Research Article

Biopiracy and the Regulatory Framework for Material Transfer Agreements in Indonesia

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ABSTRACT

Biopiracy, the misappropriation of biological and genetic resources including the ones related to traditional knowledge, is a major challenge to some of the world's megadiverse countries. Indonesia has been a major victim of biopiracy, facilitated by the current patent system. This article examines the case of Indonesia, the second richest of the seventeen identified megadiverse countries. The patent system aims to protect the rights of inventors, but the patent system causes injustice in cases of biopiracy. This research aims to analyse the Indonesian government's policies in dealing with biopiracy cases in Indonesia. This research is a normative legal research which uses the approaches of national and international law, biopiracy case, and conceptual. The Indonesian government has changed the patent law to deal with biopiracy cases through Law Number 13 of 2016 concerning Patent disclosure requirements and has also introduced the Material Transfer Agreements (MTAs) in 2009 to address this problem. They can help in controlling access to the country's resources based on prior informed consent, promoting collaboration between local and foreign researchers, and ensuring benefit-sharing. However, the realization of these objectives may be undermined by the country's lack of capacity to monitor compliance with the MTA conditions, the inappropriate use of Intellectual property rights (IPRs), and MTA provisions that allow recipients to transfer material and derivatives to third parties without the country's consent.

Keywords: Biopiracy; MTA; Genetic Resources; Indonesia.

A. INTRODUCTION

Biopiracy is a phenomenon that has started to get international attention recently (Sahu & Amin, 2022). It is the appropriation of the knowledge and genetic resources (GRs) of farming and indigenous communities by individuals or institutions who seek exclusive monopoly control (patents or intellectual property) over these resources and knowledge (Hamilton, 2008) without their prior informed consent and the payment of fair and equitable compensation to them (Dutfield, 2009); (Robinson 2010); (Zainol et al, 2011a); (Oldham, Hall, & Forero, 2013).

The Intellectual Property Rights (IPRs) have routinely been used to legitimize the exclusive ownership and control of utilization of biodiversity products and processes already known to and used by local communities for centuries (Dutfield, 2000); (Hamilton, 2006); (Reid, 2009). One major Intellectual Property (IP) tool used to legitimize biopiracy is patent. The main goal of the patent system is to encourage the disclosure of new inventions that benefit society (Larroyed, 2018), instead of protecting patented inventions from misappropriation. Instead, they have used the patent system as a

device for legitimizing ownership claims over plants, genes, and other biological products, as well as associated Traditional Knowledge (TK) appropriated from their local holders and guardians without consent and compensation (Dutfield, 2004).

Intellectual property rights play the important role of protecting biological genetic resources from being stolen by other countries and promoting the access and benefit sharing of biological genetic resources (Luo, 2021). Noteworthy, patent rights are also available for the protection of biological and genetic material. For example, The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) Art. 27(3) (b) requires the Member States to protect plant varieties through the grant of patents, sui generis system, or a combination of both.

Indonesia is one of the seventeen megadiverse countries in the world (the Conservation International, 1998), which harbors more than 70 % of the world's species (the Australian Department of the Environment and Heritage, 2001). As one of the most endowed megadiverse countries worldwide, Indonesia has been a common target of biopiracy. Its stock of biological and genetic resources, as well as TK, is frequently the subject of appropriation by unauthorized parties.

This research is analyzed based on the theory of state sovereignty which is a fundamental concept in political science and international relations, emphasizing the supreme authority and autonomy of nation-states within their territories (Agnew, 2020). Nation-states have the right to exercise control and authority within their recognized borders, including the enactment and enforcement of laws (Kammel et al, 2023). Concerning access to biodiversity and genetic resources, the Convention on Biological Diversity (CBD) in 1992 promotes the idea that each country has sovereignty over its genetic resources (Soto, 2022). To protect genetic resources and to prevent biopiracy, Indonesia has included the requirement of the Disclosure of Origin (DO) in the Indonesian Patents Act of 2016 by imposing patent applicants to disclose the origins of genetic resources in patent applications (Rahmah, Barizah, & Blay, 2020).

In addition, more technical government efforts to prevent biopiracy are accommodated through the provisions of material transfer agreements. The government has introduced the provisions of the Material Transfer Agreements (MTA) of 2009, consistent with the CBD and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) of 2001. The MTA regulate the transfer of biological and genetic material between Indonesia, as a provider, and the recipients of such material. They specify the terms and conditions for the transfer of material, such as the prior informed consent of the provider, as well as the fair and equitable sharing of the benefits derived therefrom.

Discussing biopiracy, a study focused on

the impact of biopiracy on traditional knowledge in India. The various case studies of Biopiracy showed the misuse of traditional knowledge has to a great extent. The misuse of this traditional knowledge had witnessed not only the loss of the individual but also the economy of the country (Sahu, & Amin, 2022). One of the studies examined the necessity of moving from biopiracy to collaboration in terms of protecting traditional medical knowledge. it states that the best mechanism to protect traditional medical knowledge is through a combination of documenting knowledge, imposing patent disclosure requirements, and requiring access and benefit-sharing agreements. Indigenous communities can obtain control over their knowledge (Reed, 2022). Regarding biopiracy in Indonesia, previous research has discussed the changes to Patent Law number 13 of 2016 in which there are provisions regarding disclosure requirements of the origin of genetic resources in patent applications (Masrur, 2018). Similarly, Rahmah, Barizah, and Blay also discuss that Indonesia has included the requirement of DO in the Indonesian Patents Law of 2016 by imposing patent applicants to disclose the origins of genetic resources in patent applications. It also recommends that to combat biopiracy effectively Indonesia needs to review its legislative and institutional framework on DO and to consider establishing a National Anti-Biopiracy Commission (Rahmah, Barizah, & Blay, 2020). The previous research (Amalia, & Aritonang, 2023) discuss the urgency of the Commercial Material Transfer Agreement (CMTA), but it was analyzed based on national private law and did not cover internationally. This study outlines an example of CMTA provisions in Indonesia in the Regulation of the Minister of Health of the Republic of Indonesia of 2020.

This article examines some of biopiracy cases experienced by Indonesia and shows how the patent system has helped in facilitating them. In addition, it analyzes Indonesia's MTAs to determine their effectiveness in attaining expected results, especially the curbing of biopiracy. This research was analyzed in the regulatory framework of MTAs both under international and Indonesian laws.

