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PROCEEDINGS

INTERNATIONAL CONFERENCE

2nd SHIELD 2017

52nd Dies Natalis Unila

Bandar Lampung - 18-20 September 2017 - 4 International Speaker

Organized by:

Postgraduate Program
and Institute for Research
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Proceeding of International Conference 2nd SHIELD 2017
Bandar Lampung, September 18-20th 2017

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Foreword

In this globalization era, advancement in science and technology has led to remarkable gains in life. However, despite the remarkable gains, many countries particularly Asian countries face inequalities and uneven progress. Even worse, these countries are facing many problems such as poverty, terrorism, drug abuse, and other social issues. These problems are complex and multidimensional. We should give a real contribution to solving these problems. Because the problems are multidimensional, we need people from cross-disciplinary interests to work hand in hand with strong commitment, not only to face, but also to change these problems into opportunities.

Therefore, the Postgraduate Program in collaboration with Institute of Research and Community Service of University of Lampung provides a place for academicians, practitioners, policy makers, researchers and professionals from multi-disciplines related to Social Sciences and Humanities, Economics, Education, Law, and Sustainable Development (SHIELD) to meet and interact with members inside and outside their own particular disciplines. All participants are challenged to give their real contribution to helping solve the real-world problems.

The authors of Proceeding of 2nd SHIELD International Conference come from academicians, practitioners, policy makers, researchers and professionals from multi-disciplines related to Social Sciences and Humanities, Economics, Education, Law, and Sustainable Development.

This conference aims to share information and discuss resent developments and innovations arising from research in a wide range of disciplines. Through this conference, it is expected that the research articles can be documented and communicated throughout the countries.

Head of Commite

Prof. Dr. Muhammad Akib, S.H., M.Hum.

Welcome Address
Report by the Organizing Committee

Dear distinguished guests and participants,

In this globalization era, advancement in science and technology has led to remarkable gains. However, despite the remarkable gains, many countries particularly Asian countries face inequalities and uneven progresses. Even worse, these countries are facing many problems such as poverty, terrorism, drug abuse, and other social issues. These problems are complex and multidimensional. We should give a real contribution to solving these problems. Because the problems are multidimensional, we need people from cross-disciplinary interests to work hand in hand with strong commitment, not only to face but also to change these problems into opportunities.

Therefore, the Postgraduate Program in collaboration with Institute of Research and Community Service of University of Lampung holds The 2nd SHIELD Conference as a place for academicians, practitioners, policy makers, researchers and professionals from multi-disciplines relating to Social Science and Humanities, Economic, Education, Law, and Sustainable Development to meet and interact with members inside and outside their own particular disciplines. All participants are challenged to give their real contribution to helping solve the real-world problems.

At this second international conference, four keynote speakers from different disciplines and different countries were invited. Seventy-five authors initially submitted their abstracts before submitting their full papers, but finally only 49 full papers were accepted for publications. The authors are academicians, practitioners, policy makers, researchers and professionals. This conference aims to share information and discuss resent developments and innovations arising from research in a wide range of disciplines. Through this conference, we hope that the research articles can be documented and communicated throughout the countries.

I would like to thank you for your participation and look forward to having productive discussion among participants.

Sincerely yours,

Professor Muhammad Akib

Remarks by the Rector of the University of Lampung

The Honorable keynote speakers, committees, participants, ladies and gentlemen,

It gives me a great pleasure to welcome all of you and chair the Opening Ceremony this morning to the Second SHIELD International Conference, jointly organized by Postgraduate Program and Institute for Research and Public Services, the University of Lampung. We'd like to say how grateful we are to all the keynote speakers who have accepted our invitation. Also, we are delighted to have all of participants here to participate and share in the Second SHIELD International Conference.

Along with an increase in the activity of national development and dynamic development of the international world due to globalization, then it always be followed by the emergence of complex social, humanity, economics, education, law and sustainable development issues. Therefore, the University of Lampung, which has a vision to be the best 10 among public universities nationwide, a mission to be a world class research university, and as the third largest state university (outside Java Island) feels compelled to draw up concepts and provide solutions to the various issues.

