Genetic Quality Standards Appropriate with The Development of Science and Technological in The Perspective of Environmental Law

by Siti Kotijah

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Abstract

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A good and healthy environment is a basic right of every Indonesian citizen mandated in Article 28 H paragraph (1) of 1945 Constitution of the Republic of Indonesia. It is to guarantee the environmental quality against the environmental pollution, environmental quality standards, as one of the preventive instruments of pollution and environmental damage, including genetic quality standards. Genetic quality standards, the types those are appropriate with the development of science and technology, where everyone is permitted to throw waste into the environmental media by fulfilling the requirements. The regulation of genetic quality standards is regulated in Article 20 paragraph (2) G of Law No. 32 of 2009 concerning Protection and other Environmental Management, Law No. 5 of 1990, Act 4 of 2006, and Law No. 11 of 2013 concerning Nagoya Protocol and PP No. 21 of 2005.

Genetic management benefits humans if it is used appropriately. On the other hand, the developing science and technology produces hazardous and toxic waste (B3), which is at risk for the life environmental, health, and various pest threats, disease that interfere the sustainability of natural resources. The result is on the increasing of climate changing and the global warming which can threat the genetic resources needed that has been used until this time to fulfill food needed in Indonesia. Therefore

For this reason, the frequency of resources for people who are not possible is not used by those who are not responsible with the right application. Therefore, the protection of genetic resource by the government is important to be done in order to prevent the extinction and to prevent abused by people who are not responsible with the firm sanction.

Keywords: Environmental Law, Quality Standards, Genetics.

Introduction

A. Background

Genetics is the study of genes, namely the factors that determine the nature of an organism. In the biological process of life, there is a metabolism that takes place in the cell. Determination of the nature of organisms is carried out by genes by controlling the chemical reactions that make up a metabolic trajectory. In genetics is studied the structure, the process of formation and inheritance of genes and also the mechanism of expression in controlling the nature of organisms[1]. There are several types of genetics, namely plant genetics, animal genetic resources and genetic engineering.

Genetic management benefits humans appropriate with the development of science and technology, among others, enhancing the quality of life and changing the human lifestyle. The use of chemical-based products has increased the production of hazardous and toxic waste materials. This requires the development of a safe disposal system with little risk for the environment, health, and the survival of humans and other living things.

On the other hand, developing science and technology produce hazardous and toxic waste (B3), at risk for the environment, health, and various pest threats, diseases that disrupt the sustainability of genetic resources. This caused the increasing of climate change and global warming which can threaten the availability of the genetic resource which has been used to fulfil the food needed in Indonesia.

In the perspective of environmental law, there is an environmental prevention instrument; one of it is environmental quality standards. In that quality standard, one of the genetic quality standard which is included in other types of quality standards appropriate with the development of science and technology. Basically, everyone is legally permitted to dispose of waste into the environmental media by

fulfilling the requirements, but there is a parameter so that there is no pollution happened.

The regulation of genetic quality standards is regulated in Article 20 paragraph (2) G of Act No. 32 of 2009 concerning Protection and other Environmental Management, and spreading in several Acts namely: Act No. 5 of 1990, Act 4 of 2006, and Act No. 11 of 2013 concerning Nagoya Protocol and PP No. 21 of 2015.

The existing genetic quality standard dispositions still do not give a deterrent effect on the perpetrators. In fact the development of science and technology related to genetics continues to grow, and produces hazardous and toxic (B3) material, which is at risk for the environment, health, and various threats of pests, and diseases. This makes the quality of the environment declining; threatening the survival of human life and other creatures, for that the environmental protection and management is important and consistent for all stakeholders.

B. Research Problem

From the research problem above, other environmental quality standard problems, appropriate with the development of science and technology, including the genetic quality standards. There are standards and parameters regulated in the Law of Protection and Environment Management, for this reason how the environmental prevention instruments are related to genetic quality standards in the perspective of environmental law.

C. Research Objectives

The purpose of the study is to find out the environmental law prevention instruments in reducing the decline in environmental quality with standards and parameters related to genetic quality standards in the perspective of environmental law.

D. Research Methods

The research conducted was normative, with a legislative approach, a concept approach, and a case approach, with legislation primary legal materials, and field data as secondary data that supported legal arguments in this study.

E. DISCUSSION

E.1. Legal Construction of genetic quality standards

Genetics derived from the Greek language, which means "giving birth" is an important branch of biology at this time[1]. This science studies various aspects concerning the inheritance of traits and nature's variations in organisms and sub-organisms (such as viruses and prions). Some also briefly say, genetics is the science of genes. The name "genetics" was introduced by William Bateson in a personal letter to Adam Chadwick and he used it at the 3rd International Conference on Genetics in 1906[2].