B. RESEARCH METHODS

This research is a normative legal research with a statutory approach in the form of national and international laws, a conceptual approach with its legal concepts, especially in the field of IPR, and a case approach of biopiracy cases in Indonesia. This research used secondary data sources in the form of library research and documents in the form of literature both legal and non-legal materials. The data for this study were collected from the Worldwide Espacenet of the European Patent Office (EPO Espacenet) and relevant literatures from primary and secondary legal sources, which were then analyzed qualitatively.

C. RESULTS AND DISCUSSION

1. Biopiracy and IPRs in Indonesia

As explained in this article, Indonesia is one of the world's biodiversity hotspots. Not surprisingly, it has also been a major victim of biopiracy. In several cases, Western and Japanese companies, without obtaining Indonesia's prior informed consent concluding benefit-sharing arrangements or disclosing the source of origin to patent offices appropriated the country's biological and genetic resources including TK, laid patent claims to them. Those resources include herbal spices, *tempe* (soycake) (GRAIN, 1998), and *temulawak*, also called wild ginger (Purba, 2001); (Metrotvnews, 2010). An EPO Espacenet patent search revealed that Shiseido, a Japanese cosmetics company, that uses spices for the production of beauty products, filed, at least, twelve patent applications for their inventions involving the use of Indonesia's spices (EPO Espacenet).

The same search showed that Indonesia's *tempe* was the subject matter of, at least, six patent applications in Japan and thirteen in the U.S. It was also found that, at least, two patents on Indonesia's wild ginger had been issued in Japan. These resources and associated TK were taken away from the Indonesian people by foreign companies, which modified them through modern biotechnology and subsequently claimed patent rights in them as new inventions. There were neither discussions with the Indonesian people nor were benefits shared with them. In this way, foreign entities can exercise exclusive ownership and control over the country's biological and genetic resources, including TK, with the patent system as a legitimizing instrument.

Perhaps, the most widely reported Indonesia's biopiracy cases in recent times are the patenting of bird flu samples originating from that country. In 2005, Indonesia suffered an outbreak of a new strain of the H5N1 virus that commonly infected birds with influenza ('bird flu'). This virus, which can be transmitted from birds to humans, infected poultry and claimed several human lives. In response to the crisis, Indonesia shared flu viruses isolated from human victims with the Global Influenza Surveillance Network (GISN). The GISN is an influenza network of the World Health Organization (WHO). It obtains and classifies viruses, identifies those useful for vaccine production, and distributes them as appropriate. For this purpose, it maintains several laboratories called the WHO Collaborating Centers located in Australia, Japan, Hong Kong, Indonesia, the U.S., and the UK. The U.S. hosts the largest of these laboratories, which is the Centers for Disease Control (CDC) in Atlanta, Georgia as an arm of the U.S. Department of Health and Human Services.

The GISN sent the flu viruses received from Indonesia to WHO laboratories in Hong Kong and Atlanta. Having been selected for vaccine production, they were distributed freely by WHO laboratories to companies and other researchers mostly in developed countries,

without any MTAs or restrictions on patenting (Hammond, 2009). By the end of 2006, Australia had made a vaccine from the H5N1 virus samples obtained from the WHO Collaborating Center in Indonesia. In addition, the U.S. and European companies claimed patent rights in the bird flu vaccines, including the vaccine strain from Indonesia. For example, the EPO Espacenet patent search showed that patent claims involving Indonesian strains of bird flu vaccines were filed by U.S. vaccine companies, Hawaii Biotech Inc. and Novavax Inc. Another U.S. company, Protelix Inc., also filed for a patent (Third World Network Report, 2007). Surprisingly, two WHO laboratories in the U.S., the CDC and St Jude's Children's Research Hospital, also made some patent claims over the vaccines (Hammond, 2009).

Thus, although Indonesia owned the bird flu viruses, the benefit went to companies in developed countries which used them to produce patented vaccines that were not available to bird flu victims in Indonesia. In the end, despite claiming to be a WHO global framework for cooperation in health matters, the GISN came across as an agent for virus collection and an extended research unit for major vaccine companies in developed countries, to which it supplied free samples (Hammond, 2009). The patent holders failed to recognize Indonesia's sovereignty over its virus strain, to obtain its prior informed consent, and to conclude fair and equitable benefit-sharing arrangements with the country. It should be remembered that Indonesia supplied the viruses not to the vaccine-producing companies, but to WHO, as part of a global effort to tackle the flu crisis. Unfortunately, in the process, the country lost all legal rights to control its genetic resources due to the nature of the GISN, which transferred such control to foreign companies without any legal safeguards, as well as the patent system that enabled those companies to legitimize their claims.

Consequently, Indonesia was left in an awkward situation when it had to buy vaccines produced from its resources with citizens dying because they could not afford the costs of those vaccines. As a result of this injustice, Indonesia stopped sharing virus samples with the WHO in 2007, refusing to continue cooperation until the WHO system is reformed (Wilkie, 2012). It objected to the patenting of viruses submitted to the GISN, demanded better access to flu vaccines, and called for the use of MTAs. In 2011, WHO Members finally adopted an agreement on the sharing of influenza viruses (IP Watch, 2011). Pharmaceutical companies agreed to pay 50% of the cost of administering the global influenza monitoring scheme and to supply 10% of vaccines and antiretrovirals to developing countries, amid complaints that these concessions were far too insignificant (Third World Network, 2011); (Zainol et al, 2011b). The next section of this article examines the meaning of MTAs and their status under international law. This provides a basis for the consideration of

these instruments under Indonesian law. Before proceeding with that task, it should be clarified that, with this article's emphasis on the use of patents to perpetrate biopiracy, the same charge can be leveled at plant variety rights (PVRs), and even more so, since they are not subject to the nonobviousness requirement applicable to patents (Robinson, 2010). As mentioned earlier, the Agreement on TRIPS Art. 27(3)(b) permits the protection of plants through a *sui generis* system or in addition to patents. Some courts have also endorsed the extension of patents and PVRs to plants. Since TRIPS offers no guidance on what form a *sui generis* system may take, a controversy has arisen between developed and developing countries, with the former pointing to the International Union for the Protection of New Varieties of Plants (UPOV) (UPOV, 1991). as the *sui generis* mechanism mentioned in TRIPS.

