

THE LEGAL ASPECT OF PREVENTION OF THE THREAT OF EXTINCTION IN THE ORIGIN FLORA AND FAUNA OF KALIMANTAN IN A DIGITAL WORLD

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ABSTRACT

Kalimantan Island is one of the countries with various natural wealth of flora and fauna. However, this wealth is threatened, and the flora and fauna on the island of Kalimantan are damaged due to various factors so some are threatened with extinction. The aim of this research is to carry out an analysis related to preventing the extinction of flora and fauna from a legal perspective. The method use qualitative research. This research will discuss the prevention of extinction threats in terms of legal aspects related to the prevention of flora and fauna extinction threats it is supported by data sources through several relevant informants and links them to the digital world without boundaries. This research resulted in several facts that the legal aspects in Indonesia have yet to be widely known about the concept of biodiversity and only use the concept of the Environment.

Keywords : Characteristics, Extinction, Kalimantan Island, Native Resource

A. Introduction

The island of Kalimantan has a variety of natural wealth consisting of flora and fauna, as well as a wealth of cultural diversity which is still being preserved today. This condition continues to survive with various conditions and constraints due to various activities specifically designated for economic areas, development of residential areas, plantations, mining, forest fires and others.¹ The geographical conditions on the island of Kalimantan are rocky, hilly and rich in peat land which is estimated to reach 3.1 million until 6.1 million hectares.² According to Forest Watch Indonesia, the diversity that exists on the island of Kalimantan will certainly have a positive impact on the progress and development of development in Kalimantan if it is supported by good management, as well as dissemination to the wider community about ideal forest management so that forests are maintained

1 Birka Wicke et al., "Exploring Land Use Changes and the Role of Palm Oil Production in Indonesia and Malaysia," *Land Use Policy* 28, no. 1 (2011): 193–206, <https://doi.org/10.1016/j.landusepol.2010.06.001>.

2 Titi Kalima et al., "Tree Species Diversity and Ethnobotany of Degraded Peat Swamp Forest in Central Kalimantan," *Reinwardtia* 19, no. 1 (2020): 27–54, <https://doi.org/10.14203/reinwardtia.v19i1.3819>.

and well preserved.³ On the other hand, the diversity on the island of Kalimantan, when examined more deeply, will find various types of plants and plants that are specifically typical of the island of Kalimantan.⁴ One of the characteristics of the identical Fauna that only exists on the island of Kalimantan is the Orangutan, Borneo Red Cat, Sun Bear, *Pesut Mahakam* (a type of dolphin), Proboscis monkey, there are also several types of Flora namely Ulin Wood, Ramin Wood, Tengkwang Tungkul, as well as the Black Orchid which is typical of Kalimantan. However, these conditions do not make Kalimantan's flora and fauna sustainable and endangered. There are several problems including land conversion on the island of Kalimantan, recorded data for the period 1972 to 2015 found fact that land change in Kalimantan for large-scale plantations has occurred massively but has a relatively small number, namely land change of 15% with the reason is that land use utilizes land that has previously been used and does not use new land on a large scale.⁵ Other data for 2001-2016 (15 years) has changed by 23% with an estimated forest destruction of 15% there has been an increase in plantation land clearing activities on a large scale to meet international market demand.⁶

Reports from the conversation website in 2018 over the past 16 years there have been around 100,000 Orangutans being hunted. As well as other fauna, for example the Kalimantan elephant whose population is around 30-80 individuals which are scattered in the Nunukan area, North Kalimantan Province.⁷ The decline in the native fauna of Kalimantan Island is due to their economic value as pets, and the reason for hunting is to disturb the fields of farmers on Kalimantan Island.⁸ As well as other reasons from BBC Indonesia that there is trade in wild animals abroad, for example from Thailand and Malaysia.⁹ Then there are flora that are already rare in Indonesia, namely the Black Orchid plant which is native to the island of Kalimantan, mainly from East Kalimantan and parts of West Kalimantan and the Semar Pouch Plant which is often found in West Kalimantan Province which is now experiencing extinction.¹⁰ Given the natural wealth that is threatened with extinction due to

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- 3 FWI, *Deforestasi Tanpa Henti "Potret Deforestasi Di Sumatera Utara, Kalimantan Timur Dan Maluku Utara* (Bogor, Indonesia, 2018).
 - 4 Grace V. Blackham, Edward L. Webb, and Richard T. Corlett, "Natural Regeneration in a Degraded Tropical Peatland, Central Kalimantan, Indonesia: Implications for Forest Restoration," *Forest Ecology and Management* 324 (2014): 8–15, <https://doi.org/10.1016/j.foreco.2014.03.041>.
 - 5 David L.A. Gaveau et al., "Slowing Deforestation in Indonesia Follows Declining Oil Palm Expansion and Lower Oil Prices," *PLoS ONE* 17, no. 3 March (2022): 1–19, <https://doi.org/10.1371/journal.pone.0266178>.
 - 6 David L.A. Gaveau et al., "Rise and Fall of Forest Loss and Industrial Plantations in Borneo (2000–2017)," *Conservation Letters*, 2018, 1–8, <https://doi.org/10.1111/conl.12622>.
 - 7 wwf Indonesia, "Upaya Bersama Untuk Melindungi Gajah Kalimantan," www.wwf.id, 2020, <https://www.wwf.id/publikasi/upaya-bersama-untuk-melindungi-gajah-kalimantan>.
 - 8 Theconversation.com, "100 Ribu Orang Utan Punah Di Kalimantan Akibat Penebangan Hutan Dan Perburuan," <https://theconversation.com/>, 2018, <https://theconversation.com/100-ribu-orang-utan-punah-di-kalimantan-akibat-penebangan-hutan-dan-perburuan-92450>.
 - 9 BBC Indonesia, "Orangutan Dipulangkan Ke Indonesia Di Tengah 'Perburuan Yang Masih Terjadi,'" www.bbc.com, 2021, <https://www.bbc.com/indonesia/majalah-55899594>.
 - 10 CNN Indonesia, "4 Tanaman Endemik Di Indonesia Yang Hampir Punah," 2CNN Indonesia, 2022, <https://>

changes in land use change due to various factors, of course, it must receive attention from various parties.¹¹ A study conducted by the Ministry of Environment and Forestry of the Republic of Indonesia (*KemenLHK RI*) noted that are currently at a critically endangered level, namely the Ivory Hornbill typical of Kalimantan Island which is a type of bird and has a costly price. In the international market, then the Super Red Arowana which is a mammal in the fish family whose status is (already endangered) or endangered, which can be interpreted as one or two more steps, the two animals will experience total extinction they cannot be overcome or restored anymore.¹²

