of the problem that will be studied in this paper is: How is the application of the precautionary principle in environmental protection and management in genetically engineered feed that occurs due to technological developments?

LITERATURE REVIEW

Theoretical Framework

The theoretical framework that will be used in this paper is two theories, both theories are used as a fundamental basis in answering the formulation of the problem to be studied. Application of Precautionary Principles in Environmental Protection and Management in Genetically Engineered Feed Occurs Due to Technological Developments. The theory in question is as follows: 1. Theory of the Welfare State Law, 2. Theory of Legal Effectiveness.

Welfare State Theory

In this paper, the author uses the Welfare State Law Theory approach as a Grand Theory, supported by the Green Political Theory and the Green Constitution (The Green Political and Green Constitution) Applied Theory. The use of state theory as a Grand Theory with the argument and understanding that the application of the precautionary principle in environmental protection and management is an embodiment originating from the state's function to create a welfare state in dealing with and overcoming problems in the protection and management of natural resources. natural resources and the environment, (Angga La Ode & Saptenno, 2020).

The theory of the State of Law on Child Welfare in this paper is used to analyze the extent to which the involvement of the State in this case is the Government, Provincial, Regency and City Governments in the protection and management of natural resources and the environment in Indonesia so as to give birth to the people, the State or the Government, the Regency and City Provincial Governments. , is considered unable to release it to improve the welfare of the community in relation to the protection and management of natural resources and the environment in Indonesia. That the state or government needs to intervene in the management of natural resources and the environment, including the regional spatial plan so that the sources of people's prosperity are not controlled by a few people (La Ode Angga, Dyah Ridhul Airin Datie, Popi Tuhulele, Sabri Fataruba & Iqbal Taufiq, 2021).

In the theory of the welfare state law, reflecting that for the public interest or the government in the implementation of the public interest has become very broad, the possibility of supporting the interests of the people by the state apparatus is also very broad. In carrying out these tasks, the state administration requires independence, namely the independence to be able to act on its own initiative, especially in solving critical problems that arise where regulations do not yet exist. Therefore, the breadth of government functions in the context of a modern legal state or welfare state, of course, the wider the role of administrative law in it, (La Ode Angga, Latupono, Muchtar Anshary Hamid Labetubun & Sabri Fataruba, 2020).

A state law state that places legal power as its power and the implementation of that power in all forms is carried out under the rule of law, (Syamsuharya Bethan, 2008). Based on this view, all administrators of power in a country are based on law. Law is an instrument for controlling state life (Helmi, 2012).

Power based on law, according to John Locke is divided into power, executive and federative powers, besides that the state must contain 4 (four) elements, namely as follows: (Helmi, 2012).

a. The state aims to guarantee the human rights of citizens.
b. State administrators based on law.
c. There is a separation of state powers in the public interest.
d. The supremacy of the legislature that supports the interests of the people.

John Locke's view above influenced Montesquieu, the function of the state must be separated into three powers of state power, namely executive, executive and judicial. The position of these three powers is balanced, one cannot be higher than the other (Helmi, 2012).

In the theory of the welfare state, the goal of the state is seen as an instrument to achieve common goals, namely prosperity and social justice for all Indonesian people (CST Kansil & Christine Kansil, 1977). The theory of the welfare state is a combination of the concepts of the state and the welfare state. According to Burkerns, (Aminuddin, 1999).

"The state of law (rechtsstaat) is a state that places the law as the basis of its power and exercises that power in all forms carried out under the rule of law".

Meanwhile, the concept of the welfare state according to Bagir Manan is:

"The state or government does not merely maintain security or the main community, but bears the responsibility for realizing justice, public welfare", (Bagir Manan, 1996).

The birth of the welfare state as a reaction to the failure of the classical legal state concept and the socialist state law state. The two concepts and types of rule of law have different basis and form of state control over economic resources. Theoretically, these differences are motivated and influenced by the ideology or ideas they hold. The classical liberal law state is influenced by the notion of liberalism or the classical legal state, while the socialist legal state is influenced by Marxism (Abrar Saleng, 2004).

For the state of Indonesia since the beginning of its independence is the form of this country going forward. In favor of the PPUPKI (Committee for the Preparation of Indonesian Independence), the form of a welfare state was chosen because of the social and economic context of the country at that time. The country which has just been separated from colonialism and imperialism is hit by poverty, backwardness, and adversity. The constitution guarantees Indonesia's welfare state. In the Preamble of the 1945 Constitution of the Republic of Indonesia, the fourth paragraph states, "The state guarantees the welfare and all of Indonesia's bloodshed, advances the general public and educates the nation's life". This is the state's intention to realize the form of a welfare state in Indonesia. Then in the Body, Articles 33 and 34 of the 1945 Constitution of the Republic of Indonesia that the state is in control to manage natural resources and then the welfare of the people (Rachmad Safa'at, 2013).