Like TRIPS, UPOV, which has been incorporated into many domestic laws, permits the protection of plants through patents and PVRs. Successive amendments to the original UPOV (1961), which were affected in UPOV (1978) and UPOV (1991), made the acquisition of PVRs easier. Under UPOV (1961), a new plant variety only needed to be distinct, uniform, and stable to be protected, while UPOV (1978) provided that the distinctiveness requirement was met, if the new variety demonstrated just one 'important' new physical characteristic. There was no need to show genetic novelty. Despite the relative ease of this requirement, UPOV (1991) dispensed with the word, 'important,' meaning that a new variety is needed only to show a new physical characteristic that distinguishes it from a parent variety. To allay concerns, UPOV (1991) introduced the notion of 'substantially derived varieties,' meaning that a new variety substantially derived from an existing variety; without the owner's consent, it would no longer be protected (Sanderson, 2009)

That change did not mean much because the phrase, 'predominantly derived' was not defined. As a whole, the application of that test has been fraught with difficulties, especially for less technically equipped local holders. As Sanderson (Sanderson, 2009) explains, scientific methods like the 'Jaccard statistical distance,' measures the level of physical similarities between a previous variety and a new one. The Heckenberger approach (Heckenberger et al, 2005), which measures the degree of genetic similarity, is undermined by several factors. These include the peculiarities of plant species and discrepancies in research methodologies, which lead to inconsistent readings on the levels of physical or genetic similarity (Rahman, Hussain, & Zafar, 2002) ; (Staub, Chung, & Fazio,2005). Furthermore, plant breeders could circumvent these techniques by using 'molecular marker profiles.' This ensures that derived varieties register lower levels of genetic similarity than the threshold required to find substantial derivation, even with the presence of substantial qualitative similarity (Donnenwirth, Grace, & Smith, 2004)

What has been mentioned above relates to protected varieties. It is challenging for the owners of protected varieties to establish misappropriation claims against the breeders of new varieties. Needless to mention, the situation is far worse for local holders whose plant varieties are not even protected by the current IP system with which they are not familiar. Where their seeds have been pirated by plant breeders, they would not find it easy to prove substantial derivation. First, the inherent distinctiveness of plant species and the methodological difficulty encountered in attempting to differentiate between original varieties and their derivatives present problems. Second, breeders could tinker with pirated seeds to ensure that derivatives exhibit limited genetic similarity, even when they are not significantly different from the original seeds in qualitative terms.

To overcome the scientific limitations discussed above, the courts have devised a method, which considers not only the extent of genetic similarity but also the degree of qualitative similarity between an existing variety and a new one. If the latter is not significantly inventive, based on functionality and utility, it would be adjudged to have been substantially derived from the former (Sanderson, 2009). This test was applied in *Astée Flowers v. Danziger 'Dan' Flower Farm*, (Heckenberger et al, 2005) in which the court held that, based on the evidence, there was genuine breeding. N**o**twithstanding, a judicial option would be too costly for local holders, who may also find it onerous to meet the qualitative test applied by the courts. In reality, breeders who have derived new varieties from seeds pirated from local holders could easily secure protection since they need only demonstrate that the derived varieties are distinct, uniform, and stable. A single physical difference would be sufficient to establish distinctiveness. Robinson (Robinson, 2010) offers the example of how breeders in the U.S. state of Texas successfully obtained plant variety protection for a mild habanero pepper, even though it was substantially derived from a mild variety purchased in Bolivia by an official of the U.S. Department of Agriculture. That official subsequently took the plant to the Department's Plant Genetic Resources Conservation Unit in Griffin, Georgia where it was accessed by Texan breeders and subsequently crossbred with a hot habanero variety obtained from Mexico. Overall, patents and PVRs tilt in favor of foreign users, who are more able to fulfill the criteria for securing them. These rights are strengthened by genetic use restriction technologies (GURTs) through which plant breeding companies, particularly Monsanto, can render seeds sterile after each planting season (Zainol, Rohaida, & Akpoviri, 2015). This prevents local farmers from saving and reusing seeds historically bred and nurtured by them.

2. Patent Law's Disclosure Requirement

Article 15 of the CBD has regulated two main things, namely: Recognition of the sovereign rights of countries over natural resources located in

their territories, and Authority to determine access to genetic resources located in national territorial areas. As well, based on the sovereign rights of states over their biological resources, Article 15(1) states that the right to grant access rests with national governments in provider countries, and is subject to their national legislation. And, to ensure the equitable sharing objective stipulated in Article 15(7) (Zainol et al, 2011a). Therefore, Article 15 of the CBD recognizes sovereign rights over genetic resources but requires that states 'shall endeavor to create conditions to facilitate access to genetic resources'. Access to resources is balanced with access to biotechnology. States shall take legislative measures providing access to technology and the sharing of benefits arising from the utilization of these resources as confirmed under Article 16.

The principle of state sovereignty rights is also confirmed in the Nagoya Protocol in access to biodiversity, genetic resources, and benefit sharing (Yulia, & Zainol, 2013). Article 6(1) of the Nagoya Protocol, states that: "In the exercise of sovereign rights over natural resources, and subject to domestic access and benefit-sharing legislation or regulatory requirements, access to genetic resources for their utilization shall be subject to the prior informed consent of the Party providing such resources that is the country of origin of such resources or a Party that has acquired the genetic resources by the Convention unless otherwise determined by that Party". This provision shows that the state is the holder of sovereignty and can regulate access and distribution of benefits for the use of biodiversity and genetic resources through statutory regulations, taking into account the state's obligations given by the CBD. So internationally, under the CBD and the Nagoya Protocol, states have recognized the authority to regulate access to biodiversity and genetic resources based on the principle of state sovereignty.

Indonesia as a country that has 5.1 million biodiversity requires provisions regarding the protection of Genetic Resources in the Intellectual Property Rights system, and Law Number 13 of 2016 concerning patents includes provisions regarding patents derived from genetic resources (Masrur, 2018). Law Number 13 of 2016 concerning Patent has regulated disclosure requirements. Patent applicants are required to disclose the origins (DO) of the GR by the laws of the source country. It is mainly used in the process of applying for intellectual property rights to prevent the acquisition of genetic resources based on theft or other illegal means (Chen, 2019). The DO ensures transparency within the patent system and facilitates the monitoring of genetic resource utilization (WIPO, 2023). Technical regulations are needed on access to genetic resources and benefit sharing so that the recognition of genetic resources as communal intellectual property should have an impact on the welfare of local communities (Susanti, 2021).