The history of genetic development began in the 17th century, people believed that life emerged spontaneously. This opinion, known as *generation spontanea*, was refuted by Francesco Redi (1621-1697), Lazzaro Spallanzani (1729-1799), and Louis Pasteur (1822-1895), who considered that living organisms originated from organisms that lived earlier. Another opinion, called ovisma, assumed that an ovum had a female organism having an important role as a carrier of hereditary factors that would be passed on to the next generation. In this case, male organisms produce liquids whose function is to activate the development of ovum[3].

Genetics evolved after the invention of the microscope and the rediscovery of Mende's work, became a standard in the use of scientific methods in science or science. There are several stages of genetic development[4]:

1. 1859 Charles Darwin published The Origin of Species, as the basis for genetic variation.
2. 1865 Gregor Mendel submitted a Trial text on Plant Crosses;

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[1] *Essential Cell Biology: An Introduction Molecular Biology of the Cell*. New York: Garland Publishing, Inc.

[2] *Ibid*

[3] http://repository.uinjkt.ac.id/dspace/bitstream/123456789/32433/1/Lebba%20Kadorre%20Pongsibanne.pdf di akases Jumat, 10 Sepetmber 2018 Pukul 03.06WITA

[4] *Genetics Engineering. The Science of the Decade*. Canberra: The Australian National University Magazine Gibbs, A. Dkk. 1982.

3. 1878 E. Strassburger gave an explanation of multiple conception;
4. 1900 The rediscovery of Mendel's work separately by Hugo de Vries (Belgium), Carl Correns (Germany), and Erich von Tschermak (Austro-Hungary) was the beginning of classical genetics;
5. Chromosomes are known to be units of genetic inheritance;
6. 1905 British biologist William Bateson introduced the term 'genetics';
7. 1908 and 1909 Laying the basis of population genetic theory by Weinberg (doctor from Germany) and separately by James W. Hardy (British mathematician) was the beginning of population genetics;
8. 1910 Thomas Hunt Morgan showed that genes were on chromosomes, using fruit flies (Drosophila melanogaster) was the beginning of cytogenetic;
9. 1913 Alfred Sturtevant made the first genetic map of a chromosome;
10. 1918 Ronald Fisher (British biostatistics) published on the correlation between relatives on the supposition of Mendelian inheritance (freely meaning "Relation between relatives based on Mendelian inheritance"), which ended the feud between biometric theory (Pearson et al.) and Mendel's theory as well as initiating the synthesis of both of these were the beginning of quantitative genetics;
11. 1927 Physical changing in genes was called mutations;
12. 1928 Frederick Griffith discovered a carrier molecule that could be transferred between bacteria (conjugation);
13. 1931 Crossing caused recombination;
14. 1941 Edward Lawrie Tatum and George Wells Beadle showed that genes encoded proteins, which were the beginning of the main dogma of genetics;
15. 1944 Oswald Theodore Avery, Colin McLeod and Maclyn McCarty isolated DNA as material genetic (they call it the principle of transformation);
16. 1950 Erwin Chargaff showed the general rules that apply to four nucleotides in nucleic acids, for example adenine tended to be as much as thymine;

17. 1950 Barbara McClintock discovered transposons in corn;
18. 1952 Hershey and Chase proved that the genetic information of bacteriophages (and all other organisms) was DNA;
19. 1953 The puzzle of the DNA structure was answered by James D. Watson and Francis Crick in the form of double helix, based on X-ray diffraction images of DNA from Rosalind Franklin being the beginning of molecular genetics; and
20. 1956 Jo Hin Tjio and Albert Levan ensured that the human chromosome was 46.

From this division, genetics develops both as pure science and applied science. These branches of knowledge are formed primarily as a result of the deepening of a particular aspect of the object of study.

E.2. Genetic Quality Standard Disposition

a. Convention on Biological Diversity (Act No. 5 of 1990 concerning Biodiversity and Ecosystems)

The Convention on Biological Diversity (CBD) is a legally binding International Agreement adopted at Rio De Janeiro in June 1992 which was inspired by the growing commitment of the world community to sustainable development. In Article 8 J the biodiversity convention requires member states of the Convention on Biological Diversity to comply with national legislation by respecting, protecting and maintaining knowledge, innovations, and practices of indigenous and local communities that reflect traditional lifestyle, appropriate with the conservation and sustainable use of biodiversity and extending its determination more broadly with the approval and involvement of knowledge owners of innovations, and such practices are encouraging equitable sharing of benefits resulting from the utilization of knowledge, innovations, and that kind of practices . It means that the development of science and technology in the field of biodiversity is developed appropriate with the usefulness or benefits of a country.

b. Access and Distribution of Profits on Utilization of Genetic Resources Regulated in the Bonn Guidelines