One way to prevent this is to designate the flora and fauna characteristic of Kalimantan as Communal Intellectual Property which cannot be found in other areas throughout Indonesia. In addition, engagement with the Dayak people on the island of Kalimantan to manage forests is urgently needed and requires support from all parties, including the Indonesian government. Forest management by the Dayaks people who are known for their carefulness in managing forests is undoubtedly able to adapt and return the flora and fauna species that are about to become extinct to be saved.¹³ The threat of extinction of various flora and fauna on the Kalimantan Island is undoubtedly a concern for all parties. However, through the world of technology that is already sophisticated, genetic engineering is starting to be carried out to prevent sustainable extinction. Through sophisticated technology, several endangered flora and fauna will be saved with various latest discoveries. Even those that have become extinct can be revived even in the virtual world so that it will feel real even in digital form.

On the other hand, the condition regarding the virtual world that has been supported by artificial intelligence (AI) has now entered stage 4.0 with the sophistication it offers and is expected to be able to save several species that are suspected of being extinct or endangered even though they have to sacrifice considerable resources and significant financing. With a success rate it could fail due to technical errors.¹⁴ Even so, at least AI users can feel through their senses the species of flora and fauna that have been destroyed, as well as those that are threatened with extinction.

www.cnnindonesia.com/gaya-hidup/20220316103010-284-771892/4-tanaman-endemik-di-indonesia-yang-hampir-punah.

- 11 [mmc.kalteng.go.id](https://mmc.kalteng.go.id/berita/read/753/pohon-ulin-si-pohon-besi-terkenal-di-kalimantan), "Pohon Ulin, Si Pohon Besi Terkenal Di Kalimantan," mmc.kalteng.go.id, 2018, <https://mmc.kalteng.go.id/berita/read/753/pohon-ulin-si-pohon-besi-terkenal-di-kalimantan>.
- 12 balaikliringkehati.menlhk.go.id, "Rangkong Gading Dan Arwana Super Red Satwa Karismatik Kalbar Yang Terancam Punah," <https://balaikliringkehati.menlhk.go.id/>, 2019, <https://balaikliringkehati.menlhk.go.id/rangkong-gading-dan-arwana-super-red-satwa-karismatik-kalbar-yang-terancam-punah/>.
- 13 Cahyoko Edi Tando, Sudarmo, and Rina Herlina Haryanti, "Collaborative Governance Effort to Manage Forest in Kalimantan Island: Literature Review," *Jurnal Manajemen Hutan Tropika (Journal of Tropical Forest Management)* 28, no. 1 (2022): 15–21, <https://doi.org/10.7226/jtfm.27.1.15>.
- 14 BBC Indonesia, "Dapatkah Hewan Yang Sudah Punah Dihidupkan Kembali Untuk Melawan Perubahan Iklim?," *BBC Indonesia*, April 2021, <https://www.bbc.com/indonesia/majalah-58592804>.

Therefore, this research will also review the extent of the role of the rules implemented by the Government, for example the Ministerial Regulation of Law and Human Rights number 13 of 2017 concerning Data on Communal Intellectual Property which is authorized to collect data on all varieties of flora and fauna that are threatened with extinction or that are in danger of extinction critical stage. In addition, the study will also target the Ministerial Regulation of Environment and Forestry of the Republic of Indonesia number P.2/Menlhk/Setjen/Kum.1/1/2018 concerning Access to genetic resources of wild species and sharing of benefits from their use. Also, Ministerial Regulation Agriculture number: 67//Permentan/OT.140/12/2006 concerning the preservation and utilization of plant genetic resources. The last one is from Government Regulation Number 48 of 2011 concerning animal genetic resources and livestock breeding. On the other hand, the researcher also uses the rules of the Act number 11 of 2019 concerning the national system of science and technology as one of the reference materials for this research, in addition to using primary data sources as processed research results as well as several scientific articles to support analysis in research.

Through these legal regulations, of course the government, through the Dayak tribal community, must be able to preserve flora and fauna that are threatened with extinction. On the other hand, enforcement efforts are still on a massive scale and relatively minimal, this can cause many problems to arise. Researchers see that enforcement efforts are still minimal and there needs to be greater enforcement than just saving flora and fauna, because the sustainability of this should be maintained without having to quarantine every flora and fauna and return them to their natural habitat. This research will discuss how to prevent the extinction of native Kalimantan flora and fauna about to the use of the digital world without boundaries which will focus more on intergovernmental relations. The purpose of this research is that there will be a contribution in providing a broadly positive impact on the development of the digital world, especially in preventing the extinction of flora and fauna which should be preserved for future generations of youth.

This research will begin with a background explanation regarding the main problem and is linked to the legal aspect, then continued with research methods using a sociolegal aspect approach, then a sub-discussion in which there are results and in-depth discussion so that conclusions can be drawn to answer the research question already available.