The theory of the state is based on efforts to maintain freedom within the state while justifying the intervention of the authorities in the administration of the people's welfare and general welfare. The Indonesian welfare state that is followed is included in the Preamble to the 1945 Constitution of the Republic of Indonesia and in several articles including Article 33 paragraph (3) of the 1945 Constitution of the Republic of Indonesia. Article 33 paragraph (3) of the 1945 Constitution of the Republic of Indonesia does not only contain provisions on state rights regarding earth, water and natural resources contained in the 1945 Constitution. In it, but also contains a provision that the control of the state is used for the greatest prosperity of the people. These two aspects of the rule cannot be separated from each other, both of which are a systematic unity (Bayr Manan, 2004). In the sense that the state positions and places itself as a regulator, regulates, regulates, carries out management actions, and carries out supervision to ensure that its people enjoy the management of natural resources in the environment and spatial planning for the welfare

and prosperity of the people. The function of the state is how to provide service functions to the community in order to create general welfare.

The Indonesian people who have natural resources and the environment have the power to regulate and manage and make the best use of these natural resources for the prosperity of the people. Then for further implementation, considering that it is impossible for the state to implement it alone, the right of control as the day-to-day implementation of government, through the institutions it establishes, can cooperate with entrepreneurs (investors). Which in its implementation must pay attention to the principles of prudence, efficiency, transparency, environment and social justice for all Indonesian people.

Thus, including ownership of natural resources, including environmental protection and management and spatial planning based on the 1945 Constitution of the Republic of Indonesia, UUPA, UUPPLH, UUPR, PP Number 21 of 2005 and several other regulations related to this matter, must give birth to social justice and welfare. Common to all people and the environment. To fulfill this, every policy issued by the government relating to the protection and management of natural resources and the environment, including spatial planning, must reflect the precautionary principle in its implementation. In connection with the theory of the welfare state, W. Friedman in regulating an economic system that favors the people cannot be separated from the function of the state that adheres to the theory of the state, which can carry out 4 (four) functions, namely: (Mustamin Dg Matutu, 1972).

a) The State as Provider (the state as a servant) of people's welfare;
b) State as Regulator (state as regulator);
c) State as Entrepreneur (state as entrepreneur);
d) State as Referee (state as referee).

In these four functions of the state in the economic field, the most essential function lies in the regulatory function. If the regulator function is wrong or neglects to place it, it will have an impact on the other three functions. Therefore, in carrying out the function of government regulators, it must pay attention to moral norms and applicable legal norms.

Regarding the theory of the welfare state, Utrecht said the following: (Friedman, W, 1971).

“The government of a modern legal state keeps security in its broadest sense, namely social security in the community. In a welfare state, the era of the liberal economy has ended and the liberal economy has been replaced by an economy that is more led by the center (central geleid economie).
The government's task is no longer only as a night watchman (nachtwakerstaat) and cannot be passively silent, but must actively participate in community activities so that everyone can be guaranteed (SF. Marbun & Moh. Mahfud MD, 2000)”.

Kelsen mentions this as follows: (Hans Kelsen, 1961)

“In all modern legal systems, states as well as other legal entities, can have personal rights, any rights and obligations determined by private law. When there is civil law, the norms apply to both individuals and the state.”

Free translation:

“In all modern legal systems, as is the case with other individuals, the state can have rights in persona, over all matters and obligations regulated by civil law. If there are civil provisions, then the norms are treated equally both to individuals and to the state”.

Based on the spirit contained in Article 33 of the 1954 UUDNRI, both the government and the people must jointly strive to realize the welfare of the community. National development activities based on the principles of togetherness and kinship in accordance with the 1945

Constitution of the Republic of Indonesia have a very broad meaning where the community cannot leave efforts to achieve prosperity solely in the hands of the government. The achievement of goals must be carried out hand in hand between the welfare of the community and the government, (Aju Wisnuwardani, 2010). Green Political Theory and Green Constitution (The Green Political and Green Constitution)

The next theory used in this research is the Green Political Theory and Green Constitution, as the Middle Range Theory. The use of this theory is in accordance with the use of the previous theory and is in synergy with the core problems that will be studied in this paper. Green Political Theory (Green Political) and the Green Constitution (The Green Political and Green Constitution) are used in this paper with the argument and understanding that, currently the Republic of Indonesia has embraced green politics and a green constitution, this can be seen in Article 28H paragraph (1)) and Article 33 paragraph (4) of the 1945 Constitution of the Republic of Indonesia. The use of Green Political Theory and Green Constitution, as Middle Range Theory, will be used to analyze the problems in this paper.