In relation to these issues, practically the University of Lampung through its Postgraduate Program in collaboration with its Institute Research and Public Services organizes the Second International

Conference with such disciplines as social sciences, humanities, economics, education, law and sustainable development. This international conference presents several keynote speakers who come from leading universities in the world. These activities are held in Lampung, which is one area that has a nationally important role, because it is the gateway of Sumatera Island and is strategically located for the development progress.

As the arena for discussion, communication, and enrichment of the knowledge of participants, this conference is expected to provide a significant contribution to capturing opportunities for the development of science today. This conference is intended to function as a forum among the participants from various walks of

life for dissemination of research results in the fields of social sciences, humanities, economics, education, law and sustainable development. The participants include practitioners, researchers, academics, students, industrialists and science observers from various organizations such as industries, state-owned enterprises, research institutions, government agencies, and public and private universities.

To expand the horizons of thinking for the participants and to share the experiences of international researches from world experts, this conference invites four keynote speakers from four countries who will present their main papers. These speakers are:

1. Prof. Dr. Arief Hidayat, S.H., M.S., Chairman of the Constitutional Court, Republic of Indonesia
2. Prof. Ryohei Kada from Shijyonawate Gakuen University, Japan.
3. Dr. Fonny Dameaty H. from University of Malaya, Malaysia.
4. Dr. Jenny H. Panchal from James Cook University, Singapore.

We are honored to have you all the speakers here in this conference, and thank you for being our keynote speakers in this conference.

Finally, I do hope that this seminar can run well and all participants can participate actively.

Sincerely yours,
Rector,

Prof. Dr. Hasriadi Mat Akin

International Conference
2nd SHIELD 2017
University of Lampung

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How Far is the Precautionary Principle Considered in the Benefits of Genetically Modified Organisms World Wide?

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Abstract

It has been years since the human kind first started to advance their life qualities. Humans have evolved all kind of aspects in their lives such as economically, socially, technologically, and scientifically. If we are to integrate between technology and science, we would end up with one of the leading aspect in human life that is biotechnology. From the early stages of using organisms or molecular analogues into certain products or services, biotechnology has taken us into a very different level of new nature insertion that is the Genetically Modified Organisms (GMO). GMO is an organism (human, animals, and plants) or microorganism that is genetically engineered, in order to create new and inheritable characteristic. Because of its direct impact upon human and environment health, the implementation of the precautionary principle is ought to and has been able to settle worries that come from countries across the world. Either GMO is considered as a scientific or trading premise, both Cartegana Protocol on Biosafety and the Sanitary and Phytosanitary Measurement from the World Trade Organization have ensured the safety of those products. Despite all the regulations, nowadays, there are still a lot part of countries that banned the usage of GMOs domestically. These actions have left law experts and international organizations wonder how far the countries consider the binding of GMO regulations and its precautionary principle.

I. Introduction

Since the beginning of early human civilization, biotechnology has become a part of human activities, aiming on improving the quality of life. As time goes by, traditional biotechnology such as using yeast to make alcohol has evolved into a modern way of using genetically engineered (GE) substance. Those products of GE are called the Genetically Modified Organisms (GMO) under the regulations of Cartegana Protocol on Biosafety (CPB). GMO is an organism (human, animals, and plants) or microorganism that is genetically engineered, in order to create new and inheritable characteristic.[1]

It only became a problem when GMO are commercialized below the regulation of the Sanitary and Phytosanitary (SPS) Agreement. Nations do not trust the resemblance of SPS Agreement standard with the CPB regarding to GMO products. Thus, the Precautionary Principle (PP) came through as a link between SPS Agreement and CPB with the goal of minimizing human health and environmental risks. Despite of that, there are still most nations who prohibit the cultivation of GMO benefits commercially such as Germany, Italy, and Poland. Due to that, the purpose of this research is to understand the implementation of PP by the nations regarding to the benefits of GMO according to CPB and SPS Agreement and the establishment in Indonesia.