B. Research Method

Research Method Method will use a qualitative approach in the form of a sociolegal approach to the problem of the threat of extinction of several native flora and fauna species from the island of Kalimantan, and also carry out an analytical approach to legal aspects related to the sustainability of flora and fauna. Beside that, this research use the legal aspect with have relevation in this paper and also use the reference of this research is

that the native flora and fauna of Kalimantan Island are communal intellectual property. The data collection will be carried out online and the data source will use primary data sources in the form of processed interviews and also secondary data sources originating from government regulations that the researchers mentioned in the previous sub-discussion as well as several relevant scientific journal articles in this study.¹⁵ As for the data analysis, the researcher will be presented interactively and sequentially as well as a narrative explanation and the use of tables or pictures if needed during the analysis.¹⁶

C. Discussions

The results of the study show that the flora and fauna of Borneo are threatened with extinction in a borderless digital world, when referring to the theory of intergovernmental relations that at least there are several mechanisms for prevention. This theory was chosen because it would be an appropriate analytical tool considering that extinction is not only an obligation of the Dayak people, but also of all agencies that must be involved, including the government and business actors involved in it.

The prevention of the extinction of flora and fauna includes when viewed using intergovernmental relations, namely as follows:

1. Intergovernmental Relations in Terms of Legal Aspect

This research uses the study of intergovernmental relations theory, namely the relationship carried out by the government with other parties interested in handling and following up on the threat of extinction so far.¹⁷ In addition, intergovernmental relations also allow the government to apply so far because of complex problems and the emphasis on intergovernmental relations will focus on local governments in the regions.¹⁸ Intergovernmental relations will also focus on internal government, namely the formal structure and will traditionally be more vocal in analyzing local governments in their follow-up in reviewing various issues.¹⁹

Strengthening the researcher's analysis also analyzes from a regulatory standpoint related to regional autonomy through Law Number 23 of 2014 concerning Regional Government

15 Sugiyono, *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, Dan R&D)*, 10th ed. (Bandung: Alfabeta, 2014).

16 Surya Galang Gumilang, "Metode Penelitian Kualitatif Dalam Perspektif Rancangan," *Jurnal Fokus Konseling* (2016).

17 Brendan F. Burke, "Understanding Intergovernmental Relations, Twenty-Five Years Hence," *State and Local Government Review* 46, no. 1 (2014): 63–76, <https://doi.org/10.1177/0160323x13520461>.

18 John Phillimore, "Understanding Intergovernmental Relations: Key Features and Trends," *Australian Journal of Public Administration* 72, no. 3 (2013): 228–38, <https://doi.org/10.1111/1467-8500.12025>.

19 Grichawat Lowatcharin, Charles David Crumpton, and Sittipol Pacharoen, "Intergovernmental Relations in a World of Governance: A Consideration of International Experiences, Challenges, and New Directions," *Asia-Pacific Social Science Review* 19, no. 4 (2019): 44–55.

which is already underway in Indonesia. Clearly the regulation also gives authority to the region in managing its nature and the wealth contained therein for the welfare of its people in the form of recommendations.²⁰ Meanwhile, national policy-making is carried out by the central government. The problems raised by the researchers in this study will be analyzed by presenting research data related to intergovernmental relations and the use of related rules to implement relevant rules in responding to the threat of extinction of the unique flora and fauna of Kalimantan Island.

In particular, the existence of flora and fauna must be maintained and preserved, through Law Number 5 of 1990 concerning Conservation of Living Natural Resources and their Ecosystems, it can be concluded that conservation efforts can be made by providing education and outreach, then supporting conservation efforts, establishing captive breeding, creating prohibition boards, prohibiting animal hunting, and preventing wildlife trade. Therefore, existing actions must be carried out continuously by various parties, including the involvement of law enforcement officials, for example the police, maritime security agencies, the Indonesian national army, as well as customs and excise agencies if the flora and fauna are to be traded abroad.

The natural wealth that exists in Indonesia, especially in Kalimantan, has of course invited many parties to take negative actions, thus having a negative impact on the sustainability of the flora and fauna. Through existing actions, of course cases that lead to the threat of extinction still occur. Economic activities are also often the cause of the extinction of flora and fauna. There is also Law Number 12 of 1992 concerning Plant Cultivation Systems where discussions are found in relation to intergovernmental relations, only the involvement of government agencies related to licensing and also research related to varieties to prevent extinction which has not been carried out completely, apart from taking action against individuals who carry out activities. Illegal activities are only small in nature and in fact illegal activities to improve the economy in the year in which this Law was issued were so severe in Kalimantan that they continued for the following years.

2. Condition of Flora and Fauna on the Kalimantan Island

The form of the implementation of the Indonesian government when referring to Law Number 23 of 2014 concerning Regional Government,²¹ which is contained in article 9 explains that the basis of concurrent government which is not absolute will be given power to regional governments and in article 10 paragraph 2 it again emphasizes that the delegation of power can be carried out to vertical agencies in the regions or governors who are in level

20 C Sahabuddin et al., "Administration of Post-Reformation Decentralization Government," *International Journal of Recent Technology and Engineering* 8, no. 3 (2019): 7631-34, <https://doi.org/10.35940/ijrte.C6182.098319>.

21 "Law Number 23 of 2014 Concerning Regional Government".

1 regions. So the confirmation regarding the principle of regional government autonomy in fostering its region is huge, especially in providing basic services to its people.

