An Investigation of Biodiversity and Genetic Resources: The Importance of Legal Protection in Indonesia

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Abstract

Indonesia has great biodiversity's and genetic resources and essential natural resources due to its utilization by industry activities as the second largest megadiversity country. However, industrial activity is identically vulnerable in causing biopiracy continuous use and detrimental to the community. The convention on biological and Nagoya protocol have recognized the protection of biodiversity and genetic resources through accent and benefit-sharing. Of these, Indonesia has ratified two international arrangements supported in protecting biodiversity and genetic resources. In line with the issue, the present study aims to analyzes the importance of protecting biodiversity and genetic resources in Indonesia. The result of the study indicated that two reasons underlie the need to preserve biodiversity and genetic resources, i.e., increasing economic value and reasons for moral rights to communities around biodiversity and genetic resources. In conclusion, the legal protection of biodiversity and genetic resources is crucial for Indonesia. As an island nation, Indonesia has a very strategic position with a wealth of natural resources and high endemic species of flora and fauna. The richness of biodiversity and genetic resources includes genetics, species, to a variety of unique ecosystems. In addition, the use of biodiversity and genetic resources in the activities of the cosmetic and pharmaceutical industries has increased the economic value that can bring prosperity to the community.

Keywords
Biodiversity, genetic resources, legal protection and genetic resources protection theories.

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1. Introduction
The meeting of countries in Rio de Janeiro, Brazil, in 1992 succeeded in signing the CBD to support countries for the protection of biodiversity and genetic resources. In 2010, at the 10th meeting of CBD members in Nagoya, Japan also

succeeded in signing the Nagoya Protocol to implement the principle of access to biodiversity and genetic resources through fair and balanced benefit-sharing (Vogel, Álvarez-Berríos, Quiñones-Vilches & Medina-Muñiz, 2011). Indonesia has ratified the CBD in 1994 and the Nagoya Protocol in 2013. Indonesia is a megadiversity country with the second-largest biodiversity and genetic resources in the world after Brazil. It located in the biodiversity distribution trajectory of the Asian continent (Java, Sumatra and Kalimantan) and the Australian continent (Papua Island), as well as the distribution of the Wallacea transitional area (Sulawesi Island, Maluku and Nusa Tenggara). Although Indonesia covers only 1.3 per cent of the world's total land area, it has 22,215 fauna species and 35,000 flora species (Setiawan & Alikodra, 2001). The diversity of Indonesia's biodiversity and genetic resources has become an economic potential for the country's development. This article analyses the importance of protecting biodiversity and genetic resources in Indonesia.

2. Materials and Method

The method in this study uses normative law with a legal approach. The data in the study refers to international agreements that apply in Indonesia. The research conducted by tracing relevant legal materials based on the similarity of methods, focusing on the topics discussed and analyzing the literature review results.

3. Result and Discussion

Table 1. Plant Species Used by Indigenous Peoples In Indonesia

No	General Name	Scientific Name	Function	Society
1	Gondopuro	*Gaultheria Punctata BL*	Reducing fever, antipyretic	Jawa tengah, Sulawesi
2	Daun wungu	*Graptophyllum Pictum*	Ambient	Banjar (Kalimantan Selatan)
3	Daun Sogo	*Arbus Precatorius Linn*	Blisters on the gums, sky, tongue	Jawa, Sulawesi
4	Jarong	*Achyranthes Aspera*	Fever, Tonsils	Jawa, Kalimantan, Sulawesi
5	Legetan warak	*Adenostemma Lavenia*	Toothache, rheumatic	Jawa, Kalimantan
6	Lenkuas kering	*Galanga (L.) Swarts*	Fungus, Diarrhea	Sumatera selatan; Bali
7	Pule/Babakan pule	*Alstonia Scholaris*	Deworm, Malaria	Bali; Tolaki(Sulawesi Tenggara)
8	Mungsi	*Artemisia Cina Berg*	Antiseptic, menopause	Jawa tengah
9	Sambiloto	*Andrographis Panicurata*	Stroke, Headache, Rheumatic, antiseptic	Banjar (Kalimantan Selatan); Pekurahua(Sulawesi Selatan); Lampung
10	Buah Cangkok	*Schima Wallichii*		Kalimantan, Lampung