[1] IDEP Foundation, 2012, "Apa itu transgenik?" Pg. 1, accessed from www.idepfoundation.org

This research uses the normative legal research with secondary type sources consisting of primary, secondary, and tertiary material of legal source. The collecting method of the research data is through literature-study techniques. Afterwards, the providing data would be process by a law comparison among countries to have a proportion of precautionary principle adoptions. The result stated that in order to regulate the GMOs, CPB has few requirements that have to be fulfilled for export-import mechanisms such as Advanced Informed Agreement, Simple System of Agriculture Commodity, Biosafety Clearing House, Export Documentation, risk assessment and management. In the other hand, SPS Agreement regulates the needed standards for GMO products that are Codex Alimentarius, World Organization for Animal Health (OIE), and International Plant Protection Convention (IPPC). As for implementing PP, nations implement by adopting through their national law; Korea (still adapting), Brazil (CTNBio and *estudo de impacto ambiental*), Germany (The Vorsorgeprinzip), and Indonesia (environment management act, government regulations No. 27 year 2012, and government regulations No. 5 year 2012).

Based on the urgency acknowledged above, it is very clear that the importance of this matter should be considered in order to provide a clearer and better understanding on the practice of implementing PP's role as the international environmental law's principle between states, particularly in the benefits of GMO.

2. Precautionary Principle and the GMOs

2.1 Precautionary Principle

On the early year of 1970, the precautionary principle was recognized from a German fundamental environmental law principle known as the vorsorgetprinzip. It is now adopted into many policies that connect with environmental cases in German such as acidic rain, global warming, and the North Sea pollution.[2] And then, the precautionary principle was introduced in the 1987 Ministerial Declaration of the Second Conference on the Protection of the North Sea through the amendment of the Maastricht Treaty on the European Union.[3]

Internationally, the precautionary principle was first introduced on the 1984, through the First International Conference on Protection of the North Sea, which is followed by number of conventions and international treaties, among them are the Bergen declaration on sustainable development, the Maastricht Treaty on the European Union, the Barcelona Convention, and the Global Climate Change Convention.[4] Nowadays, the precautionary principle has enrolled in international policies that relate with high risk international issues whereas the science is still in doubt or as sustainable development national planning.

Definitions of precautionary principle have never sought the light of day, although it is clearly explained in the 15th principle of Rio Declaration which stated:

> "Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."

The term of "measures" is not particularly mentioned, but mainly accepted as governments' actions in using their authorities to lack or give provisions as to consider the developments or activities of its' countries' environmental issues. Mainly, the precautionary principle is just a form of a "careful" nature. While specifically, precautionary principle is an environmental-risk origin principle that acts as a standard to prevent serious cases relating to human and environmental health, based on uncertainty or science presumption upon negative circumstances.[5]

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[2] Joel Tickner, 1999, "The Precautionary Principle in Action: A Handbook", Dakota: Science and Environmental Health Network", pg. 2.

[3] Leeka I. Kheifets, 2001, "The precautionary principle and EMF: Implementation and Evaluation", *Journal of Risk Research*, vol. 4, no. 2, pg.115.

[4] Joel Tickner, *loc.cit.*

[5] Marco Martuzi, 2004, *The Precautionary Principle : Protecting Public Health , the Environment and the Future of Our Children*. Denmark: World Health Organization, pg. 7.

Precautionary principle aims to avoid case in a negative possibility which is addressed as ruin problems. Ruin problems can be explained as an absolute more that 0% chance of irreversible risks. One of the real examples of an irreversible risk is extinction of a species.[6] The component of precautions consists of:[7]

a. Having a purpose, such as establishing an intended kind of agriculture or seed breeding.
b. Considering and re-evaluating dangerous practice alternatives.
c. Transferring burden of proof to the financially responsible which comes with the responsibility of evaluating, understanding, researches, information, and professionalism.
d. Evolving a democratic and open procedure that allows a whole decision making methods and criteria.

2.2 What is the GMO?

Genetically Modified Organisms (GMO) are living organisms that experienced changes of their nature and characteristics using modern science technology which studies the inheritance of an organism's nature or characteristic to another that creates a new nature. Genetic engineering can be understood as changes of an animal's or plant's nature to develop new natures that are intended by humans. For example, a pest-resistant gene from a certain bacteria is inserted to a plant. Due to that, the plant embraces that same resistant. From that example, we can identify that GMO's are not only possible between the same species, but also different species which are called as transgenic.[8]

a. GMO's Advantages

The advantages of GMO's among human lives are clearly seen in two aspects that are food and health (medicine).[9] Genetically Modified (GM) plants are used as crops that are consumed by humans and animals. Theses crops are eventually produced faster through a genetic engineered process rather than a conventional one. The processed crops contains characteristic that can adapt and have high tolerance to drought, pests, and herbicide. As in for medication, GMOs are usually or expected to be used in