Related to existing problems in this study the threat of extinction of flora and fauna on the island of Kalimantan has shown very worrying things when referring to the Report from the Organization for the Protection of Animals in Kalimantan, namely World Wild Life in 2022 for fauna similar to the Orang Utan there are only 230 thousand orangutans in the world and \pm 50% are on the Kalimantan, poaching is also carried out for the pangolin fauna because there are only eight species in the world and one of them is on the Kalimantan while reports from National Geographic note that tens of thousands of pangolins are hunted every year to be used as medicine combined with other plants and be an alternative treatment. Apart from that, there are also the Proboscis Monkeys, of which there are only 7,000 recorded in the world until 2022, as well as several other animals including the White-Foreheaded Monkeys (Red Monkeys), Sunda Clouded Tigers (a type of cat), and White-Foreheaded Monkeys.²²

The flora side of Kalimantan Island, it shows similar things that cause the threat of extinction of flora, including acts of exploration, poaching, and even forest fires which occur every year on the island of Kalimantan. It is known that the island of Kalimantan is the wealthiest biodiversity area in the world it contains almost all plant species in the world and has survived for more than 150 years and make Indonesia one of the second richest biodiversity after the Amazon in South America.²³

Likewise, when viewed from the law regarding the protection of flora and fauna habitat, namely through Law Number 8 of 1999 concerning Utilization of wild plant and animal species which in article 7 can carry out captive breeding of animals and plants in a controlled artificial environment and breeding of young which can be taken from nature,²⁴ while the second point described in this article is that captive breeding can be carried out both for protected and unprotected wild plants and animals.²⁵ After that, when referring to Law Number 32 of 2009 concerning Environmental Protection and Management the environment contained therein must be protected by prioritizing the principles of responsibility, sustainability and justice.²⁶

In general, the rules regarding biodiversity in Indonesia still need to be widely known and are still focused on the environment which can be interpreted as the surrounding

22 Kompas.com, "Hewan Langka Terancam Punah Di Pulau Kalimantan," Kompas.com, 2022, <https://www.kompas.com/skola/read/2022/03/22/161341169/hewan-langka-terancam-punah-di-pulau-kalimantan?page=all>.

23 Efridani Lubis, "Konsep Hukum Biodiversitas Dalam Dunia Digital (Fondasi Teoritik Pengembangan Hukum Lingkungan Indonesia Berbasis Biodiversitas)," *Jurnal Hukum Jurisdictie* 3, no. 2 (2021): 133-44, <https://doi.org/10.34005/jhj.v3i2.54>.

24 "Government Regulation Number 48 of 2011 Concerning Animal Genetic Resources and Livestock Breeding".

25 "Law No. 8 of 1999 concerning Utilization of Wild Plants and Animals".

26 "Law Number 32 of 2009 Concerning Environmental Protection and Management".

environment and still need to lead to the contents of the forest, including its flora and fauna. When referring to the rules, namely the Ministerial Regulation of Environment and Forestry of the Republic of Indonesia number P.2/Menlhk/Setjen/Kum.1/1/2018 concerning Access to genetic resources of wild species and sharing of benefits for their utilization, which adopts more results from the Nagoya Protocol which is specifically aimed at utilization which contributes to the state in cooperation with several parties. Another thing is also evident when research by Lubis in 2021 shows that the law regarding biodiversity in only touches on environmental law.²⁷

Apart from that, another study from Najicha in 2022, biodiversity is linked to the environmental conservation cluster. In his research, he explained that existing regulations still have weaknesses and require further revision, for example Law Number 23 of 1997 concerning environmental management needs improvement because it must be adapted to the current conditions which are more complex, than Law Number 32 of 2009 concerning the implied protection and management of the environment still do not intersect with the rights of the local government, so there are indications of overlap in environmental management.²⁸

The 2019 Asram research also explained that the legal products of the law related to environmental protection only contain the environment broadly so there are multiple interpretations of the environment that there are still many changes that need to be adjusted in the form of laws that provide more separate protection for the environment.²⁹ Therefore, the sectoral ego in biodiversity management in Indonesia still has many obstacles and if this is allowed to drag on it will harm the sustainability of flora and fauna which currently require protection stages so that they do not become extinct and will not be able to return again and of course there will affect the food supply chain in nature.

So, this condition on the island of Kalimantan is very worrying for all the flora and fauna. While the research results when refers to local regulations regarding handling from a legal perspective, for example in West Kalimantan Province, namely by West Kalimantan Provincial Government Regulation Number 3 of 2014 concerning Environmental Protection and Management, Article 21 shows the reasons why extinction threats can occur, namely due to climate change and damaged ecosystem factors. The damage from climate change will undoubtedly have a impact and this area will also be affected including storms, drought, sea level rise and temperature. As for ecosystems, they include damage to mangrove areas, peatlands, coral reefs, forest and land fires, and extensive seagrass beds prone to

27 Lubis, "Konsep Hukum Biodiversitas Dalam Dunia Digital (Fondasi Teoritik Pengembangan Hukum Lingkungan Indonesia Berbasis Biodiversitas)."

28 Fatma Ulfatun Najicha, "Penegakan Hukum Konservasi Lingkungan Di Indonesia Dalam Perencanaan Pembangunan Berkelanjutan," *Doktrina: Journal of Law* 5, no. 1 (2022): 1–7.

29 Asram A.T. Jadda, "Tinjauan Hukum Lingkungan Terhadap Perlindungan Dan Pengelolaan Keanekaragaman Hayati," *Madani Legal Review* 3, no. 1 (2019): 39–62.

fires.³⁰

Then if we compare it with other regions, for example from the Province of East Kalimantan adheres to Local Government East Kalimantan Regulation Number 12 of 2021 concerning Criteria for Areas with High Conservation Value (ANKT), which are listed in article 4 where prevention of flora and fauna is associated with high conservation areas for unique, rare and vulnerable or endangered ecosystems, then for captive areas to maintain biodiversity continuity, as well as areas designated for the cultural identity of the Province of East Kalimantan as well as areas used as the carrying capacity of resources for food for the local population,³¹ so that a mechanism for sustainability will be created when reviewing these regulations.

Meanwhile, if you review Law Number 8 of 1999 concerning the Utilization of wild plant and animal species in article 34 there are only a few types of flora and fauna that can be special attention from the President of the Republic of Indonesia, especially if it is to be utilized economically. As for the endemic island of Kalimantan itself, there are only orangutans. Of course, this condition must receive the attention of all parties because the flora and fauna on the island of Kalimantan have of course been damaged and lost their homes and of course need to be preserved.