This provision aims to ensure that the genetic resources used are not recognized by

other countries and to support Access Benefit Sharing (ABS) (Explanation of Article 26 Paragraph (1) Patent Law 2016). Patent rights may be waived through a court decision if the requirements for disclosure of the origin of genetic resources and/or traditional knowledge are not fulfilled (Article 132 Paragraph (1) Patent Law 2016). Disclosure of Information on genetic resources and benefit sharing as referred to in the Patent Law is in line with the Nagoya Protocol, namely access and benefit sharing to the use of genetic resources including their utilization or commercialization and derivative products; access to genetic resources promotes state sovereignty and is adapted to national law based on the principle of prior informed consent (PIC) with owners or providers of genetic resources; and prevent biopiracy.

3. MTAs and their Status under International Law

The MTA is a contract between a provider of genetic or biological material and the recipient of that material. The use of MTAs originated in the industrial sector but is now prevalent among other entities, including governments and research bodies (Rodriguez et al, 2007). The MTA is a contract securing the legal transfer of tangible research material between organizations such as laboratories, pharmaceutical companies, or universities (Van Wichelen, 2023).

The MTAs define the rights of all parties involved in the transfer of material, including third parties. Noncompliance with their terms could amount to a breach of contract resulting in a claim for damages (Barton, & Siebeck,1994). Specifically, they confer on recipients the license to use biological and genetic material. They ensure that providers as well as recipients are clear about the terms and manner of use. The MTAs regulate matters spanning the ownership of products derived from the use or modification of licensed material, including rights to inventions and other research results; the sharing of benefits; limitations on use; transfer of risks; and confidentiality of information concerning such material (Bennett, Streitz, & Gacel, 2007). They can serve as useful mechanisms for developing countries and their local communities to ensure consented and beneficial transfers of resources, as well as the promotion of research and development, consistent with CBD objectives (Putterman, 1996).

The CBD proclaims states' sovereignty over their genetic resources. According to Article 2, genetic resources refer to 'genetic material of actual or potential value.' Under this article, 'genetic material' is defined as 'any material of plant, animal, microbiological or other origin containing functional units of heredity.' In essence, the Convention applies to seeds and cuttings, as well as DNA extracted from a plant, such as a chromosome, gene, plasmid, or any part thereof, for example, the promoter part of a gene (Blakeney, 2005). The CBD's objectives are to ensure the conservation and sustainable use of

biological resources, and for access to those resources to be based on the prior informed consent of provider states. The Convention also demands that the results of research and development, as well as the benefits derived from the commercialization and other uses of genetic resources, be shared fairly and equitably between provider states and recipients of genetic material, based on mutually agreed terms. This calls for a negotiated agreement between both parties.

The CBD is reinforced by the Nagoya Protocol (NP) of 2010, which became effective in 2014. Likewise, NP recognizes states' sovereignty over their genetic resources and TK. One of its principal aims is to prevent the piracy of genetic resources, including TK. It provides a binding framework for ensuring access to those resources based on the prior informed consent of provider states, including local communities, in the exercise of their sovereignty and line with domestic access and benefit-sharing laws**.** In Art. 5, the Protocol mandates the fair and equitable sharing of benefits between provider states and recipients**,** based on mutually agreed terms, under CBD Art. 15. Accordingly, Member States are to ensure that genetic resources used in their territories have been obtained with the consent of provider states based on benefit-sharing agreements required by their domestic laws and to collaborate, as well as offer redress in cases involving the violation of these requirements. For this reason, they are required to guarantee access to justice in their legal systems in disputes bordering on mutually agreed terms and may make use of arbitration or mediation.

Similarly, the ITPGRFA recognizes the sovereign rights of states over their plant genetic resources for food and agriculture. It aims at the conservation and sustainable use of plant genetic resources for food and agriculture. The instrument calls for the fair and equitable sharing of benefits obtained from their use, consistent with the CBD (Tedasse, 2009). To achieve these objectives, the CBD requires states to use MTAs and oversee their implementation, including applications for IPRs over any material they have supplied (Secretariat of the CBD, 2002). Applicants for IPRs may also be encouraged to disclose, in their applications, any genetic material they have used (Lawson, 2009). As well, the ITPGRFA requires the use of MTAs in facilitating access to genetic resources (Art.12 (4)). The MTAs are to require recipients to insist on the applicability of stipulated conditions to any transfer of resources to another person or entity, as well as to any further transfers (Art.12 (4))

Thus, through the CBD and NP, as well as the IPPGRFA, the international community acknowledges the importance of the conservation and sustainable use of genetic resources. These instruments also affirm that states have the authority to determine access to those resources based on national legislation. They equally provide a framework, through MTAs, for ensuring such access, as well as the

fair and equitable sharing of the resulting benefits (Dutfield, 2004). This attests to the recognition of MTAs under international law. States are to adopt appropriate rules and regulations implementing this framework at the national level (Tedasse, 2009).

Indonesia ratified the CBD through Act No. 5 of 1994 on the Ratification of the United Nations Convention on Biological Diversity. This Act vests Indonesia with authority over its genetic resources and entitles it to determine access thereto. Moreover, Indonesia ratified the ITPGRFA through Act No. 4 of 2006 on the Ratification of the International Treaty on Plant Genetic Resources for Food and Agriculture. Indonesia also ratified NP with the enactment of Law No. 11 of 2013 on the Ratification of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. By ratifying these treaties, Indonesia expects to regain sovereignty over its biological and genetic resources, as well as TK. It also indicates the country's recognition of the need for balanced and sustainable development, as well as its willingness to cooperate in facilitating appropriate access to its resources (Ul Haq, 2006).

4. MTAs under Indonesian Law

The types of restrictions imposed by MTAs depend on many factors: the kind of material, its rarity, the types of organizations involved (industry, university, repository), the competition among scientists, the influence of scientific authorities, access to collections of materials, IP policy and legal framework and competences (Schaeffer, 2019).

Having established the basis of MTAs under international law, this section examines the place of these instruments under Indonesian law, as well as their effectiveness in tackling the problem of biopiracy. Until 2009, Indonesia lacked specific regulations for access to genetic resources, despite the series of biopiracy cases experienced. That regulatory vacuum has now been filled by ministerial regulations. Presently, the transfer of biological and genetic material is implemented through two types of MTAs. One of them, the Regulation of the Minister of Agriculture, (Minister of Agriculture No. 1/Permentan/OT.140/3/2009) applies to the transfer of plant genetic resources for food and agriculture. The other is the Regulation of the Minister of Health (Minister of Health No. 657/Menkes/Per/VIII/2009 concerning the Delivery and Use of Clinical Specimens, Biological Materials, and Content of information, which had been amended through the Minister of Health Regulation Number 85 of 2020 concerning the Transfer And Use of Materials, Information and Data Content.), which applies to the transfer and use of material, information and data content. The materials regulated in the transfer are clinical specimens, biological materials, and nonbiological materials. These regulations provide guidelines for making MTAs relating to two types of transfers; transfer of

material for commercial purposes and transfer for non-commercial purposes.