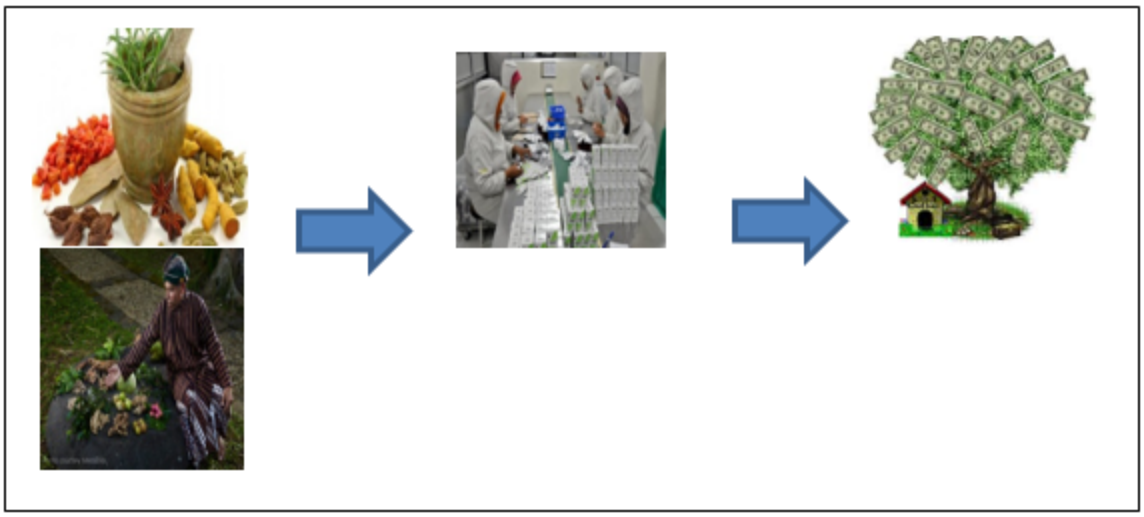

Figure 1. Use of biodiversity and genetic resources for the pharmaceutical industry

3.1 Protection Theories of the Genetic Resources

The legal protection of genetic resources in Indonesia is important. The idea of state sovereignty was pioneered by (Bodin & Jean, 1992), they assert that sovereignty as a state power, not shared with other authorities, and not limited by anyone, is eternal as long as the state still exists and does not come from a power higher. The highest power lies with the state, and the state regulates the lives of its members of society. He is also in charge of formulating laws, including developing rules to protect genetic resources (Tooley, Froud Williams, Boatman, Holland, Davies, Chaney, & Sparks, 1999). The sovereign state over its territory emphasized by Oppenheim-Lauterpacht that, *"As all persons and things within the territory of a state full under its territorial supremacy, each state has jurisdiction over them".* State sovereignty becomes a state power in three aspects: 1. the element of autonomy has the freedom to act 2. aspects of natural resource control within the region and any external actions that are considered a threat, e.g., inspiration. 3, aspects of the legitimacy of the right to formulate laws and decide cases that occur (Litfin, 1997). Second, the sociological jurisprudence theory is one of the legal, philosophical schools pioneered by Eugen Ehrlich and Roscoe Pound. In sociological jurisprudence, the law functions as a tool for reform and a means to ensure order and legal certainty. The law favours providing economic benefits to individuals, but there need to be norms that regulate how to provide help. So, the formulated laws must pay attention to the rules contained in the community (living law) and reflect the values in society, written and unwritten values (Mousourakis, 2017).

3.2 Ownership of Genetic Resources

Many people are interested in access and benefit-sharing, referring to interested people who are directly involved and curious people who are indirectly involved. Stakeholders who are directly involved are providers and users involved in the access and benefit-sharing agreement. Meanwhile, interested people are indirectly affected, including those interested in the entrance and benefit-sharing agreement results. However, it is not involved with the implementation of the accords in a typical way, for example, non-governmental organizations representing the interests of a group of people who have an indirect interest (Guay, Doh & Sinclair, 2004). In general, there are four categories of people with interest, namely national/local governments, research and industrial institutions, communities/community organizations (Shahmirzadi, 2012). Each category may include individuals, community groups, organizations, or institutions from developing and developed countries directly affected by access to biodiversity and genetic resources. The national/regional government is an interested person who the CBD authorizes to protect genetic resources in its territory. He is responsible for formulating and implementing laws relating to access and access and benefit-sharing at the national level.

Second, researchers and research institutes. As a person with interest in access and benefit-sharing, it has activities to access genetic resources in the community area and provide activities that involve genetic resources in research. Usually carried out in the scope of gene resource exchange or technology transfer. So, researchers and research institutions are a strong interest in access to genetic resources (Afreen & Abraham, 2008). Third, industry. Major commercial users of genetic resources. Access to genetic resources usually occurs singly or in collaboration, as a

person with interest in the access agreement and benefit-sharing who is interested in the allocation of access. The industry has the technological power to choose countries with relatively safe access and benefit-sharing arrangements and robust institutional approaches (Laird & Wynberg, 2005). Fourth, indigenous peoples. As people interested in the access and benefit-sharing agreement, indigenous peoples will be represented by groups or organizations that negotiate on behalf of indigenous peoples to access genetic resources and traditional knowledge in indigenous peoples' territories. Indigenous peoples have an interest in access, which requires prior informed consent (Ten Kate & Laird, 1999).