   The Bonn Guidelines are guidelines for determining the steps in the process of access and distribution of profits on the basis of the use of genetic resources, with an emphasis on the obligation for users to obtain approval on the basis of initial information from the provider country (Prior Informed Consent)[5]. In addition, it regulates the requirements of Mutual Agreed Terms and determines the roles and responsibilities of both users and providers of genetic resources and the importance of stakeholder involvement. The Guidelines also regulate the determination of incentives, accountability, verification and dispute resolution. This guide is in developing strategies regarding access and benefit sharing for the use of genetic resources, determining the steps in the process to gain access to genetic resources and sharing benefits from their use.

c. Act Number 4 of 2006 concerning Agreement About Plant Genetic Resources for Food and Agriculture (Treaty on Plant Genetic Resources for Food and Agriculture).

   An international agreement on plant genetic resources for food and agriculture (SDGTPP) was addressed by the Food and Agriculture Organization (FAO) on 3 November 2001 at the 31st session of the United Nations Food and Agriculture Organization (UN-FAO) in Rome[6]. In general, PGRFA is a multilateral system of access and benefit sharing on the use of genetic resources (Multilateral System on Access and Benefit Sharing) that supports breeders and farmers.

   The SDGTPP agreement gives acknowledgement on the rights of farmers, regulated in Article 9 which is a continuation of the Nairobi Conference adopted from the biodiversity convention and FAO Conference in 1993, Article 9 acknowledges the contribution to indigenous / traditional communities and farmers for conservation and sustainable development on the genetic resources of plants, especially food

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[5] http://repository.uinjkt.ac.id/dspace/bitstream/123456789/32433/1/Lebba%20Kadorre% 20Pongsibanne.pdf di akases Jumat, 23 Maret 2018 Pukul 03.06WITA

[6] Mila Hanifa 2012, *Op. Cit.* hlm 97

and agricultural products and provide responsibility for realizing the rights of farmers in national law.

Indonesia as a country that is very rich in biodiversity, needs to be conserved and utilized to carry out sustainable development in order to improve the welfare of all people, for that reason to ratify and enact in Act Number 4 of 2006 concerning Agreement about Plant Genetic Resources for Food and Agriculture (Treaty on Plant Genetic Resources for Food and Agricultural). The point is the plant genetic resources continues to experience declining due to the low attention and utilization, and also changes in traditional agricultural practices.

On the other hand, in the changing environment and the dynamics of consumer demand, there needs to be a reserve of plant genetic resources for the recovery of plants in providing community welfare. Furthermore, it is encouraged to provide plant genetic resources in an effort to preserve and utilize sustainable genetic resources.

d.   UU no. 11 of 2013 concerning Nagoya Protocol

The Nagoya Protocol is prepared based on the principles of international law, namely countries that have sovereignty and sovereign rights to exploit natural resources appropriate with environmental policies and development, and also have the responsibility to ensure that activities in their jurisdiction or control do not cause harm to the environment of other countries or regions outside the jurisdiction of the country concerned.

Indonesia, which has abundant genetic resources and traditional knowledge and has economic value, needs to be preserved, to developed and utilized for the prosperity of the people. Act No.11 of 2013, as access to genetic resources and traditional knowledge related to genetic resources must be given based on the approval and provider of genetic resources from conventional knowledge of the country.

The use of genetic resources provides fair and balanced benefits to providers of genetic resources and conventional knowledge for Indonesia

by entering Nagoya Protocol on Access the Genetic Resources and the Fair and Equitable Sharing of Benefits From Their Utilization to the Convention on Biological Diversity (Protocol Nagoya on Access to Fair and Balanced Genetic Resources and Profit Sharing from Utilization of the Convention on Biological Diversity)[6], which regulates the process of access and fair and balanced distribution of benefits to genetic resource providers.

e. Government Regulation of the Republic of Indonesia Number 21 of 2005 concerning Biosafety of Genetically Engineered Products

Biosafety genetically engineered products are environmental safety, food safety and / or safety of genetically engineered feed products. Utilization of biodiversity through modern biotechnology with the results of Genetic Engineering Products (PRG) provides an opportunity to support agricultural production, food endurance and improve the quality of human life.

This regulation aims to improve the used result and the used energy of Genetic Engineering (PRG) products for the welfare of biological resources, consumer protection, legal certainty and certainty in doing business.

f. The Government Regulation of Indonesia Number 48 of 2011 concerning Animal Genetic Resources and Animal Breeding

Genetic Resources (SDG) Animals are managed through utilization and conservation activities. Utilization of Animal SDGs is carried out through cultivation and breeding, while Animal SDG preservation is carried out through conservation in their habitat and / or outside their habitat and other efforts such as land conservation.