A transfer is considered commercial if it involves for-profit companies, and non-commercial if it concerns research institutions. The Regulation of the Minister of Agriculture provides guidelines for the preparation of MTAs falling within the remit of the Body for Agricultural Research and Development. These MTAs facilitate access to plant genetic resources for basic and applied research, subject to the terms and conditions provided therein. The relevant plant genetic resources are specified in paragraph 1 to the Agreement, while the available related information is referred to in Article 5b and paragraph 1. In addition, the MTAs govern the rights of the provider state and local communities. MTAs for foreign transfers are modelled on Article 12(4) of the ITPGRFA. These guidelines are designed to protect genetic resources and their derivatives originating from Indonesia. They are also meant to ensure that research and development, including the use of technology, does not harm human health and safety, the preservation of the environment, social harmony, and the overall safety of the country.

The Regulation of the Minister of Health provides the guidelines for making MTAs concerning the transfer of clinical specimens, biological materials, and nonbiological materials, with all information attached to and contained in the material, as well as the data related to the material. The purpose of these guidelines is to protect the public, researchers, implementers of health programs, healthcare facilities, as well as research and development institutes against the dangers of the spread of infectious diseases and other health problems. They are also intended to prevent the use of transferred material for the production of biological weapons or other dangerous purposes. Both provisions of MTAs aim to protect the preservation of the diversity of traditional knowledge, local wisdom, and biological natural resources. General Provisions of Indonesia's MTAs is currently examined.

a. Ownership of Materials

Both of the MTA regulations require the recipient of genetic material to acknowledge that rights, title, and interests in the material are the property of the provider, who shall retain ownership thereof. Therefore, the recipient shall not claim any IPR or other rights that limit the facilitated access to the material provided under the MTA, its genetic parts, or components in the form received from the multilateral system. In turn, the provider undertakes to grant expeditious access to all available passport data and, subject to applicable law, any other associated available non-confidential descriptive information. Such access shall be granted free of charge or, where a fee is charged, for a sum not exceeding the minimal cost involved. Concerning plant genetic resources for food and agriculture associated with TK, as a community heritage,

MTAs under the Regulation of the Minister of Agriculture recognize the ownership of local communities. Those communities will normally sign and approve the MTAs since they are the rightful owners of the TK. The Regulation of the Minister of Health provides for the possibility of further negotiation of the ownership of material in light of prevailing laws and regulations.

b. Use of Material

The MTAs also contain provisions governing the use of material. According to MTAs under the Regulation of the Minister of Agriculture, the recipient undertakes to use the transferred material solely for research, breeding, and training for food, as well as agriculture. Chemical, pharmaceutical, and/or other non-food/feed industrial uses are forbidden.

Previously, MTAs under the Regulation of the Minister of Health 2009 oblige the recipient to use the material and relevant modifications only for the purposes stated in the research plan or protocol. Then, the Regulation of the Minister of Health 2020 added the aim of regulating these MTAs for research, development; education; Service; and/or other interests.

The two ministerial regulations are the same, the recipient is forbidden from transferring, distributing, releasing, or disclosing by any means, either intentionally or accidentally, the material or modifications or the use thereof to any other party, except for the sole purpose of the research plan under the supervision of the scientists.

Provisions in the MTAs also require the return of material and modifications, as well as all the data, records, and results derived from the material to the provider within two weeks after the relevant study has ended. This restricts the use of the material after the purpose for which it was intended has been achieved. Concerning biological material transferred to non-commercial organizations, such as academic researchers, government institutions, or private research institutes, use is limited to basic, collaborative research. In this regard, no exclusive rights to study particular samples are assured because the research is meant to promote open basic research in the public interest, rather than the monopolization of commercially lucrative compounds.

The recipient of material transferred for non-commercial purposes is also prohibited from disseminating or distributing the material and its derivatives to another party, as well as from using it for commercial purposes or acquiring IPRs over it. The recipient may transfer the relevant material or invention to a third party purely for research purposes, but this must be done after obtaining the written authorization of the provider, including local communities. The recipient must also furnish a written notice of any such transfer, including a record of the same to the provider and local communities. However, in respect of a transfer under an MTA meant for commercial purposes, the recipient is free to distribute the genetic material and its derivatives

to other parties, propagate the genetic material in any form, or send it to another location, without the authorization of the provider. This is a far-reaching provision the potential implications of which are considered later in Section 5.

c. Intellectual Property (IP)

Concerning genetic material transferred under MTAs governed by the Regulation of the Minister of Agriculture, which involves IPRs, the recipient is entitled to request an exclusive or nonexclusive license. Where, however, such material is not already subject to any IPRs, a recipient who intends to apply for such rights must obtain the written approval of the provider in line with the agreed terms. If a recipient who has modified the material and/or its derivatives applies for and obtains an IPR, such right shall be owned by the recipient and the provider. The recipient is also to grant a permanent nonexclusive, sublicensable license to the provider, free of any royalty. The IP provisions in MTAs under the Regulation of the Minister of Health require the recipient to acknowledge that the relevant material or modifications thereof may be the subject of a patent application. They further state that nothing in the agreement should be construed as granting, whether express or implied, any license or right under any patents, knowhow, trade secrets, or other proprietary rights to use the material or modifications or any product or process related thereto, for profit-making or commercial purposes, including but not limited to production, sale, screening or drug design.

Moreover, IPRs in the genetic material or any testing material derived from it will vest in the provider. The recipient cannot assert IPR or any other right, that prevents the provider from enjoying facilitated access to the material, its genetic parts, or components as received from the multilateral system. Also, a recipient or third party who obtains any IPR in derivatives of the material must agree to license such IPR to the provider for research purposes on a permanent nonexclusive, sublicensable basis, without the payment of royalty. Concerning IPR acquired in the material, the recipient must agree to grant the provider a nonexclusive, sublicensable license of same. This grant is required to be based on fair and reasonable terms if the IPR application was made in a developed country. If it was made in a developing country, then the grant shall be without any payment of royalty.

d. Benefit-sharing

Another key provision in Indonesian MTAs relates to the sharing of benefits. As indicated earlier, CBD Art. 15 (7) and NP Art. 5 also deal with this issue. However, these provisions are not restricted to the sharing of results, products, commercialization, and other positive outcomes of the use of genetic resources. They also cover situations where the material and its modifications are patented and commercialized (Stoll, 2009). These benefits must, as well, be shared through Benefit Sharing Agreements (BSAs). The BSAs

are in addition to the MTAs concluded by recipients with the provider, who granted access to the biological resources of local communities (Wynberg, & Taylor, 2009). The MTAs made under the Regulation of the Minister of Agriculture specifically require benefit-sharing to be arranged and mutually agreed in a separate agreement, which forms part of the MTA. In MTAs for commercial purposes, recipients are required to provide compensation to the provider. They are further required to pay royalty representing a percentage of the total revenue accruing from the commercialization of products made from the transferred material, as well as other benefits, as provided in the relevant MTA.