3. Prevention From Threats of Extinction of Flora and Fauna Through a Wide Virtual World

Virtual world is one of the existence of technological sophistication scientist are currently developing from all over the world. The virtual world is generally a utopia from the real world which is expected to be an ideal world without restrictions and without laws to create something ideal. The virtual world is also capable of presenting all forms of knowledge and its ability to continue to evolve with the times and of course must be able to be the answer to become a supporter in the movement to prevent the extinction of flora and fauna on the island of Kalimantan. In Zubaidah's research in 2019, it was said that the damage to nature that has resulted in reduced biodiversity includes turning animals and plants into endangerment due to a lack of information about the importance of their existence and they are often considered a threat to the survival of human life.³² Where so far the existence of the virtual world only supports the existence of the market and commercial interests do not lead to the existence of this biodiversity. He also added that there is a global scale ecological crisis which is a threat to all countries in the world and this needs to be a concern

30 "Regional Government of West Kalimantan Province Number 3 of 2014 Concerning Environmental Protection and Management".

31 "East Kalimantan Governor Regulation Number 12 of 2021 concerning Criteria for Areas with High Conservation Value".

32 Siti Zubaidah, "Biodiversitas: Lestarian Melalui Pembelajaran Dan Pewarisan Pengetahuan Lokal," *Jurnal Pendidikan Biologi FMIPA UNM*, no. August (2019): 1-14.

for all parties in ecological conversion in all lines of life.³³

Referring to the Law Number 11 of 2019 concerning the National System of Science and Technology in Article 6 which can be interpreted that the existence of technology must undoubtedly be able to contribute to the State of Indonesia both in the short and long term including in the context of maintaining sustainability natural.³⁴ In research conducted by Sardjono in 2011 stated that the existence of technology in various angles must be able to answer all challenges in various ways, one of which is *Sistem Pembelajaran* (Learning System).³⁵ He also added to his research that in preserving the natural environment, the most important thing is the local community's real and sustainable contribution and the government's role as an outreach activist to all communities. Thus, strengthening nature will depend heavily on the people who in general have direct contact with them and through the learning system mechanism it will certainly be easy to understand because it is not only for government needs but has also led to the basic, secondary to tertiary education system and the business community.

The results of research in the field also found that related to this socialization activist there is the role from the Ministry of Law and Human Rights which also contributes significantly to policy-making wherein the rules are Ministerial Regulation of Law and Human Rights Number 13 of 2017 concerning Data on Communal Intellectual Property. It is known that the regulation can be said to have succeeded in providing data and clarity on several sources include fauna dan flora as communal intellectual property in Indonesia.³⁶ Through these regulations, the public will understand and understand some of the flora and fauna which are currently a government priority and are protected. Prevention in the form of dissemination of this rule is the basis for the regions on the island of Kalimantan to continue to monitor efforts to develop various types of flora and fauna.

Another findshows that the existence of these regulations also provides many illustrations that the communal wealth of flora and fauna unique to Kalimantan makes Kalimantan very rich in wealth. In addition, artificial intelligence in the virtual world will be a guide in providing an overview of the impacts of cultivation, vegetation between forests and their contents which contain flora and fauna, where the technology will be a collection of information about the location of forests and their contents in protecting species and their habitat. One of the internet pages on Media Indonesia in 2020 where the use of the

33 Muhammad Asril et al., *Keanekaragaman Hayati*, ed. Ronal Watrianthos, 1st ed. (Jakarta: Yayasan Kita Menulis, 2022).

34 "Law of the Republic of Indonesia Number 11 of 2019 Concerning the National System of Science and Technology".

35 Wahyu Sardjono, "Model Pelestarian Lingkungan Hidup Berbasis Teknologi Informasi Pada Aktivitas Sosialisasi Berbasis Masyarakat Sebagai Sentra Partisipan," *ComTech: Computer, Mathematics and Engineering Applications* 2, no. 1 (2011): 368, <https://doi.org/10.21512/comtech.v2i1.2765>.

36 "Regulation of the Minister of Law and Human Rights of the Republic of Indonesia Number 13 of 2017 Concerning Communal Intellectual Property Data".

virtual world in several artificial intelligences has been combined and used as monitoring of the West Bali National Park (TNBB) in collaboration with the Ministry of Environment and Forestry of the Republic of Indonesia, but in this condition it is still in progress early stage and is expected to become a pilot project in Indonesia.³⁷

The digital world also does not only function as a commercial facility, but there is also a concept that supports programs from the government and pays attention to natural conditions without destroying it, namely the concept of digital tourism in villages that combines the concept of digital technology with its natural wealth and culture in the village. This concept is also one way to improve the village economy, including preserving culture and protecting the environment.

On the other hand, it refers to the rules, namely the Ministerial Regulation of Tourism and Creative Economy/Head of the Tourism and Creative Economy Agency of the Republic of Indonesia Number 9 of 2021 concerning Guidelines for Sustainable Tourism Destinations where in art. 2 regarding criteria for sustainable tourism destinations it also explains that the application of standards in tourism also does not only emphasize the involvement of information systems in the field of technology that presents a virtual world to involve many sectors, namely the government and the private sector as well as from the community in achieving its goal.³⁸

Referring to Indonesia's National Artificial Intelligence Strategy for the period 2020 to 2045 in explanation on pages 149-150 that prevention of damage to nature which is a threat to flora and fauna will combine with technology to become fast detection and fast response to natural damage. Detection in this book will focus on inputting data such as weather, temperature, and visuals, both from satellite imagery, sensors, surveillance cameras and others.³⁹ Innovations made in preventing the threat of extinction of flora and fauna through the virtual world certainly require support and also a lot the necessary funds. Innovation will not only protect the habitat but will also be combined to improve the economy for the local community. Indirectly, the community will also feel a loss due to the destruction of nature and the habitat of the flora and fauna that they have been able to use, which have become scarce, and for flora and fauna that are already endangered, they will be included in national priorities and a captive breeding is needed to stabilize these flora and fauna so that not extinct. Extinction in nature can of course be a disruption to the natural food supply chain and if there is no action from the government in utilizing technology it will be a loss to all parties.