Green Political Theory (Green Political)

The political movement in green Indonesia begins with the awareness and national condition of the Indonesian nation where various environmental damage occurs due to development that is too growth-oriented and exploitative development strategies that threaten environmental sustainability. According to Emir Salim, the essence of development is to seek (sustainability) of life. For sustainable development life has several prerequisites:

First, reaching the long term beyond one-two so that development activities need to consider long-term impacts. Second, realizing the interdependence between natural, social and man-made actors. Natural actors in the ecosystem, social actors in the social system, and man-made actors in the economic system. Third, meet the needs of humans and society today without compromising the ability of future generations to meet their needs. Fourth, development is carried out using natural resources as sparingly as possible, as low as possible waste, as narrow spaces as possible, as much energy as possible, non-renewable energy as clean as possible, as well as with optimal environmental, social, cultural-political and economic benefits Fifth, development is directed at eradicating, just balancing social quality and high quality of social life, environment of poverty, and economy (Emil Salim, 2003). Discourse on sustainable development in Indonesia has been around since the 1980s. This discourse is rolling in line with the ups and downs of the democratization movement in the country. The state's interpretation of sustainable development was very dominant in the New Order's centralism which reached its peak in the decade of the 1980-1990s. The democratic transition which was marked by the spirit of reform in 1998 also repositioned the map of sustainable discourse. This phase raises the significant role of non-governmental organizations (NGOs) and other civil society in responding to the discourse of sustainable development with more dynamic polemics. Walhi, Kehati, Bina Desa, HUMA, AMAN (Alliance of Indigenous Peoples of the Archipelago), are NGOs that are actively campaigning for green politics in the country by participating in the discourse of sustainable development as one of the alternatives.

Green Political Theory is taken from the fact that humans are a part of nature which has a political world. Thus, humans are not only seen as rational individuals as in the view of liberalism or as social beings as in the view of socialism, but as natural beings, and furthermore as political animals. Meanwhile, it is necessary to distinguish between green and environmental politics. Environmentalism accepts existing frameworks in political, social, economic and normative structures in the world of politics and tries to fix environmental problems with existing structures. Meanwhile, Green Politics considers this structure as the main basis for the emergence of environmental crises. Therefore, they argue that the structure requires major changes and attention.

In another discussion in the book Theories of International Relations by Andrew Linklater and Scott Burchill: (Linklater, Andrew & Burchill, Scott. 1996).

> "It is explained that the world is experiencing very crucial problems, apart from issues that are always discussed in the science of international relations, such as economics, politics, social, culture, security, and so on. This problem erodes the existence of the earth in its physical aspect slowly. This problem is also often forgotten and deliberately ignored as a global problem. This problem also has not been found in the bright spot because the existing solutions are still cross-border". Green Politics has a basic assumption that is against anthropocentrism. Anthropocentrism itself means "the teaching which states that the center of the universe is man".

Green Political Thought, which is based on ecocentrism, tries to link the existence of individuals with ecology and tries to provide a clear mapping between human and non-human interests. The presence of Green Politics as a critical theory in International Relations has a firm view of the three leading schools in International Relations. First, Green Politics criticizes realists who have state-centric basic assumptions. Gerald Gaus & Chandran Kukathas try to make other prescriptions on Green Politics in their Handbook of Political Theory. (Gaus, Gerald & Chandran Kukathas, 2012).

In this problem book, the environment that plagues the world can be overcome by expanding different political communities, different here to sort out old non-environmental ideological texts. All components are invited to know about the environment as a diversity of resources of all kinds. Not only the kind of resources needed to survive physiologically, but also the resources needed to understand any kind of life plan. This is the "environment" that is reached as "words and deeds" that shape and carry out various life plans. Put another way, the environment is a variety of options regarding the conception and planning of life in the universe.

According to Nicholas Low & Brendan Gleeson that: (Nicholas Low & Brendan Gleeson, 2009).

Green politics examines the moral response that must be given by today's world of ecological crisis if changes occur to society and the global economy in order to support ecological integrity. Starting from the foundation of the idea of the self, through the principles of political justice to global institutional justice, examines the multi-layered structure of the philosophy of justice as applied to environmental and ecological problems. Green Constitution Theory.

The term green constitution or (green constitution) in the dynamics of the Indonesian state administration, both at the practical and academic levels, is undeniably a new phenomenon for those who do not know it. Even scholars of constitutional law themselves have never heard of the term "green constitution". Historically, the term "green constitution" first appeared in Indonesia driven by members of the Constitutional Court (MK) in 2008 when they visited the leadership of the Regional Representatives Council (DPD) around August 2008. The discourse on "green constitution" was first initiated by Achmad Sodiki, in response to the idea of a possible fifth amendment to the 1945 Constitution of the Republic of Indonesia, the importance of prior studies, including the possibility of adopting the idea of a "green constitution" in the amendment of the 1945 Constitution of the Republic of Indonesia (Jimly Asshiddiqie, 2009).

Furthermore, a green constitution was introduced by the former Chief Justice of the Constitutional Court, Jimly Asshiddiqqie in May 2009 in his book entitled "Green Constitution, Green Shades of the 1945 Constitution of the Republic of Indonesia". However, Jimly also acknowledged that the green constitution is not entirely new, because it has often been used in various scientific titles (Jimly Asshiddiqie, 2009). This can be seen by the increasing number of countries that have environmental policies in their constitutions (Jimly Asshiddiqie, 2009).

The meaning that leads to the content of the green constitution, among others, is stated by Heinlard Stieger. In his writings, he put forward the idea of the need to guarantee the protection of environmental rights into the constitution, especially the rights of the individual's environment. Stieger states: (Heinhard Steiger et al., 1980).