The type of benefit-sharing required under the MTAs depends on whether the recipient places any limitations on further uses of the commercialized product for research and breeding. When such restrictions exist, the recipient would be obliged to pay a specific percentage of sales of the commercialized product into the mechanism established by the Food and Agriculture Organization (FAO), which is the Governing Body of the ITPGRFA. This mechanism called the Benefit Sharing Fund (BSF), is to be used by the Governing Body to assist farmers, especially those in developing countries and economies in transition. The specific percentage payment required is '1.1 % of the sales of the product or products less 30% or an alternative discount rate of '0.5% of the sales of any products and of the sales of any other products that are plant genetic resources for food and agriculture belonging to the same crop. If there are no restrictions on the use of the product made from transferred material, the recipient is encouraged to make voluntary payments to the BSF. This option would not apply if the recipient chooses the alternative discount rate described above.

A recipient who obtains material or its components from the multilateral system and acquires IPRs over any products developed from such material or its components, which rights are subsequently assigned to a third party, must also transfer the benefit-sharing obligations in the MTA to that third party (Adhiyatma, & Roisah, 2020). This is a way of ensuring that benefit-sharing obligations relating to IPRs arising from the commercialization of products incorporating plant genetic resources obtained from the multilateral system are not circumvented by merely transferring those proprietary rights. It remains to be seen. However, how such monetary benefits can be retrieved where the recipient fails to transfer the benefit-sharing obligations. Unlike those under the Regulation of the Minister of Agriculture, MTAs under the Regulation of the Minister of Health do not have elaborate provisions on benefit- sharing, the amount of profit-sharing, and distribution to third parties. They only provide that where clinical specimens, biological materials, or nonbiological materials are to be patented and commercialized, the MTA must be with a benefit-sharing agreement. It

states that new data and findings from the research collaboration can be shared by both parties and then provisions regarding the use of intellectual property rights and royalty arrangements are specified in separate agreements.

e. Local Communities

Indonesian MTAs also address the interests of local communities. The CBD provides in Article 8 (j) that the benefits created from the use of TK, innovation systems, and practices should be shared equitably with indigenous and local communities, however, the CBD was silent on the use of traditional knowledge for research and development purposes and did not provide for the sharing of benefits with indigenous and local communities (Parks, & Tsioumani, 2023).

The Indonesian government has been seen to pay attention to Communal IPR through various legal regulations in the Communal IPR sector (Dharmawan et al, 2023). Indonesian MTAs, therefore, allow local communities to claim ownership of their TK, while facilitating basic research and development incorporating their resources. For example, MTAs under the Regulation of the Minister of Agriculture provide that it is the local communities, which have the right over material obtained in their region. In these cases, it is the responsibility of the provider and the recipient to protect the rights of local communities under the MTA provisions.

In addition to ownership and profit-sharing rights, local communities are entitled to receive a research monitoring report, at least, once every six months. Further, the acquisition of IPRs over jointly owned inventions or the licensing of those inventions can only be done after the recipient has obtained the written consent of the provider or local communities. This condition also applies to inventions and genetic resources owned by local communities. It entitles them to compensation from the development and commercialization of genetic resources and related TK.

Previously, the 2009 Ministry of Health MTAs Regulation did not address local communities, then the 2020 amendment regulation stated that this goal is respect for traditional knowledge and local wisdom, then the agreement is expected to contribute to the local economy.

f. Publication

Apart from the above provisions, MTAs under both the Regulation of the Minister of Agriculture and that of the Minister of Health also establish the rights of the provider and the recipient of material to the publication of research results. MTAs under the Regulation of the Minister of Agriculture specifically require the recipient to acknowledge the provider's contribution in any publications citing the results of studies based on the transferred material. Under the Regulation of the Minister of Health, the recipient must also obtain the written authorization of the provider to use any data,

results, or concepts derived from the use of the material in presentations, abstracts, publications, grants, or other means of dissemination by the recipient. The requirement to include the provider's name in any published results offers commercial and non-commercial benefits to the provider. In non-commercial terms, it strengthens the position of the provider state as the owner of the material, prevents the unilateral and potential misuse of that material by the recipient, and provides opportunities for cooperation on the transfer of the material for research with other parties. Commercially, it offers opportunities for profitable research collaboration with different parties.

g. Dispute Settlement

Lastly, Indonesian MTAs provide for dispute settlement, as well as applicable laws. Under ITPGRFA Art. 12(5), contracting parties are to provide mechanisms for the resolution of disputes arising from MTAs. Consistent with this, MTAs under the Regulations of the Minister of Agriculture stipulate that any dispute arising from the MTAs are to be resolved first through amicable settlement. If the dispute is not resolved by negotiation, the parties may resort to mediation. If the dispute is still not resolved, any of the parties may submit it to arbitration under the Arbitration Rules of an international body agreed by the disputing parties. Where they fail to agree on this, then the dispute shall finally be settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed following the said Rules. Unlike the Ministry of Agriculture, the Minister of Health (2020) stipulates that if an amicable settlement is not reached, dispute resolution is through arbitration by the Indonesian National Arbitration Board (Badan Arbitrasi Nasional Indonesia/BANI).

5. Discussion of the MTAs

In dealing with the problem of biopiracy, The CBD provides a set of norms but gives little guidance on how to address complex situations (Parks, & Tsioumani, 2023) The adoption of MTA regulations in Indonesia is, in several ways, useful to the country and the world at large. The existence of these regulations affirms Indonesia's fulfilment of its obligations under the CBD, as well as the ITPGRFA. It shows the country's willingness to provide other parties with facilitated access to material relating to food, agriculture, and health. The MTAs can foster research and development activities in those areas and boost inventions both domestically and internationally. They can increase research and development in Indonesia by enabling it to continue studies commenced by recipients on the food, agriculture, and health material transferred. At the same time, by providing access to such material, MTAs enable recipients to engage in inventive research that benefits their home countries. Additionally, MTAs offer recognition and protection to Indonesia concerning ownership and IP matters concerning its genetic

and biological resources, as well as TK. In this sense, MTAs can help in addressing the problem of biopiracy confronting the country. Also, as a provider, the country can reap profits from products generated from material transferred for commercial purposes.