1) Insulin. As a form of medication for diabetes patients, insulin is one of the first GMO health products. In the making of insulin, a certain bacteria are modified genetically to adjust human's insulin gene.[10]
2) GMO can produce medication such as growth hormone.[11]
3) GMO is now a lot used for Hepatitis B Vaccine (produced from yeast). In the future, it is expected that vaccines are inserted into plants or crops, so it is possible to eat the vaccines instead of injecting them.[12]

b. GMO Positive Impacts

GMOs advantages best seen in agriculture are divided into pests' resistance and herbicide resistance.[13] *Bacillus thuringiensis* or *Bt*, is a genetically engineered modification discussed widely for pests' resistance. Bt is an organic insecticide used in the last decades as eradicator by organic farmers and a licensed method in controlling pests. The poison from *Bt* are isolated and inserted into crops'

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[6] *Nassim Nicholas Taleb, 2014, The Precautionary Principle (with Application to the MGO), NYU School of Engineering Working Paper Series, pg. 2.*
[7] A. Wallace Hayes, 2005, The Precautionary Principle, Boston: Harvard School of Public Health, pg. 162.
[8] Jeri Freedman, 2009, *Science and Society Genetically Modified Food*, New York: The Rosen Publishing Group, pg.2.
[9] Lilian E. Forman, 2010, *Genetically Mofified Foods*, Minnesota: ABDO Publishing Company, pg.13.
[10] Steven Seefeldt, 2014, "Genetically Modified Organisms and Food", *University of Alaska Fairbanks*, vol. *94*, pg. 3.
[11] FAO, 2003," Genetically Modified Organisms and Aquaculture". *FAO Fisheries Circular, No. 989*, pg. 4, accessed from https://doi.org/10.1108/00346659410048901.
[12] Sarad E. Parekh, 2004, *The GMO Handook: Genetically Modfified Animals, Microbes, and Plants in Biotechnology*, New York: Springer Science+Business Media, pg. 40.
[13] Bill Freese, 2014, "The GMO Deception: (Chapter 36) Genetically Modifief Crops and the Intensification of Agriculture", from *The GMO Deception* by Sheldon Krimsky, New York: Skyhouse Publishing, pg. 36

gene, now elaborated in corns. The benefits of *Bt* are focusing on enhancing pests' resistance.[14] Despite all the positive impacts, critics have been given due to this issue for causing the high rates of monarch butterflies' larvae.[15]

c. GMO Negative Impacts

Although GMOs are proven to have a lot of positive returns to human lives, states' concerns are never eased. In fact there a few of negative impact classified from GMOs.

1) Human Health Risk

The concerns when it comes to health risk consist of allergies, poisoning, and antibiotic resistance.[16] On 2005, the National Research Arm of the Australian Government (CSIRO) Scientists reported that they have genetically engineered peas to be pests' resistance which caused an allergy that led to a lung failure to rats. Due to that minor testing, the long term project was abandoned. This fact has rises the doubt weather the same impact would occur with humans.

2) Habitat Change

GM supporters declared that GM Crops have indirectly contributed to forest conservation by allowing marginal land to be processed which prevents wood cutting in the forest that changes field soil position. The fact is, experience indicates that the process of GM crops have increased the change of soil usage.[17]

3) Pollution and Foreign Species Invasion

Agricultural modern practices applied in herbicide, pesticide, and fertilizer has causes severe damages in a big part of environments through out the world, especially water and soil[18] besides that, GM crops have introduced cross breeding between crops or natural plants that grows in the area. The genetic current alone is not a risk and several times are a part of a plant's development or evolution. But it is always to be kept it mind that these kind of evolution can possibly lead into an uncontrollable plant which end up to a risk of extinction due to the foreign species.[19]

2.3 GMO and the Precautionary Principle

The arguments of GMOs and the risks they carry are in spotlight between scientists. Scientists believe that the GMO works under the precautionary principle, because the GMO risks have a system. Two aspects of the system include spreading and the impact towards health and ecosystem. Ecologically, regarding to intended maintenance of soil and plants, GMO has its habit to spread without control thus the unknown risks.[20] Cross breeding of a plant type with GMOs prevents their freedom that directs to a very wide and irreversible system effect without knowing the flaws.[21] Precautionary measures that relates with GMOs consists of two requirements; appropriate science and supporting evidence as a part of valuing risks that has a role of introducing consequences from the GMOs.[22] Whenever science is proven unqualified, then precautionary approach takes actions. From a

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[14] Eliana M. G. Fontes, 2002, "The Environmental Effects of Genetically Modified Crops Resistant to Insects", *Neotropical Entomology*, vol. *31*, no. 4, pg. 499.