3.3 Fundamental Principles of the Convention on Biological Diversity and the Nagoya Protocol

The Nagoya Protocol reaffirms the CBD principle to support access and benefit sharing in the use of biodiversity and genetic resources under the CBD. There are four main principles in the CBD: the principle of state sovereignty, the focus of Mutual Agreed to Terms, the declaration of Prior Informed Consent, and the guide of Access and Benefit Sharing (Oyewunmi, 2013). First, the principle of state sovereignty empowers all countries as CBD to protect and oversee the use of biodiversity and genetic resources within their territories (Fowler, 2001). Article 3 of the CBD gives every country the right to make laws and police to protect biodiversity and genetic resources (C Anton; 2012). It is also responsible for access to biodiversity and genetic resources to ensure their preservation and continued use within their territory (Aguilar, 2001). State sovereignty empowers the state to enact legislation on access to biodiversity and genetic resources administered by the national government (Mikail & Zainol, 2018). Section 15(1) of the CBD emphasizes that recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to federal legislation. The designation of article 3 and article 15(1) of the CBD, clearly recognizes the power of the state to oversee access to biodiversity and genetic resources. It gives power to the state in controlling access to biodiversity and genetic resources (Meyer, Cariño & Ling, 2013). Emphasis is given to the national government to formulate legislation on access to biodiversity and genetic resources.

Second, the principle of Mutual Agreed Terms is an agreement made in access to biodiversity and genetic resources. Article 15(4) emphasizes that granting access to biodiversity and genetic resources must be based on mutual understanding. It used to obtain permission to access biodiversity and genetic resources and limit benefit sharing.
Third, the principle of Prior Informed Consent is the access requirement as stated in article 15(5) of the CBD. There must be permission based on prior informed consent. It intended that the user in the access and benefit-sharing agreement must notify the provider before using biodiversity and genetic resources. The provider can accept, or decline based on the information provided by the user. Fourth, the principle of access and sharing of benefits is one of the goals of the CBD. That access and benefit-sharing refer to two issues. First, the goal is to ensure the benefit-sharing from the use of biodiversity and genetic resources. And second, the goal is to allow local users or legal owners to obtain benefit-sharing from the commercial use of biodiversity and genetic resources (Lewis, 2010). Thus, users need to share fair and balanced benefits with the supplying country, including technology transfer.

3.4 Bio-economic Interests and Moral Rights

Two primary interests need protecting in developing biodiversity and genetic resources by industries that enjoy commercial results. First, as an economy, biodiversity is an essential commodity in the industrial sector. The genetic resources and retail trade in biodiversity exploration in technology research (Aguilar, 2001). This condition has resulted in pharmaceuticals, plant medicines, agro-biotech, horticulture, beauty and beauty products with high economic value (Venkataraman, 2008). Bioprospecting activities in various countries have also increased the use and demand for biodiversity and genetic resources. In indigenous 'san' tribal areas in the Kalahari region of South Africa, Botswana and Namibia. They live in remote areas and live in poverty. The San Tribe have used the Hoodia plant as an appetite suppressant for hundreds of years as food on hunting expeditions. Research institutes and industries in South Africa became aware of the plant through a publication in 1937 by a Dutch ethnobiologist (Van Wyk, & Van Staden, 2002). Bioprospecting activities in the Mayan community were living in Chiapas, Southern Mexico. They have a long history of using plants for therapeutic purposes. In the 1990s, the Maya Biodiversity International Cooperation Program established. It is a joint project between a researcher at the Mexican Academic Institution, a biotechnology company and a non-governmental organization representing the Mayan community. Under this project, it agreed that the Mayan community would receive one-fourth of the royalties and co-ownership of any research. Bioprospecting activities in the Maya are an example of increasing biodiversity and genetic resources (Ten Kate & Laird, 1999).

The pharmaceutical industries have also intensively used biodiversity and genetic resources in high-cost research. The contribution of herbal medicines from biodiversity and genetic resources by the pharmaceutical industry reaches 50 per cent of drugs globally, such as leukaemia drugs. The sale of vinblastine for Hodgkin's disease and vincristine is obtaining from tread specimens found in Madagascar. It generated over 200 million US$ in one year for Eli Lilly Corporation as a manufacturer in the United States (Torrence, 2017). Second, the importance of protecting biodiversity as a moral right in the universal teachings of Nature Law shows the treatment of moral values (Howse & Langille, 2012). Grotius asserted that morality is based on considering the human mind or mind, which can show what is right and what is not. Good reasons and actions have a moral quality (Crouch, 2012). In the view of modern teachings, morals give equal treatment to anyone and are not discriminatory. In protecting biodiversity and genetic resources as a gift from God, morality refers to the meaning that it is a mistake to unfairly use biodiversity and genetic resources (Stenson & Gray, 2018). Thus, protecting biodiversity and genetic resources is a moral responsibility. Protection of Indonesian genetic resources are an important thing to do. It needs to regulate the national legal system for the welfare of the people, especially the Indonesian people.

4. Conclusion

Legal protection is necessary primarily to protect genetic resources by region, where Indonesia as an island nation has a very strategic position with a wealth of natural resources and high endemic species of flora and fauna. The richness of biodiversity and genetic resources includes genetics, species, to a variety of unique ecosystems. The use of biodiversity and genetic resources in the activities of the cosmetic and pharmaceutical industries has increased the economic value that can bring prosperity to the community.

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