Despite those benefits, the MTAs have potential limitations. As a provider, Indonesia may find it difficult to control the use of transferred material, as well as confidential information and research reports, especially in cases involving foreign recipients. MTAs or domestic legislation on access and benefit-sharing may require recipients to inform the provider whenever a product is generated and to have a new agreement negotiated. This is, however, unlikely to help in surmounting the difficulty of monitoring the transferred material from the time of access to when a product is generated. This problem would be exacerbated where there is a long time lag. Apart from the lack of capacity to determine the likely future value of transferred material, it is a challenging task for a developing country like Indonesia to track and control research and development activities concerning such material. (Nijar, 2010). In the absence of any effective system of control, adherence to MTA provisions is not assured. Thus, a mechanism that can effectively monitor the implementation of these agreements is needed.

Also, it should be remembered that in MTAs for commercial purposes, a recipient is free to distribute the material and its derivatives to other parties, propagate it in any form, or send it to another location, without the prior authorization of the provider. The implication is that the recipient can transfer the material to other parties that are not signatories to the relevant MTA. This may give rise to the misuse of material and the nondisclosure of benefits derived from it. There may be an additional problem of conflict of interest because a nonexclusive user of the material may inadvertently transfer samples to competing private sector firms. One way of addressing these problems is to require recipients to obtain the prior authorization of the provider before any transfer is made to third parties. This form of control may also help to maintain the exclusivity guaranteed to private sector recipients under MTAs for commercial purposes.

As indicated earlier, in MTAs under the Regulation of the Minister of Agriculture, the recipients who acquire IPRs over products created from the use of material or components obtained from the multilateral system and subsequently assign those rights, are required to also transfer the benefit-sharing obligations in the MTAs to the assignees. This is a way of preserving those benefit-sharing obligations, regardless of any transfer of IPRs. The problem, however, is that it is not certain how a provider may regain any financial benefits that may be lost if a recipient fails to transfer the benefit-sharing obligations along with the assignment of IPRs, as

required by the MTAs. Additionally, unlike MTAs under the Regulation of the Minister of Agriculture, those made under the Regulation of the Minister of Health do not even dwell on issues concerning benefit-sharing and the transfer of related obligations. Policymakers need to address their minds to these gaps to enhance the effectiveness of the MTAs.

Attention should be drawn to another irony in the MTA regulations. Although the Regulation of the Minister of Agriculture covers genetic resources for agriculture, and the government recognizes the rights of local communities in these resources, the provisions do not include traditional medicines. MTAs in the Minister of Health Regulation (2020), do not protect the rights of local communities, only stating it respects local wisdom. Thus, this regulation also does not provide provisions for direct sharing of benefits for local communities. Yet, another possible explanation may be the fact that the MTAs are modelled on the ITPGRFA. Whatever the case, since Indonesia has now ratified NP, it may be prudent for the government to broaden the scope of the MTAs and the sharing of benefits.

Apart from the issues discussed above, the analysis has focused on the unfavorable effects that MTA regulations may have. As pointed out previously, MTAs forbid IPRs that inhibit facilitated access to transferred material or related parts and components. They provide that 'the recipient shall not claim any intellectual property or other rights that limit the facilitated access to the material provided under this Agreement, or its genetic parts or components, in the form received from the multilateral system.' The concern here is that IPRs should not hinder access to material obtained from the multilateral system's plant genetic resources for food and agriculture. This is a way of securing the benefits arising from development and commercialization made possible by facilitated access to the multilateral system.

Nevertheless, all that requires some delicate balancing. On the one hand, the MTAs strive to use IPRs in appropriating the benefits resulting from the commercialization of products that incorporate material accessed from the multilateral system. On the other, they try to avoid the potential hindrance that those rights may place on access to material in that system. The dilemma, therefore, is that excessive IP may restrict the effectiveness of the multilateral system, while too little of it may produce less than optimal benefits. This demonstrates the potential for IPRs to either support or defeat the aims of the MTAs and the ITPGRFA (Lawson, 2009).

A related observation is that, apart from voluntary contributions from some governments, the BSF meant to generate revenue from the use of material in the multilateral system, has so far not received any payments, which are mandatory where IPRs are acquired over such material. The Governing Body of the ITPGRFA noted this dismal situation during its fifth session held in

September 2013 (International Treaty on Plant Genetic Resources for Food and Agriculture, 2013). The poor performance of the BSF was one of the issues discussed at the first meeting of the Working Group to Enhance the Functioning of the Multilateral System of the ITPGRFA held in Geneva, Switzerland in May 2014 (International Treaty on Plant Genetic Resources for Food and Agriculture, 2014). This Ad Hoc Open-ended body, established during the fifth session of the Governing Body, focused on how to generate more income for the BSF and enhance participation in the multilateral system, particularly from industry. This was in addition to the possibility of expanding the list of materials available in the system under Annex 1 of the ITPGRFA. Although developed countries want more material to be placed in the system, developing countries are reluctant to do so without the expected benefits from industry.

Since the Standard MTA requires recipients to make compulsory payments into the BSF only when they restrict further uses of material obtained from the multilateral system, particularly through IPRs, and to make voluntary payments, where they impose no restrictions, the industry has tended to use the latter option. The result is that no income has accrued to the BSF since the ITPGRFA became effective in 2004. As developing countries are already clamoring, it is imperative to revisit these articles. The BSF faces an additional problem. Major agricultural countries like Argentina, China, and the U.S. are not parties to NP. It means, for example, that if commercial users from the U.S. can obtain material available in the multilateral system from an alternative source, such as the Plant Genetic Resources Conservation Unit of the U.S. Department of Agriculture, they can avoid making payments to the BSF (Hammond, 2014).

Further, fears have been expressed that MTA provisions may restrict academic freedom (The Royal Society, 2003; Azoulay, Ding, & Stuart, 2009) For example, recipients may be unable to progress a line of research once the ownership of inventions made from transferred material no longer vests in them. Recipients may also experience delays in obtaining the provider's consent to publish study results. In some cases, the provider may even be unwilling to grant authority to publish. It has been suggested that terms and conditions represent one of the major obstacles to MTA negotiations. (Rodriguez, 2008) Although in their study of the interaction between MTAs and biomedical research, Mowery and Ziedonis (Mowery, & Ziedonis, 2006) conclude that MTAs do not deter research and development, a similar study by Walsh et al. claim, quite to the contrary, that MTAs contain far-reaching rights that hinder the use of material and induce delays (Walsh, Cohen, & Cho 2007).