> "The subjective rights are devided in two groups according to their their legal guarantee: the fundamental rights at the constitutional level and the ordinary legislation. Fundamental rights are of essential importance for the constitutional and legal order. Ordinary subjective rights below the constitutional level enjoy less legal proktection than constitutional subjeltive rights".

In fact, environmental rights that can become the content of the constitution are not only limited to subjective rights, but also other rights such as procedural rights and environmental rights which are based on the intrinsic value of nature itself. This plant can be seen in W. Pedersen which states:

> "Traditionally the nation of rights in environmental context has been addressed on three different levels. These three sometimes overlapping levels are: (1) a substantive right to the environment; (2) Procedural righs allowing for participation and acces to information and remedial procedures; and (3) rights for the environment based on the nation of the intrinsic value of nature, not simply its utility to humans".

In Indonesia, the above idea was put forward by Siti Sundari. Rangkuti in 1987 in her dissertation with the title: "Environmental Law and Environmental Policy in the Process of Developing National Environmental Law". Siti Sundari Rangkuti in her dissertation stated:

> "In general, the provisions of environmental law that apply in ordinary laws have less legal meaning compared to basic rights that fulfill the provisions in/through basic statutory regulations. Fundamental rights should be accommodated from their fundamental aspects in the Constitution and can and if necessary be limited in ordinary laws", (Siti Sundari Rangkuti, 2005).

Similar plants were also proposed by Mas Ahmad Santosa around 1990. In his book entitled "Human Rights and the Environment". In the article, Mas Ahmad stated. If the concept of the right to a good and healthy environment is included in the concept of human rights, then environmental protection at the national level becomes a right protected by the constitution (Mas Ahmad Santosa, 2002) for example, providing several constitutions that have recognized the right to a good and healthy environment, namely the Constitutions of South Africa, South Korea, Ecuador, Hungary, Peru, Protugal, and the Philippines, (Mas Ahmad Santosa, 2002).

From the above description requires rights, the environment is adopted into human rights so that it is a fundamental right and protection of the constitution. The constitutional protection of individual environmental rights has two reasons (2), namely:

1) It becomes a strong basis for a person to maintain the environment that has an impact on him.
2) It becomes the basis for demanding the state to realize these rights. This is in line with Heinhard Steiger (et. al) which states that there are two (2) functions of subjective rights, namely.

a) The function ofdefense (abwehrfunktion) is the right of the individual to defend himself against an interference with his environment which is to his disadvantage;
b) The function of performance (leistungsfunktion) is the right of the individual to demand the performance of an act in order to preserve, to restore or to improve his environment, (Heinhard Steiger (et. Al), 1980).

One aspect that becomes the idea of the content of the constitution is the environmental management policy. The constitution which contains the legal policy on environmental management which Jimly asshiddiqie calls the "green constitution." From this understanding it can be said that the term green constitution is a term that indicates the content of the constitution on environmental management.

"Green constitution" in terms of constitutional developments, especially for world countries, is actually not something new. It is undeniable that in the Indonesian context the discourse of "green constitution" as a term has not been introduced for too long. However, for those who are active and acquainted with various developments related to the dynamics of legal thought and state practices in the contemporary world, both through scientific journals and many new books, and of course they will not feel foreign to the term "constitution". Green".

In the Indonesian context, the provisions regarding a green constitution can be found in Article 28H paragraph (1) and Article 33 paragraph (4) of the 1945 Constitution of the Republic of Indonesia, therefore the 1945 Constitution of the Republic of Indonesia is clearly very pro-environmental, so it can be called a green constitution.

In the constitution around the concept of a green constitution, it can be concluded in the idea of power and human rights as well as the concept of democracy in the 1945 Constitution of the Republic of Indonesia. That is, it also adheres to the concept of a green constitution with the assumption that when the highest power or that exists in the people, in terms of human rights, the environment is good and healthy as referred to in Article 28H paragraph (1) of the 1945 Constitution of the Republic of Indonesia, as well as views on the concept of democracy related to the principles of sustainable development and environmental insight as affirmed in Article 33 paragraph (4) of the 1945 Constitution of the Republic of Indonesia, are evidence that the concept of This has been accommodated in the provisions of the Indonesian constitution.

On the other hand, awareness about the importance of ecological problems from time to time continues to grow, so that eventually humanity finds the fact that our ecosystem is not local, but also global and global. This is what happened with the phenomenon of global climate change and now environmental issues are important to pay attention to because they are directly related to human life in the world, all nations are starting to unite and agree to jointly control global climate change.

Nowadays, there are more and more terms that like the word green (green), such as green economy, green policy, green politics, green paper, green jobs, green collar jobs, green market, green festival, green infrastructure, green building and so on. And now the term green constitution is starting to be widely discussed in various countries in the world. In Jimly Ashiddiqie's view, it is related to the idea of the importance of a green constitution, the environment and even the conception of a new model of democracy which is termed ecocracy. This ecocracy can be used to complement the treasures of understanding contained in the terms democracy (sovereignty of the people), monocracy (sovereignty of law) and theocracy (sovereignty of God) which have been known so far. Also, the term ecocracy can be said to be not a completely new term, since the late 1990s, this term has been included in various forums and mass media regarding environmental issues, as well as the term green constitution which has been around since the 1970s. has often been used to describe something related to the idea of environmental protection, (Jimly Asshiddiqie, 2009).