[15] F. B. Peairs, 2010, "Bt Corn: Health and the Environment", Colorado: Colorado State University, pg. 2.

[16] Nancy Mills, 2006, Genetically Modified Organisms, *Center for Ecogenetics & Environment Health*, pg. 314.

[17] Marlon Henkel, 2015, *21st Century Homestead: Sustainable Agriculture I*, pg. 30, accessed from https://books.google.co.id/books?id=bGLxCQAAQBAJ&printsec=frontcover&dq=marlon+henkel&hl=id&sa=X&redir_esc=y#v=onepage&q=marlonhenkel&f=false

[18] Sheldon Krimsky, S, 2002, *Environmental Impacts of the Releases of Genetically Modified Organisms*, Massachusetts: Encyclopedia of Pest Management, pg. 1.

[19] P. Kameri-Mbote, 2005, "Regulation of GMO Crops and Foods", Jenewa: *International Enviromental Law Research Center*, pg. 7.

[20] Renate Schubert, 2010, *Future Bioenergy and Sustainable Land Use*, London and Sterling: Earthscan, pg. 149.

[21] Simonetta Zarrilli, S., 2005, "International Trades in GMOs and GM Product: National and Multilateral Legal Frameworks, New York and Geneva: United Nations, pg. 42.

[22] Natalie Ferry, 2009, *Environmental Impact of Genetically Modified Crop*, Oxfordshire: CAB International pg.329.

practical implementation, the Cartegana Protocol on Biosafety (CPB) focuses on the precautionary aim. It states:[23]

"Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects of a living modified organism on the conservation and sustainable use of biological diversity in the Party of import, taking also into account risks to human health, shall not prevent that Party from taking a decision, as appropriate, with regard to the import of that living modified organism intended for direct use as food or feed, or for processing, in order to avoid or minimize such potential adverse effects."

3.4 Precautionary Principle: GMO's Link Between Research and Trade

The different premise of GMOs between CPB and SPS Agreement has always been a problem world wide. Both of them do underline GMO in the export-import activities, yet CPB treats GMO as a research matter, an environmental reason, while SPS Agreement takes GMOs and commercialize them as a part of the international trade. Society feels that SPS Agreement opposite perspective of GMO from the CPB could lead to very dangerous causes. They need one thing in common to act as a "bridge" between them. The answer is one: precautionary principle. The WTO states that SPS Agreement will prioritize international trade without neglecting the environment through risk assessments and risk managements performed by each country domestically. To understand how to vision precautionary principle as the link between research and trade, it is likely to learn of GMO regulations in CPB and SPS Agreement.

1. GMOs in the Cartegana Protocol on Biosafety (CPB)

The Cartegana Protocol on Biosafety (CPB) was entered into force on 11 September 2003, and it is the first international law that regulates genetic engineering specifically. The existence of this rule reflects the global concerns towards the safety, health, and environment risks. For the first time on the international law history, there is an implicit acknowledgement that inherited GMOs from different organisms can carry a different risk and biological hazard as well. As of that statement, the international community considered a regulation to this matter is very much needed. The CPB states that GMOs do have high chance of giving impacts to the biodiversity, human health, and social economy, where the impact mentioned has to experience risk assessments or policy calculations.

Precaution is the base of this protocol, which takes the form of a policy making or risk assessment.[24] CPB refers to "GMO" with the term of "LMO" or Living Modified Organisms, and it regulates the nature, transit, handling, and benefits of an LMO which could lead to minor issues when dealing with cultivation or sustainable biodiversity that is very risky to human health.[25] CPB divides LMO into two types of procedures; direct contacts with environment, such as seed for soil cultivation or animal breeding[26] and in forms of food, such as crops.[27] CPB underlines the clear information given during import-export of a GMO. There are a few rules and procedures that regulate information during and export-import activity:

1) The Biosafety Clearing House (BCH)

The BCH is the base of biological safety in the form of an internet forum.[28] The BCH consist of information of national law, regulation, and guidance in applying CPB as adding information of countries' reports that agree to import a GMO product.