37 Putri Rosmalia, "Kecerdasan Buatan Untuk Lindungi Alam," Media Indonesia, 2020, <https://mediaindonesia.com/teknologi/357114/kecerdasan-buatan-untuk-lindungi-alam>.

38 "Regulation of the Minister of Tourism and Creative Economy / Head of the Tourism and Creative Economy Agency of the Republic of Indonesia Number 9 of 2021 concerning Guidelines for Sustainable Tourism Destinations".

39 Sekretariat Nasional Kecerdasan Artifisial Indonesia, *Strategi Nasional Kecerdasan Artifisial Indonesia 2020-2045* (Jakarta: Sekretariat Nasional Kecerdasan Artifisial Indonesia, 2020).

4. Challenges and Solutions for Flora dan Funa Conservation Efforts in Indonesia

The challenges in carrying out law enforcement related to violations or economic activities that can cause damage to the flora and fauna habitat on Kalimantan Island must of course be a national development priority program. Scientists estimate that at least 45% of flora will become extinct in Kalimantan, Madagascar, Hawaii, and parts of the Philippines. Apart from that, there are + 100,000 species of flora whose uses and benefits are unknown and which are threatened with extinction, which means that 3 out of 4 flora will slowly experience extinction.⁴⁰ Apart from that, data collection in 2019 for fauna in the world and 17% of it is in Indonesia or around 300 thousand, and Indonesia is inhabited by at least 515 various types of mammals. Based on data on biodiversity in Indonesia, there are at least 294 types of flora and fauna that are experiencing extinction.⁴¹

One of the supporting factors in causing this extinction, according to the BRIN agency or the National Innovation Research Agency, is that anthropogenic activity factors include agriculture and land clearing and tend to play a very high role, especially in Kalimantan, and almost evenly in Papua, including in the Sumatra region. This, of course, disrupts the existing ecosystem and disrupts the food supply chain which will change drastically and threaten human safety itself. Research conducted by Fitriani states that if there is no attention and every program is not a priority, it will certainly disappear or become extinct.⁴²

Several other sources say that one of them is an environmental observer organization based in Germany, namely DW, where one of their findings is that the Earth will lose one million species of flora and fauna by 2030, apart from that every ten minutes every species of flora and fauna experiences extinction without its existence is known.⁴³ Referring to legal aspects in Indonesia through Law Number 32 of 2009 concerning Environmental Protection and Management, or the Law concerning Regional Government, it still does not touch on aspects of cooperation in handling the threat of extinction of Flora and Fauna in Indonesia, including in Kalimantan. Apart from that, until 2023, Executive Order Number 1 of 2023 concerning Mainstreaming Diversity Preservation in Sustainable Development has been issued, which explains on the first page that this activity involves many government agencies, both central and regional, as well as the police.⁴⁴

40 forestdigest.com, "Tumbuhan Dan Fungi Yang Belum Teridentifikasi Segera Punah," *Forestdigest.Com*, last modified 2023, accessed November 8, 2023, <https://www.forestdigest.com/detail/2435/tumbuhan-dan-fungi-punah>.

41 news.detik.com, "Miris! Ada Banyak Satwa Endemik Indonesia Yang Terancam Punah," *News.Detik.Com*, last modified 2019, accessed November 8, 2023, <https://news.detik.com/adv-nhl-detikcom/d-4604960/miris-ada-banyak-satwa-endemik-indonesia-yang-terancam-punah>.

42 Fitriani Fitriani, "Ancaman Kepunahan Dan Strategi Pemertahanan Tradisi Sinrili Di Masyarakat Makassar," *Paradigma : Jurnal kajian Budaya* 12, no. 2 (2022): 185–194.

43 dw.com, "Punahnya Keragaman Hayati Ancaman Terbesar Bagi Umat Manusia," *Dw.Com*, last modified 2022, accessed November 9, 2023, <https://www.dw.com/id/punahnya-keragaman-hayati-ancaman-terbesar-bagi-umat-manusia/a-62206772>.

44 Intruksi Presiden Nomor 1 Tahun 2023 Tentang Pengarustamaan Pelestarian Keanekaragaman Dalam Pembangunan Berkelanjutan.

However, if we look at the existence of this Excequtive Order which contains cooperation between the center and regions without involving business actors and in fact if only the government acts, including the local government or the police, the researchers believe that it will certainly not be effective. Apart from that, the Law on Regional Government should also be able to use extinction prevention actions as a strong legal umbrella. Apart from that, there is also the Ministerial Regulation of Law and Human Rights of the Republic of Indonesia Number 13 of 2017 concerning Communal Intellectual Property Data, which should be one of the legal aspects in reporting to support the efforts of the Presidential Instruction which still has minimal weaknesses, especially when there is no cross-actor involvement of course. will make things difficult for the government itself.

D. Closing

This study concludes that in preventing the threat of extinction of flora and fauna in Kalimantan, the research results show that the technological conditions in Indonesia, which are currently supported by statutory regulations must of course be able to accommodate this. Meanwhile, the concept of using it in the field has been implemented in one of the national parks as an initial protection system and will be implemented in 2021. Meanwhile, the laws and regulations related to biodiversity in Indonesia are not widely known and are still in the realm of law. environment. So it really needs to be implemented widely, especially in strengthening the field of biodiversity. Apart from that, Indonesia is one of the countries with the richest biodiversity in the world and a high forest content. With existing regulations, including the 2013 Excequtive Order, a solution for cooperation in supporting efforts to preserve and prevent the extinction of flora and fauna in Indonesia, including in Kalimantan, should be possible. However, of course real implementation must be carried out in real terms. When there is a balance between legal regulations and the correct application of technology, the condition of Indonesia's biodiversity will certainly be well maintained. Apart from that, to support sustainability it must be accompanied by additional aspects of punishment and also strong support for law enforcement from across sectors and not only local and central government, but also representation from all existing elements, including government, private sector and local communities.