The constitutionalization of the environment in the Indonesian constitution itself has been carried out in the amendments to the 1945 Constitution of the Republic of Indonesia, but not many parties have taken this matter seriously. Article 28H paragraph (1) and Article 33 paragraph (4) of the 1945 Constitution of the Republic of Indonesia are proof that the Indonesian constitution is a Green Constitution. In the provisions of Article 28H paragraph (1) of the 1945 Constitution of the Republic of Indonesia states:

"Everyone has the right to live in physical and spiritual prosperity, to have a place to live, and to have a good and healthy living environment and have the right to obtain health services."

Based on these provisions, it can be said that the right to obtain a good and healthy environment and good health services is a human right. Therefore, the 1945 Constitution of the Republic of Indonesia is clearly very pro-environmental. Meanwhile, Article 33 paragraph (4) of the 1945 Constitution of the Republic of Indonesia states:

"The national economy is organized based on economic democracy with the principles of togetherness, efficiency, justice, sustainability, environmental insight, independence, and maintaining a balance of progress and national economic unity".

Thus, there are 2 (two) concepts related to the idea of ecosystems, namely that the national economy based on democracy in question must contain the principles of sustainability and the environment. This means that in nature it is recognized that there is power and its own human rights that cannot be violated by anyone (an inalienable right). Nature is recognized as having its own sovereignty. Therefore, in addition to the people as humans who are considered sovereign, nature is also sovereign. This is what is meant by the 1945 Constitution of the Republic of Indonesia, the principles of environmental principles contained in the 1945 Constitution of the Republic of Indonesia. Thus it can be said that it is important for the state to realize and realize a green constitution.

Furthermore, Jimly Ashiddiqie, said that: (Jimly Asshiddiqie, 2009).

"There are at least two main reasons why the concept of a green constitution and ecocracy is very important to be understood by the components of the Indonesian nation; First, with regard to the condition of environmental sustainability which is now being considered, we should lay down and re-strengthen the conceptual foundations of the environment and sustainable development with an environmental perspective. Second, the 1945 Constitution of the Republic of Indonesia as the supreme law of land basically contains basic ideas about the environment and ecosystem whose values can also be equated with the concepts of democracy and nomocracy".

Therefore, the environmental legal norms contained therein have strictly enforced laws and policies in various development sectors, especially UUPPLH to obey and submit to it. Unfortunately, until now not many have been able to translate the meaning and values of the environment contained in the 1945 Constitution of the Republic of Indonesia.

RESEARCH METHODS

This paper is the result of normative legal research, which examines legal principles, namely the principle of prudence, (La Ode Angga, Latupono Barzah, Hamid Labetubun Muchtar Anshary & Fataruba Sabri, 2020). The data used are secondary and primary data. Primary legal materials consist of all legal products, both national and international; Secondary legal materials consist of journals, both national and international journals related to the theme being studied.

RESULTS AND DISCUSSION

Precautionary Principle

The precautionary principle and the precautionary principle are principles that were initially adopted in the declaration and later adopted in various conventions as a form of embodiment of the development principle. (Angga La Ode, Latupono Barzah, Hamid Labetubun Muchtar Anshary & Fataruba Sabri, 2020) This principle is a development in national and international policies aimed at protecting humans and the environment from serious and irreversible harm. The precautionary principle or the precautionary principle is on how to do prevention so that environmental quality does not decrease due to pollution. Furthermore, these principles also regulate prevention so that environmental damage does not occur (Wibisana, 2008: 214).

Such prevention is carried out on activities and/or businesses for which the extent and magnitude of the loss and/or damage is unknown. Prevention is carried out with concrete actions, although there is no scientific evidence on how widespread and large the consequences may be. However, this principle will only apply to estimates of serious and irreversible damage to the environment (Freestone & Hey, 1996). This principle is developing so fast in all parts of the world as an axiomatic principle as a principle in preserving the environment (Freestone & Hey, 1996).
The precautionary principle became an important principle and was adopted in various policies after the 1992 Rio Declaration produced at The United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil on 3-14 June 1992. Principle 15 1992 Rio Declaration states that: "In order to protect the environment, the precautionary approach should be widely applied by States according to their capabilities. Where there is a threat of serious or irreversible harm, the lack of full scientific certainty should not be used as an excuse to delay cost-effective measures to prevent environmental degradation", (Freestone, 1994).

The precautionary principle shows that the state needs to be careful in making its policies. Activities that have the potential to cause serious impacts and cannot be carried out are the main ones in this regard. In this case, the lack of science can be used as an excuse for delaying prevention efforts.