2) Advanced Informed Agreement (AIA)

AIA only regulates objects of living organisms such as seed or a fish to grow in a new environment and breed to create a new natured of GMO generation.[29] Parties that export GMOs will give

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[23] Article 11 point 8 of the Cartegana Protocol: Procedurs for Living Modified Organisms Intended for Direct Use as Food or Feed or for Processing.

[24] Lim Li Lin, 2007, "Chapter 26: Cartagena Protocol on Biosafety" dari buku *Biosafety First*, Norwegia: Tapir Academic Publishers, pg. 2.

[25] *Article 4 of Cartegana Protocol.*

[26] Article 7(1) 0f Cartegana Protocol.

[27] Article 7(2) of Cartegana Protocol.

[28] See http://bch.biodiv.org

administrations to the receiving country. The country will either accept or reject based on the rules regulated by the AIA.

3) Simpler System of Agricultural Commodity

GMOs that are in form of food (crops) are regulated in a simpler version. States that agree to import GM Foods are likely to report in the BCH. The purpose of reporting is to maintain the international trading system transparency.[30]

2. GMOs in the Sanitary and Phytosanitary (SPS) Agreement

On the 1st January 1995, the Sanitary and Phytosanitary (SPS) Agreement is established on the same time as the World Trade Organization (WTO).[31] Originally, agreements that are relevant to GMO or particularly Genetically Modified Food (Labeling) are *The Agreement on Technical Barriers to Trade* (TBT Agreement) which regulates standards of production, process, packing, labeling and *The Agreement on the Application of Sanitary and Phytosanitary Measures* (SPS Agreement) that regulates measurements needed to protect the lives and health of humans, plants, and animals. TBT Agreement is a continuous action of SPS Agreement.[32] When it comes to giving standards, the SPS Agreement is known for the "three sister organizations" which are:

a. Codex Alimentarius

Standardization for food product or agriculture in the form of texts with relates to practice, labeling, additions, inspection, certification, nutrition, and pesticide.[33]

b. International Plant Protection Convention (IPPC)

This convention regulates phytosanitary protection and management that as a reference by nations to prevent contamination of plant illness towards environment.

c. *World Organization for Animal Health* (OIE)

OIE's roles is to provide recommendations based on scientific proof to measure prevention, management, and demolishing animal diseases including zoo noses, especially in an occasion where humans, animals, and environment interacts.[34]

4 Benefits of the GMO between Sates

1. Indonesia

Indonesia does not take advantage of GMO commercially, but is on their way. PT Perkebunan Nusantara is recently given permission by Indonesia's Ministry of Agriculture to introduce their products (GM Sugar) commercially. Indonesia does not have any exporting activities regarding to GMO. Although for import, Indonesia accepts tempeh, tofu, cotton, corn, and soybeans. Tempeh and tofu are a major part of food consumed in Indonesia. The main ingredients of both foods are soybeans. The rate of consume from soy beans is 2.7 million metric tons (MMT) which overcome 9% of Indonesia market. While soybean import are 4.3 MMT on 2014. As the 9th biggest cotton exporter in the world, Indonesia consumed 457 MMT, and corn takes place of consuming for 7.4 MMT. There are numerous of regulations that relate to GMO in Indonesia's national law:

a. Law No. 32 Year 2009 on Environment Protection and Management.

b. Law No. 18 Year 2012 on Food

c. Ministry of Agriculture Decree No. 856 Year 1997

d. Government Regulation No. 28 Year 2004 on Food Safety, Quality, and Nutrition

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[29] Aaron Cosbey, 2000, "The Cartegana Protocol on Biosafety: An analysis of Results", Kanada: International Institute for Sustainable Development, pg.1.

[30] *Ibid*, pg. 704.

[31] World Trade Organization, 2010, "The WTO Agreement Series: Sanitary and Phytosanitary Measures", Switzerland: World Trade Organization, pg. 3.