India regulates the exchange of genetic resources through the Biological Diversity Act 2002 as amended in 2023, India also has an institution that functions for collecting, conservation, characterization, evaluation, and

exchange of genetic resources (GR) in a network mode, namely Indian Council of Agricultural Research (ICAR). ICAR also created guidelines for MTAs that are used by the parties to the agreement, which consists of MTA for International Bilateral Exchange under Collaborative Research Programmes/ Projects and MTA for Research Use within the Country for Public and Private Entities. One of the things in common with Indonesia is the emphasis on PIC and ABS. India also has a special agency called the National Biodiversity Authority of India as an approver of MTAs. The agreement regarding benefit sharing with the owner/developer of the material is then agreed in a different agreement with MTAs, namely through a Memorandum of Agreement (MoA).

In the United States, arrangements regarding MTAs are largely regulated by universities that work with researchers. Welch et al. (Welch, Shin, & Long, 2013) attempted to show how access and benefit-sharing obligations under NP may affect patterns of resource exchange among users and overall public and private outcomes. They explain that, in the U.S., resource exchange within the research community is based mainly on social capital; close relationships built on trust and reciprocity. Researchers may, therefore, resent formal arrangements like MTAs. Even in the U.S where MTAs have a long history in many universities, approximately only 50% of the researchers surveyed indicated that they had used MTAs in exchanging material with university colleagues. There were fewer uses of MTAs with gene banks when sending and receiving material, as well as when receiving material from local companies.

Welch et al. suggest that, while formal regulations and effective enforcement of access and use requirements may compel compliance, often, they may yield suboptimal results in that researchers may be tempted to underreport their work, including the use and exchange of material. In addition, stringent regulations may discourage the preservation of material. They reiterate the point raised earlier that the wide range of material exchanged, from visible substances like plants to invisibles like DNAs, may pose difficulties for worldwide tracking, and, hence, the documentation of access and use necessary to enforce benefit-sharing under MTAs.

Many members of the research community, Welch et al. maintain, partake in projects that have a mix of private and public goals, which are not always separable; from monitoring activities for the safeguard of human, animal, and plant health to breeding and product development. Researchers would need extra diligence to be able to discern when research has moved away from MTA-permitted uses and, consequently, whether the renegotiation of terms has become necessary. Also, according to the authors, since research sometimes leads to entirely unanticipated results, the imposition of use restrictions at the time of MTA negotiations may prevent the use of material for other potentially

valuable goals, such as food safety and security during emergencies.

Notwithstanding, those findings should not undermine the need to address the problem of biopiracy and the associated injustice. For now, MTAs are the agreed means of confronting these challenges. What is required is for the providers of material, including Indonesia, to ensure that MTA regulations achieve their objectives, while remaining attractive to prospective recipients. In this regard, although Welch et al. project the perspective of the U.S., which has not ratified the CBD and NP, policymakers may, nevertheless, choose to consider the relevance of their findings to the formulation of domestic MTA regulations.

D. CONCLUSION

Biopiracy is a problem in some of the megadiverse countries of the world. In this article, biopiracy has been defined as the appropriation of the biological and genetic resources, including associated TK of local communities, without their prior informed consent and the payment of fair and equitable compensation to them. Patents and PVRs are the major devices used in perpetrating biopiracy. Although patent holders enjoy protection against the unauthorized use of their innovations, they fail to respect the IP of local communities. This article has relied on the special experience of Indonesia in making its case. As the second richest megadiverse country worldwide, Indonesia has been a principal victim of biopiracy, with patent claims being made over its spices, ginger plants, ancestral food products, including related TK, as well as bird flu samples.

In response to that problem and consistent with the CBD and the ITPGRFA, the Indonesian Government stipulates the obligation to disclose the origin of genetic resources in patent registration and the provisions for benefit sharing on the use of GR and TK through the 2016 Patent Law. The Indonesian Government also adopted MTA regulations meant to govern the access to the country's biological and genetic resources, including TK. These regulations have obvious benefits for Indonesia and the rest of the world. They can contribute to the conservation and sustainable use of biological resources and promote cooperation between local and foreign researchers, as well as the joint exploitation of results. Indonesia can also be a joint patent owner, entitled to lucrative royalty payments, where patentable and commercially viable inventions are made from transferred material. In addition, the country, and especially local communities, can share the benefits resulting from any sale of products created from transferred material. Thus, the regulations could help in ameliorating the problem of biopiracy.

However, the realization of those benefits demands the proper management of IPRs. Unless used optimally, such rights may undermine MTA's objectives of facilitating access and appropriating the resulting benefits. An additional issue is the likely impact of MTA terms and conditions on academic research and

freedom of expression. Existing studies are divided on this matter. There are also concerns that MTAs may disrupt established patterns of resource exchange in the research community and discourage the reporting of research activities and biodiversity conservation through the destruction of materials. Those fears invite close attention from policymakers. The MTA regulations that permit commercial recipients to transfer material and its derivatives to third parties, without Indonesia's consent, may also lead to misuse and the concealment of benefits arising from the material. In addition, there may be a conflict of interest as a nonexclusive user of the material may unintentionally transfer samples to competitors. This weakness can be addressed by requiring recipients to seek the written consent of the provider before transferring material to third parties.

Another limitation of the regulations lies in the fact that Indonesia, like many developing countries, cannot monitor and control compliance with MTA terms and conditions, especially where foreign recipients are involved. This calls for clear and effective mechanisms that can help to track and ensure reporting on the development of transferred material. Further, although MTAs under the Regulation of the Minister of Agriculture demand that the transfer of IPRs in products derived from material obtained from the multilateral system should be accompanied by the transfer of benefit-sharing obligations contained in the agreement, it is not clear how such benefits can be regained where recipients fail to comply with this requirement. This issue needs to be examined and remedied. A related challenge is how to make the multilateral system more attractive for the providers and recipients of material and to generate more income for the BSF. Finally, the MTAs do not cover traditional medicines, ostensibly because they are modeled on the ITPGRFA. Since Indonesia has now ratified NP, it is expected that the scope of the MTAs, including the sharing of benefits, will be expanded.

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