Based on the definition of a good living environment given by UUPPLH-2009, it can be seen that the environment is a system that includes the entirety of biological and non-biological diversity which as a whole affects the life and welfare of humans and other living creatures. biological diversity Refers to the level of diversity of natural resources owned in a particular area. variety which includes three different levels of understanding, namely: diversity of terms, species diversity and biodiversity, (Environmental Agency North Bengkulu, 2011).

The importance of biodiversity as a natural resource for human life and other life is very important to be protected and preserved. By giving the community an active role in asking for support, the community indirectly participates in the law enforcement process, even from the early stages of the decision-making process. That way the community can be closer and involved in the process of environmental conservation and management. In addition, the community also participates in defending their human rights from activities and/or businesses that can harm them and the environment.

Technological Developments in Genetically Engineered Feed. One of the genetically engineered plants (GM), especially those with new properties such as resistance to pests, diseases, herbicides, or improving the quality of products produced through genetic engineering technology. PRG plants have been widely cultivated and marketed in various countries. PRG plants are not only used as food ingredients but also for animal feed, which is known as PRG feed. In principle, the management and utilization of PRG feed and feed ingredients is carried out through a precautionary approach. In this regard, a risk assessment system is needed. In 2005, the Ministry of Environment (KLH) Genetically Engineered Feed Technology Requires Precautionary Principles AgroinnovationI Agroinnovation 3 Agricultural Research and Development Agency Edition 1-7 May 2013 No.3505 Year XLIII has issued Government Regulation No. 21 of 2005 concerning Biosafety of Genetically Engineered Products .

In its implementation, Government Regulation Number 21 of 2005 is based on a prudent approach in realizing environmental security, food and feed security by considering the application of religion, ethics, socio-culture and preservation and preservation. This precautionary approach is in accordance with the Cartagena Protocol on Biosafety which Indonesia has ratified with Law Number 21 of 2004 concerning Ratification of the Cartagena Protocol on Biosafety. In order for the circulating GM feed to meet safety requirements, an assessment must be carried out in accordance with standard procedures and standards.

Therefore, guidelines have been produced that regulate the types of GM feed and requirements, procedures for application and assessment, procedures for assessing and providing recommendations for the safety of GM feed and feed ingredients. PRG feed is needed because the results of the 2011 cattle census showed that the population of cattle in Indonesia reached 15.4 million heads (600 thousand of them were dairy cattle) and 1.3 million buffaloes. Most of the livestock are located on the island of Java, which is a dense area with limited land. The obstacle faced by farmers is the lack of feed supply. With such a population, the need for forage ranges from 240 to 244 million tons of fresh forage per year or about 670 thousand tons of fresh forage per day of which about 70 percent is consumed by livestock in Java.

The need for non-grass and non-nut forage is not only in Indonesia. It is estimated that the need for feed cereals (corn, wheat, rice, etc., for concentrate) in developing countries in 2020 will be 445 million tons while in developed countries it is around 430 million tons. Thus it can be understood that a very large area is needed to produce the feed. The technologies currently being applied such as cultivation technology, plant breeding and feed conservation in the near future will no longer be sufficient. 4 AgroinnovationsI AgroinnovasisI Edition 1-7 May 2013 Number 3505 Year XLIII The Agency for Agricultural Research and Development is estimated that transgenic technology will be 'contagious' from food crops and plantations to animal feed crops. Thus, an objective and careful assessment is needed so that the negative aspects of GMO technology experienced by food crops and plantations do not occur in plant feeds. In Indonesia itself, transgenic research on animal feed crops may not occur in the near future due to various limitations such as expertise (HR), capital and equipment, but these transgenic products will easily enter Indonesia, as has happened with other products food (soybeans, corn, sugar cane, fruits and also medicines).
Problems arise when genetically engineered products from developed countries enter Indonesia and turn out to be unsafe for livestock and humans who use livestock products. The purpose of GMOs in feed crops is not only to increase production but also to improve feed quality through increasing protein content, reducing antinutrients and toxins. In addition, to obtain forage plants that are resistant to pest attack, drought resistance, salinity resistance and resistance to other stresses as has happened to food crops. From the discussion above, it can be seen that GMO technology in animal feed crops can provide various advantages, but in addition to the various benefits that will be obtained, the use of GMO technology in animal feed crops can also cause losses and problems, for example:

a) Feed products originating from transgenic plants from developed countries that enter Indonesia are not known so that the negative impact is also not known;
b) There is a possibility that some food transgenic plant products can cause allergies, it is unlikely that the same thing will happen to feed crops;
c) There are several transgenic plant products that are not environmentally friendly, for feed plants that are many from the Gramineae family the possibility of becoming weeds is very high.
d) GMO feed crops that are already widespread, especially grasses, which are harmful, will become increasingly difficult to control over time. In addition, currently there are transgenic food crops (maize, soybeans, sugar cane) with the resulting biomass can also be used as feed ingredients. the things mentioned above there are several things that need to be considered Given the possibility of loss:
e) Vigilance when adopting feed/forage plant seeds from other countries, especially developed countries, lest the provision of transgenic feed or seeds that harm plants;
f) It is necessary to anticipate the possible negative impact of transgenic food crops and feed crops, both on livestock and directly on humans, so a comprehensive research or assessment is needed.