[32] Heike Baumuller, 2004, "Domestic Import Regulation for Genetically Modified Organisms and Their Compatibility with WTO rules", pg. 39, accessed from http://www.ris.org.in/images/RIS_images/pdf/abdr_July044.pdf

[33] Food and Agriculture Organization of the United Nations and World Health Organization, 2016, *Understanding Codex*, Rome: FAO and WHO, pg. 13

[34] Corning, S., 2014, "World Organisazion for Animal Health: strengthening Veterinary Services for effective One Health collaboration", vol. *33*, no. 2, pg. 641.

5 How do States Implement the Precautionary Principle?

1. Indonesia

The focus of precaution as an environmental law principle is when the cases of electric cable radiation and land slide.[38] There are three environmental principle acknowledged in Indonesia, that is polluter pay principle, prevention principle, and precautionary principle.[39] Law No. 32 Year 2009 on Environment Protection and Management (UUPPLH) regulates about precautionary principle on Article 2f. UUPLH also regulates an analysis of environmental impact that has to be fulfilled with every company or factor. The UPPLH article 47(1) and (2) stated.[40]

(1) Every business and/or activity that has a potential of effecting the environment, threatening the ecosystem and lives, and/or human safety and health, are demand to organize and analysis of environmental risk.

(2) Environmental risk analysis mentioned in point (1) consists of:

a. Risk assessment;

b. Risk management; and/or

c. Risk communication.

The precautionary principle can also bee seen in the Government Regulations No. 27 Year 2012 on environment permission and Government Regulations No. 5 Year 2012 on types of business that obligates to analyze environment impact.[41] The Ministry of Agriculture Regulation No. 61/Permentan/Ot.140/10/ on testing, evaluating, releasing, and withdrawing varieties of GM foods was created as a preventing action upon GM foods. Unfortunately, in this regulation there are no indication of precautionary principle, environment risk analysis, and environment permission. This is not relevant with the higher regulations such as CPB, UUPPLH, Government Regulations No. 27 Year 2012, and Government Regulations No. 5 Year 2012 and need a re-evaluation based on the principle of *lex superior derogate lege inferiori*.[42]

2. Korea

There are three environment regulations in Korea, but none of them have implemented the precautionary principle.

a. Framework Act on Environmental Policy (FAEP)1990 and *Natural Environment Conservation Act (NECA)1991*only introduce the prevention principle instead of precautionary principle, both of them does not mention lack of science and focus on the economic sides.[43]

b. Act on Impact Assessments on Environment, Transportation, Disasters (AIA) 1999 did not mention of the precautionary principle but rather an unclear version of sustainable development.[44]

3. Brazil

Precautionary principle is one of the environmental aspects that are very much deliberated. In Brazil, the implementation of this principle was taken seriously since the "RR Soy Bean" Case occurred. The

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[38] David Cole, 2005, "The Precautionary Principle-Its Origins and Role in Environmental Law", pg. 4 accessed from https://www.laca.org.au/images/stories/david_cole_on_precautionary_principle_EDO.pdf.

[39] Andri G. Wibisana, 2006, "Three Principles of environmental law: the polluter-pays principle, the principle of prevention, and the precautionary principle" from *Environmental Law in Development: Lessons from Indonesian Experience*, Massachusetts: Edward Elgar Publishing, pg.24.

[40] La Ode Angga, 2014, "Penerapan Prinsip Kehati-hatian dalam Kebijakan Perlindungan dan Pengelolaan Lingkungan Hidup di Bidang Pertanian Untuk Keunggulan Varietas Produk Rekayasa Genetik", *Supremasi Hukum*, vol. 3, no. 2, pg. 114.

[41] Pasal 3 ayat (1) dan (2) PP No. 27 Tahun 2012 tentang Izin Lingkungan.

[42] Wahyu Sasongko, 2013, *Dasar-Dasar Ilmu Hukum*, Bandar Lampung: Penerbit Universitas Lampung, pg. 29.

[43] See Article 7-2 of FAEP and Article 3(5) NECA.