Bibliography

A. Books

- Asril, Muhammad, Marulam MT Simarmata, Silvia Permata Sari, Indarwati, Ryan Budi Setiawan Arsi, Afriansyah, and Junairiah. *Keanekaragaman Hayati*. Edited by Ronal Watrianthos. 1st ed. Jakarta: Yayasan Kita Menulis, 2022.
- Gumilang, Surya Galang. "Metode Penelitian Kualitatif Dalam Perspektif Rancangan." *Jurnal Fokus Konseling* (2016).
- Sugiyono. *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, Dan R&D)*. 10th ed. Bandung: Alfabeta, 2014.
- Sekretariat Nasional Kecerdasan Artifisial Indonesia. *Strategi Nasional Kecerdasan Artifisial Indonesia 2020-2045*. Jakarta: Sekretariat Nasional Kecerdasan Artifisial Indonesia, 2020.
- Sugiyono. *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, Dan R&D)*. 10th ed. Bandung: Alfabeta, 2014.

B. Paper/Article/Proceeding/Research Result

- Blackham, Grace V., Edward L. Webb, and Richard T. Corlett. "Natural Regeneration in a Degraded Tropical Peatland, Central Kalimantan, Indonesia: Implications for Forest Restoration." *Forest Ecology and Management* 324 (2014): 8–15. <https://doi.org/10.1016/j.foreco.2014.03.041>.
- Burke, Brendan F. "Understanding Intergovernmental Relations, Twenty-Five Years Hence." *State and Local Government Review* 46, no. 1 (2014): 63–76. <https://doi.org/10.1177/0160323x13520461>.
- Fitriani, Fitriani. "Ancaman Kepunahan Dan Strategi Pemertahanan Tradisi Sinrili Di Masyarakat Makassar." *Paradigma : Jurnal kajian Budaya* 12, no. 2 (2022): 185–194.
- Gaveau, David L.A., Bruno Locatelli, Mohammad A. Salim, Husnayaen, Timer Manurung, Adria Descals, Arild Angelsen, Erik Meijaard, and Douglas Sheil. "Slowing Deforestation in Indonesia Follows Declining Oil Palm Expansion and Lower Oil Prices." *PLoS ONE* 17, no. 3 March (2022): 1–19. <https://doi.org/10.1371/journal.pone.0266178>.
- Gaveau, David L.A., Bruno Locatelli, Mohammad A. Salim, Husna Yaen, Pablo Pacheco, and Douglas Sheil. "Rise and Fall of Forest Loss and Industrial Plantations in Borneo (2000–2017)." *Conservation Letters*, 2018, 1–8. <https://doi.org/10.1111/conl.12622>.
- Jadda, Asram A.T. "Tinjauan Hukum Lingkungan Terhadap Perlindungan Dan Pengelolaan Keanekaragaman Hayati." *Madani Legal Review* 3, no. 1 (2019): 39–62.
- Kalima, Titi, Sri Suharti, Sumarhani, and Liam A. Trethowan. "Tree Species Diversity and Ethnobotany of Degraded Peat Swamp Forest in Central Kalimantan." *Reinwardtia* 19, no. 1 (2020): 27–54. <https://doi.org/10.14203/reinwardtia.v19i1.3819>.
- Lowatcharin, Grichawat, CharlesDavidCrompton, andSittipolPacharoen. "Intergovernmental Relations in a World of Governance: A Consideration of International Experiences, Challenges, and New Directions." *Asia-Pacific Social Science Review* 19, no. 4 (2019): 44–55.

- Lubis, Efridani. "Konsep Hukum Biodiversitas Dalam Dunia Digital (Fondasi Teoritik Pengembangan Hukum Lingkungan Indonesia Berbasis Biodiversitas)." *Jurnal Hukum Jurisdiction* 3, no. 2 (2021): 133–44. <https://doi.org/10.34005/jhj.v3i2.54>.
- Phillimore, John. "Intergovernmental Relations: Key Features and Trends." *Australian Journal of Public Administration* 72, no. 3 (2013): 228–38. <https://doi.org/10.1111/1467-8500.12025>.
- Sahabuddin, C, M Muliaty, U Farida, Hasbi, and Y Yusriadi. "Administration of Post-Reformation Decentralization Government." *International Journal of Recent Technology and Engineering* 8, no. 3 (2019): 7631–34. <https://doi.org/10.35940/ijrte.C6182.098319>.
- Sardjono, Wahyu. "Model Pelestarian Lingkungan Hidup Berbasis Teknologi Informasi Pada Aktivitas Sosialisasi Berbasis Masyarakat Sebagai Sentra Partisipan." *ComTech: Computer, Mathematics and Engineering Applications* 2, no. 1 (2011): 368. <https://doi.org/10.21512/comtech.v2i1.2765>.
- Tando, Cahyoko Edi, Sudarmo, and Rina Herlina Haryanti. "Collaborative Governance Effort to Manage Forest in Kalimantan Island: Literature Review." *Jurnal Manajemen Hutan Tropika (Journal of Tropical Forest Management)* 28, no. 1 (2022): 15–21. <https://doi.org/10.7226/jtfm.27.1.15>.
- Ulfatun Najicha, Fatma. "Penegakan Hukum Konservasi Lingkungan Di Indonesia Dalam Perencanaan Pembangunan Berkelanjutan." *Doktrina: Journal of Law* 5, no. 1 (2022): 1–7.
- Wicke, Birka, Richard Sikkema, Veronika Dornburg, and André Faaij. "Exploring Land Use Changes and the Role of Palm Oil Production in Indonesia and Malaysia." *Land Use Policy* 28, no. 1 (2011): 193–206. <https://doi.org/10.1016/j.landusepol.2010.06.001>.
- Zubaidah, Siti. "Biodiversitas: Lestarian Melalui Pembelajaran Dan Pewarisan Pengetahuan Lokal." *Jurnal Pendidikan Biologi FMIPA UNM*, no. August (2019): 1–14.