Utilization of SDG Animals is used as one of genetic material for the formation of germs. The government establishes livestock breeding policies to encourage the availability of certified livestock germs and

supervise the procurement and distribution in the context of sustainable livestock development.

g. Minister of Agriculture Regulation Number: 67 / Permentan / Ot.140 / 12/2006 concerning Preservation and The Use of Plant Genetic Resources

Plant Genetic Resources is the priceless asset of state, its existence is spread in various places, and it is an important basic material to be used in breeding activities to obtain new superior plant varieties for the purposes of Preservation and Utilization of Plant Genetic Resources, to maintain the existence of diversity and the potential of it needs to be done by doing the activities of searching, collecting, breeding and development, to fulfil the breeding needs which is required and also the Genetic Resources of Plants originating from the outside of Indonesia with exchange way.

E.3 Preventive Instruments in Genetic Quality Standards in The Perspective of Environmental Law.

Protection of genetic resources is mandated in legislation, both Article 33 paragraph (3), Article 28 H paragraph (i) of the 1945 Constitution of Indonesia, Article 20 paragraph (2) G of Act No. 32 of 2009 concerning Protection and other Environmental Management and legislation referred to above. It becomes the basis of instrument prevention for environmental and pollution. Genetic quality standards and other types of quality standards appropriate with the development of science and technology, where everyone is permitted to dispose of waste into the environmental media by fulfilling the requirements.

In the determination of existing genetic quality standards, how many B3 waste standards that has been disposed into the environmental media will be known, and still will be the carrying capacity and capacity of the environment. Basically by maintaining the standard of environmental quality, it will protect the pollution and environmental damage, it means fulfilling human rights to a good and healthy environment.

The problem of decreasing environmental quality due to quality standards that exceeds more than the available of environmental media is the responsibility of all parties, including the government, stakeholders, entrepreneurs, and the public. The environmental media has a standard of environmental damage and pollution. Prevention and / pollution of the environment must be done with coordination, systematic, and law enforcement for the perpetrators.

E.4. Instrument to Prevent Standard Criteria for Seagrass Beds Damage in the Environmental Law

A good and healthy environment is a basic right of every citizen guaranteed by the State Article 28 H paragraph (1) of the constitution in the Unitary State of Indonesia. To guarantee this right, instruments for preventing pollution and environmental damage are carried out, including the media environment used, related to genetic quality standards that produce B3 exceeding the limit.

To ensure environmental quality against environmental pollution, there are environmental quality standards, as one of instrument to prevent pollution and environmental damage, including genetic quality standards. Genetic quality standards, each person is permitted to dispose of waste into the environmental media by fulfilling the requirements. The regulation of genetic quality standards is regulated in Article 20 paragraph (2) G of Act No. 32 of 2009 concerning Environmental Protection and Management.

Prevention and environmental damage instruments in the Act of Environmental Protection and Management, one of it is in the environmental quality standard. Determination of the occurrence of environmental pollution is measured through genetic quality standards, for genetic resources. Everyone is allowed to dispose waste into the environmental media with the requirement to fulfilling the environmental quality standards and get permission from the Minister, Governor, Mayor or Regent appropriate with their authority.

Regarding B3 waste generated in the utilization of genetic resources, in Article 88 concerning the Act of Environmental Protection and Management states that every person whose actions, business and / or activities use B3, produces and / or manages B3 waste, and / or which poses a serious threat to the environment is liable to the absolute responsibility for losses that occur without the need to prove the elements of error. The point is, if there is someone throwing B3 into the environmental media beyond the carrying capacity of the environment, there is no need to prove a mistake, because the evidence is clear.

Regarding to B3 waste, in the criminal provisions of the Environmental Protection and Management Act, Article 103 is regulated, "every person who produces B3 waste and does not carry out the management as in Article 59 paragraph (4), is punishable with the shortest prison of 1 (one) year and the longest is 3 (three) years and a fine of at least Rp. 1,000,000,000.00 (one billion rupiah) and a maximum of Rp. 3,000,000,000.00 (three billion rupiah). Article of criminal refers to Article 59 paragraph (4), related to B3 waste management must obtain permission from the Minister, Governor, or Mayor appropriate with their authority. The criminal provisions above is in order to provide a deterrent effect on B3 production related to the use of genetic resources.

F. Conclusion

The regulation of genetic quality standards is regulated in Article 20 paragraph (2) G of Act No. 32 of 2009 concerning Environmental Protection and Management, in the category appropriate with the development of science and technology. Environmental quality standards are permitted to be disposed in environmental media, suitable with the prescribed standards. The use of genetic resources provides benefits for humans, but on the other hand produces B3 waste that can interfere with the environment. Management of B3 without permission can be subject to criminal provisions in Article 102 of Act No. 32 of 2009 concerning Environmental Protection and Management.

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D.Website

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