In principle, this plant is inserted a special gene that can kill insects when eating the plant. Ensuring this then affects biodiversity and the ecosystems in which cotton crops exist. This is because the lifestyle of the cotton plant has changed, so the place of life may change. This kind of risky business needs to be supported by an AMDAL document as a prerequisite for a business license.

The precautionary principle became an important principle and was adopted in various policies after the 1992 Rio Declaration produced at The United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil on 3-14 June 1992. Principle 15 1992 Rio Declaration States that:

"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation", (Freestone, 1994).

The precautionary principle shows that the state needs to be careful in making its policies. Activities that have the potential to cause serious impacts and cannot be carried out are the main ones in this regard. In this case, the lack of science can be used as an excuse for delaying prevention efforts.

The concept of early prevention has been widely accepted and applied in various aspects of life. In this precautionary principle, it is argued that "Science does not always provide the insight needed to protect the environment effectively, and undesirable effects will occur if action is taken only when science provides such insight" (Freestone and Hey, 1996).

From the explanation above, it can be described the elements in the application of the precautionary principle:

1) Once risks are identified. If there has been a loss that may arise.
2) Where there is a threat of serious or irreversible damage. If there is a serious threat or the threat cannot recover its impact so that it has an impact on the environment. Serious and permanent damage is undetermined in size and must be looked at on a case by case basis.
3) Lack of scientific certainty. If there is no ability to measure the possible consequences or impacts that will occur. So there is uncertainty or uncertainty about the certainty of the magnitude and extent of the impact that will occur.

Scope of Application of the Precautionary Principle. The scope of application of the precautionary principle is usually determined based on geographic conditions or based on aspects of the ecosystem to be protected. An example of the scope of application of the precautionary principle based on geographical conditions is the North Sea Declaration, which covers only the North Sea. In addition, the Bamako Convention also has room for the application of the precautionary principle only in the African region. While an example of the scope of the precautionary principle based on aspects of the ecosystem to be protected listed in the Montreal Protocol is the ozone layer of the Second World Climate Change Conference, its scope is change, and the Final North Sea Declaration has the scope of marine protection. Furthermore, the parties can clarify or limit the scope of application of the precautionary principle by identifying the type of damage (type of harm) and type of threat (type of hazard). The types of damage to be avoided include "ozone layer depletion", "eutrophication or acidification", or to use more general terms such as "permanent damage to the marine environment". Meanwhile, based on the type of threat, for example, it can be referred to as "to protect the ozone layer certain substances such as chlorofluorocarbons (CFCs)", "to prevent climate change caused by greenhouse gases" or "to protect the African region from harmful hazards".

Spacing is very important in international law:

1) Scope will be very important with state ownership
2) Relating to the state
3) Relating to objective standards carried out by other countries (parties) in relation to the commitment of a country (certain parties) to the implementation of the precautionary principle formulated in international agreements or national laws and regulations.

The precautionary principle as the basis for the emergence of an obligation to act. Another function of the precautionary principle is to create an obligation to act (prudence as an obligation to act). This can be seen in Article 3(2) of the Helsinski Convention which states: "...should... take precautions if there are reasons to think that substances or energy introduced, directly or indirectly, into the marine environment, may cause harm to human health, endanger living resources and marine ecosystems, damage facilities or interfere with other legitimate uses of the sea even when there is no conclusive evidence of a causal relationship between the inputs and their alleged effects." Several other formulations of the precautionary principle contained in international treaties create more specific obligations. This can be seen, for example, in the resolution adopted by the Paris Convention for the Prevention of Marine Pollution from Land-Based Sources which states that when the hazard threshold is reached, the state is obliged to use the "best technology" to reduce pollution emissions. The same is also formulated in Paragraph 11 of the World Natural Charter. The Bamako Convention on the Prohibition of Imports into Africa and the Control of Transboundary Movements and Management of Hazardous Waste in Africa contains the obligation to provide environmentally friendly production methods that are imposed on the parties to prevent contaminating natural hazardous substances.

CONCLUSION

The protection and management of the environment which is the obligation of the state, government, and all elements of society is important as an effort to prevent pollution and environmental damage. These efforts are carried out through planning, utilization, control, supervision, and law enforcement actions. Environmental management provides economic, social and cultural benefits and needs to be carried out based on the principles of prudence, environmental democracy, decentralization, as well as recognition and respect for local wisdom and environmental wisdom, so that the Indonesian environment must be protected and managed properly.

The precautionary principle is one of the principles of environmental law in the law on environmental protection and management. This principle develops along with the very rapid development of technology, which is undeniable, often the development of this technology brings unexpected negative (dangerous) impacts on public health. and the environment. The potential dangers resulting from technology and human activities in the context of developing and implementing this technology are not only on a local scale but also globally because new products resulting from technological sophistication have also been distributed by multinational companies and therefore can endanger the health and physical integrity of the entire world population and planet (water, atmosphere, climate, plants, animals and humans) irreversibly.