C. Internet

- balaikliringkehati.menlhk.go.id. "Rangkong Gading Dan Arwana Super Red Satwa Karismatik Kalbar Yang Terancam Punah." <https://balaikliringkehati.menlhk.go.id/>, 2019. <https://balaikliringkehati.menlhk.go.id/rangkong-gading-dan-arwana-super-red-satwa-karismatik-kalbar-yang-terancam-punah/> (diakses 2 Mei 2023).
- BBC Indonesia. "Dapatkah Hewan Yang Sudah Punah Dihidupkan Kembali Untuk Melawan Perubahan Iklim?" *BBC Indonesia*, April 2021. <https://www.bbc.com/indonesia/majalah-58592804> (diakses 2 Mei 2023).
- . "Orangutan Dipulangkan Ke Indonesia Di Tengah 'Perburuan Yang Masih Terjadi.'" [www.bbc.com](https://www.bbc.com/indonesia/majalah-55899594), 2021. <https://www.bbc.com/indonesia/majalah-55899594> (diakses 1 Mei 2023).
- CNN Indonesia. "4 Tanaman Endemik Di Indonesia Yang Hampir Punah." *2CNN Indonesia*, 2022. <https://www.cnnindonesia.com/gaya-hidup/20220316103010-284-771892/4-tanaman-endemik-di-indonesia-yang-hampir-punah> (diakses 28 April 2023).
- dw.com. "Punahnya Keragaman Hayati Ancaman Terbesar Bagi Umat Manusia." *Dw.Com*. Last modified 2022. Accessed November 9, 2023. <https://www.dw.com/id/punahnya-keragaman-hayati-ancaman-terbesar-bagi-umat-manusia/a-62206772>.

- forestdigest.com. "Tumbuhan Dan Fungi Yang Belum Teridentifikasi Segera Punah." *Forestdigest.Com*. Last modified 2023. Accessed November 8, 2023. <https://www.forestdigest.com/detail/2435/tumbuhan-dan-fungi-punah>.
- FWI. *Deforestasi Tanpa Henti "Potret Deforestasi Di Sumatera Utara, Kalimantan Timur Dan Maluku Utara*. Bogor, Indonesia, 2018.
- Kompas.com. "Hewan Langka Terancam Punah Di Pulau Kalimantan." Kompas.com, 2022. <https://www.kompas.com/skola/read/2022/03/22/161341169/hewan-langka-terancam-punah-di-pulau-kalimantan?page=all> (diakses 29 April 2023).
- mmc.kalteng.go.id. "Pohon Ulin, Si Pohon Besi Terkenal Di Kalimantan." mmc.kalteng.go.id, 2018. <https://mmc.kalteng.go.id/berita/read/753/pohon-ulin-si-pohon-besi-terkenal-di-kalimantan> (diakses 30 April 2023).
- news.detik.com. "Miris! Ada Banyak Satwa Endemik Indonesia Yang Terancam Punah." *News.Detik.Com*. Last modified 2019. Accessed November 8, 2023. <https://news.detik.com/adv-nhl-detikcom/d-4604960/miris-ada-banyak-satwa-endemik-indonesia-yang-terancam-punah>.
- Rosmalia, Putri. "Kecerdasan Buatan Untuk Lindungi Alam." Media Indonesia, 2020. <https://mediaindonesia.com/teknologi/357114/kecerdasan-buatan-untuk-lindungi-alam> (diakses 1 Mei 2023).
- Theconversation.com. "100 Ribu Orang Utan Punah Di Kalimantan Akibat Penebangan Hutan Dan Perburuan." <https://theconversation.com/>, 2018. <https://theconversation.com/100-ribu-orang-utan-punah-di-kalimantan-akibat-penebangan-hutan-dan-perburuan-92450> (diakses 2 Mei 2023).
- wwf Indonesia. "Upaya Bersama Untuk Melindungi Gajah Kalimantan." www.wwf.id, 2020. <https://www.wwf.id/publikasi/upaya-bersama-untuk-melindungi-gajah-kalimantan> (diakses 25 April 2023).

D. Regulations

- Intruksi Presiden Nomor 1 Tahun 2023 Tentang Pengarustamaan Pelestarian Keanekaragaman Dalam Pembangunan Berkelanjutan.
- Pemerintah Daerah Provinsi Kalimantan Barat Nomor 3 Tahun 2014 Tentang Perlindungan dan Pengelolaan Lingkungan Hidup.
- Peraturan Gubernur Kalimantan Timur Nomor 12 Tahun 2021 tentang Kriteria Area Dengan Nilai Konservasi Tinggi.
- Peraturan Menteri Hukum dan HAM RI Nomor 13 Tahun 2017 tentang Data Kekayaan Intelektual Komunal.
- Peraturan Menteri Pariwisata dan Ekonomi Kreatif/Kepala Badan Pariwisata dan Ekonomi Kreatif Republik Indonesia Nomor 9 Tahun 2021 tentang Pedoman Destinasi Pariwisata Berkelanjutan.

Peraturan pemerintah Nomor 48 tahun 2011 Tentang Sumber Daya Genetik Hewan Dan Pembibitan Ternak.

Undang-Undang Nomor 23 Tahun 2014 Tentang Pemerintahan Daerah.

Undang-Undang Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup.

Undang-Undang Nomor 8 Tahun 1999 Tentang Pemanfaatan Jenis Tumbuhan Dan Satwa Liar.

Undang-Undang Republik Indonesia Nomor 11 tahun 2019 Tentang Sistem Nasional Ilmu Pengetahuan Dan Teknologi.

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