[44] See Article 1 of AIA.

case involved *Instituto Brasileiro de Defesa do Consumidor* (ICED) that sues the National Technical Commission on Biosafety (CTNBio) [45]

ICED did not agree for the reaction CTNBio gave in provisioning the soy bean from Monsato without a proper standardization of precautionary approach. Brazil Court of District underlined that CTNBio should have taken *estudo de impacto ambiental* EIA seriously. EIA is a study to decide for a GM qualifications. On the other side, Brazil High Court was satisfied enough with CTNbio's administration as a form of precaution it self. Through this case, the government finally changed the authorities of provisioning a GMO. On November 2003, Brazil's President has established a biosafety law that demand CTNBio to take precautionary principle in giving provisions seriously [46]

4. German

The Vorsorgeprinzip Has a big role in making environmental law policies in Germany. Sometimes, the principle is the main reference in the national policies. Besides that *The Vorsorgeprinzip* has become a link between other principles. Cameron and Abouchar stated that *Verschelechterungsverbot* and correction at source is another special form of the vorsorgeprinzip [47]

Water management in German has included vorsorgeprinsip in a wide substance. But, for a few decades the principle is never adopted in energy resources management. Matter of fact, the environmental principle never taken places in the energy resources policies through the federal Energy Management Act/Energiewirtschaftsgesetz (EnWG). because of that, the energy resource policies are in deliberation of destruction, while precautionary principle can be seen in Article 2 (4) of EnWg. The Article declares the probability in minimizing environmental damage risks.

Table 1.1
Nations in Implementing Precautionary Principle

No.	Country	Benefit of GMO	*Cartegana Protocol*	*SPS Agreement*	*Precautionary Principle*
1.	Indonesia.	Accepted as food	Ratified through Law No. 21 Year 2004	Ratified through Law No. 7 Year 1994	Law No. 32 Year 2009, Government, Regulations No. 27 Year 2012, Government Regulation No. 5 Year 2012.
2.	Korea	Accepted as food	-	Ratified on 1 January 1995	Adapting
3.	Brazil	Accepted as food and feed	Ratified on November 2003	Ratified on 1 January 1995	CTNBio/EIA
4.	Germany	prohibit GMO	Ratified on November 2003.	Ratified on 1 January 1995	*The Vorsorgeprinzip*

From the table above, we can see that Indonesia, Korea, and Brazil support GMOs, but Germany does not. From four countries, only one does not embrace the precautionary principle, which is Koreas. The precautionary absence does not mean GMOs can be banned. While precautionary existence does not mean GMOs are welcomed.

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[45] Robert L. Paalberg, 2001, *The Politic Precaution. Genetically Modified Organisms in Developing* Countries, London: The John Hopkins University Press, pg. 77, accessed from https://books.google.co.id

[46] Lesley K. McAllister, 2005, "Judging GMOs: Judicial Application of the Precautionary Principle in Brazil", *Ecology Law Quarterly*, vol. *32*, no 1, pg. 173.

[47] *Ibid*

6 Conclusion

The GMO is regulated specifically by the Cartegana Protocol on Biosafety (CPB). The CPB underlines that due to research issue, GMO's are exported and imported by looking up to certain regulations such as Biosafety Clearing House, Advanced Informed Agreement, and simpler system agricultural commodity. Because of these high standards, it became a problem when GMO is commercialized through the Sanitary and Phtyosanitary (SPS) Agreement with presumption of minor qualifications. Precautionary principle came through between these regulations that takes both CPB and SPS Agreement on the same page. This is proven by SPS Agreement which acts through risk assessment and management. The SPS Agreement also has international standard organs which are Codex Alimentarius (food), International Plant Protection Convention, World Organization of Animal Health.

Every country has its own ideas on GMOs; Indonesia, Korea, and Brazil support the GMOs, while Germany prohibited the GMOs. As for implementing the precautionary principle, nations implement by adopting through their national law; Indonesia (environment management act, government regulations No. 27 year 2012, and government regulations No. 5 year 2012), Korea (still adapting), Brazil (CTNBio and *estudo de impacto ambiental*), and Germany (The Vorsorgeprinzip). Out of four countries, only one does not embrace the precautionary principle, which is Korea. The precautionary absence does not mean GMOs can be banned. While precautionary existence does not mean GMOs are welcomed. This means that the precautionary principle is not permission or requirement for GMO to be acknowledged in countries, that precautionary principle are an effort to minimize risk whenever it is "intended" not "automatically".

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