REFERENCES

Angga, L.O.L., Labetubun, B.M.A.H & Fataruba, S. (2020). Aplication of hawear customary law in the prevention of pollution and environmental damage on the sea coast in southeast maluku regency. *International Journal of Sustainable Development and Planning*. *15*(5).

Angga, L.O., Datie, D.R.A., Tuhulele, P., Fataruba, S., & Taufiq, I. (2021). Responsibility of manufacturers in waste management of plastic packaged drink products based on law number 18 of 2008 regarding waste management (Case Study in Ambon City, Maluku Province). *International Journal of Sustainable Development and Planning*, *16*(2).

Angga, L.O., Barzah, L., Anshary, H.L.M., & Sabri, F. (2020) Implementation of precautionary principle in gold mine exploitation in romang island, southwest maluku regency by pt. Gemala Borneo Utama Based On Law Number 32 Year 2009, *International Journal of Scientific & Technology Research, 9*(1).

Angga, L.O., & Saptenno M.J., (2020). The formulation of green open space in the regional regulation of spatial planning of maluku province. *International Journal of Scientific & Technology Research, 9*(1)

Abrar, S. (2004). Yogyakarta Mining Law: UII Press, (Anggota IKAPI).

Aminuddin. (1999). *The privatization of state-owned enterprises (BUMN). Dissertation on Doctoral Program in Law*

Faculty of Law, UNAIR Suranaya University.
Andry, G. & Wibisana. (2008). *Economic instruments or privatization of environmental management?* Comments on the environmental services bill.
Bagir, M. (1996). *Politics of legislation in anticipating economic liberalization, scientific orations (faculty of law unila bandar lampung.*
North Bengkulu Environment Agency, (2011).
CST Kansil dan Chiristine ST. Kansil, (1977). *Constitutional law of the republic of indonesia(1) jakarta: rineka cipta.*
Dian, A.W. (2010). *legal protection of state assets in the control of the ministry of defense of the republic of indonesia, dissertation summary of legal studies doctoral program (malang: barawijaya university), faculty of law.*
Emil, S. (2003). "*Building a development paradigm" in the book launching paper and discussion forum on results and follow-up of the sustainable development".* Summit, Jakarta: April 11, 2003.
French national advisory committeee on ethics, (2002).
Friedman, W. (1971). *The stale ang the rule of law in a mixed economy*, (London: Steven & Son).
Freestone, D.H. (1996). The *precautionary principle and international law. the challenge of implementation. (international environmental law and policy series*, (31) Edited by David Freestone and Ellen Hey. The Hague, London, Boston: Kluwer Law International, 1996. Pp. xv, 268. Index. FI 195; $130; £84. Link Freestone, (1994) Freestone Cabernet Sauvignon link: Gaus, F. Gerald, dan Chandran Kukathas, (2012) Handbook Teori Politik.
Hans, K. (1961). *General theory of law and state.* (New Yor: Russel and Russel).
Helmi, H.S. (1980). *The fundamental riight to decent enviroment, dalam michael bothe (project coordinator) trend in enviromental policy and law*. (Berlin: Erich Schmidt Verlag).
Jimly, A. (2009). *"Green constitution" shades of green the 1945 constitution of the republic of indonesia.* Jakarta: pt. raja grafindo persada.
Linklater, A.D.B., & Scott. (1996). *Theories of International Relations*. (New Yorkn ST Martin's Press), inc.
Mas, A.S. Good Governance.
Mustamin, D.M. (1972). *An overview of the development of the types of modern states, the fourth speech of law and public deception.* (point of view: hasanudin university publisher).
Nicholas, L., & Brendan, G. (2009). *Green politics: Criticism of conventional towards environmentally insight politics and justice.* (bandung: nusa media).
Rachmad, S.'at, (2013). *Political reconstruction of food law.* Malang: UB Press.
Roberto, A. (2004).
Siti, S.R. (2005). *Environmental law and national environmental policy*. (Surabaya: Airlangga University Press.
Syamsuharya, B. (n.d). *Application of legal principles in preserving environmental functions in national industrial activities an effort to save the environment and life between generations*, Bandung.
US National Academy of Science, (2002).
UNESCO International Bioethics Committee, (2003).
Wingspread Statement, (1998). *Precautionary Principle: The Wingspread Statement Lessons Learned. Constitution.*
1945. *Constitution of the Republic of Indonesia.* (UUD NRI 1945).
Government Regulation Number 27 of 1999 concerning Environmental Impact Analysis, State Gazette Number 59 of 1999, Supplement to State Gazette Number 3939.
Law Number 32 of 2009 concerning Environmental Protection and Management, State Gazette Number 140 of 2009, Supplement to the State Gazette Number 5059.
Government Regulation Number 21 of 2005 concerning Biosafety of Genetically Engineered Products
Government Regulation Number 27 of 1999 concerning Environmental Impact Analysis, State Gazette Number 59 of 1999, Supplement to State Gazette Number 3939.