

# The urgency to strengthen blue carbon ecosystem settings based on theory law development to use to realize sustainable development in Indonesia

*by* PASCASARJANA UIR

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# The urgency to strengthen blue carbon ecosystem settings based on theory law development to use to realize sustainable development in Indonesia

H Susanti <sup>1\*</sup>, E Yanti <sup>2</sup>,

<sup>1</sup>Fakultas Hukum, Universitas Islam Riau,

Jalan Kaharuddin Nst, Simpang Tiga, Kecamatan Bukit Raya, Kota Pekanbaru, Riau 28288 Indonesia

\*[heni@law.uir.ac.id](mailto:heni@law.uir.ac.id)

**Abstract.** The purpose of this study is first, to find out how the blue carbon ecosystem is currently regulated in Indonesia and secondly to find out how urgent it is to strengthen the regulation of blue carbon ecosystems in Indonesia to realize sustainable development in Indonesia. The research method used in this research is a normative juridical research method, the problem approach used in this writing is through the approach of various laws and regulations (statute approach). There are already several regulations that regulate good blue carbon ecosystems in the constitution and various laws and regulations, including Law Number 32 of 2009 concerning Environmental Protection and Management and Law Number 41 of 1999 concerning Forestry. In addition, it includes Law Number 32 of 2014 concerning Marine Affairs and Law Number 27 of 2007 concerning the Management of Coastal Areas and Small Islands as well as various other laws and regulations. However, there are still many areas that have not made regional regulations to protect mangrove areas, so the blue carbon ecosystem has not been optimally maintained. It is very necessary to establish regulations strictly to protect blue carbon ecosystems both from laws and regulations, as well as derivative regulations used to protect the use of blue carbon ecosystems to achieve sustainable development in Indonesia.

## 1. Introduction

Climate change is a global problem that does not only occur in Indonesia. Increasing the temperature of the earth's surface, the intensity of extreme weather, and the frequency of floods and droughts are clear evidence of climate change. Herawati stated that climate change is a phenomenon of climate deviation from normal conditions that hit Indonesia and two conditions are known, namely El Nino and La Nina which have the potential to cause natural disasters in the form of droughts, flash floods, landslides, and others. Climate change is a global issue caused by changes in climate parameters such as temperature, rainfall, air humidity, wind, cloud conditions, rainfall, and solar radiation. According to Hilman, Indonesia is already vulnerable to the risks of natural disasters, such as floods, landslides, erosion, tropical storms, and droughts, and will face even greater risks due to climate change. [1] In 2030, the 29% independent reduction target for GHG emissions is 834 million tonnes of CO<sub>2</sub>e, while the conditional target (support international) of 38% is 1,081 million tonnes of CO<sub>2</sub>e. This target will be achieved through mitigation actions from five sectors, namely energy, process, and utilization industrial products (IPPU), agriculture, forestry and other land use (AFOLU), and waste. [2]

Climate change occurs because the climate on earth is largely influenced by the presence of natural greenhouse gases/GHGs in the atmosphere. In addition to natural GHGs, also known as anthropogenic



GHGs ( man-made greenhouse gases ) are gases that are by-products of human activities, GHGs which include carbon dioxide /CO<sub>2</sub>, methane/CH<sub>4</sub>, chloro fluorocarbon /CFC, nitrogen dioxide/N<sub>2</sub>O, and tropospheric ozone/O<sub>3</sub>. Scientific evidence has shown that the amount of greenhouse gases continue to increase because human activities on earth will eventually cause the greenhouse effect and global climate change. The first IPCC report published in August 1990 stated: if the normal scenario continues ( business as usual ), meaning that if no action is taken to deal with the environmental problem, then the global average temperature will continue to increase by around 0.3°C per decade. This brings the global average temperature to around 2°C in 2025 and around 4°C in 2100.[ 3]

Climate change is basically not only a problem in Indonesia but a global problem in many other countries, which deserves more attention from various parties. Indonesia's sea area which reaches 5.8 million km<sup>2</sup> makes the potential of the marine sector invaluable, especially from the marine natural wealth sector. [4] Indonesia as the largest archipelagic country in the world has 17,504 islands, 16,056 of which have been standardized and registered with the Union Nations through the 10th United Nations Conference on Standardization of Geographical Names. Abundant natural resources make the sea area very important for national development. Indonesia's strategic position is not only seen from the position at the junction between the two continents, namely Asia and Australia, as well as the two oceans, namely the Pacific Ocean and the Indian Ocean, but also between the South China Sea and the East Asian Sea and the Indian Ocean. placing Indonesia in an important position in creating political, economic and regional, and international security stability. [5]

One of the efforts that can be made to deal with world climate change, especially in Indonesia, is by increasing the protection of coastal ecosystems. Coastal ecosystems such as mangroves and seagrass beds provide many important services for adaptation to climate change. For example protection from storms and sea level rise, prevention of shoreline erosion, adjustment of coastal water quality, providing habitat for commercially important fisheries and endangered marine species, and food security for many coastal communities. One of the ecosystem services provided by mangroves and seagrass beds concerning global climate change is to absorb and store large amounts of blue carbon originating from the atmosphere and oceans so that it is now being recognized for its role in overcoming climate change. [6]

Despite providing many benefits and services, blue coast carbon ecosystems are among the most threatened on Earth, with an estimated 340,000 to 980,000 hectares of these ecosystems being destroyed each year. It is estimated that up to 67% and at least 35% and 29% of all global forest cover of mangroves, tidal marshes, and grasslands had been lost, respectively. If this continues at a constant rate, 30-40% of tidal marshes and seagrass beds and almost all of the unprotected mangroves will be lost in the next 100 years.

Article 1 paragraph (3) of the 1945 Constitution of the Republic of Indonesia (1945 Constitution of the Republic of Indonesia) "Indonesia is a country based on law" or ( rechtstaat ). [7] In Indonesia, there are several obstacles to protecting and preserving blue carbon ecosystems. At least 7 challenges have been identified. First, safeguard instruments (conservation, etc.) do not cover all blue carbon ecosystems. Then there are constraints related to institutional arrangement and enabling conditions, such as those related to law enforcement in the blue carbon ecosystem protection sector. Another challenge is the need to strengthen the recognition and empowerment of community-led initiatives, including increasing community participation in the policy-making process. In addition, there are still obstacles in supervision and law enforcement. Finally, there needs to be a development mechanism that supports the financing of high-quality blue carbon projects.

Based on this description it is necessary to strengthen regulations related to blue carbon protection, as a form of government efforts to preserve blue carbon on the coasts and as an effort to make people aware who are also ecosystems on earth to participate in empowering. to preserve blue carbon ecosystems in the face of world climate change, thus the formulation of the problem in this study is First, how is the regulation of blue carbon ecosystems in Indonesia currently, and secondly what is the urgency of strengthening blue carbon ecosystem regulations in Indonesia to realize sustainable development in Indonesia?

## 2. Research method

Research on these articles is a legal study that focuses on values, principles, and legal norms, both written and unwritten, to use legal issues that are thoroughly examined. The type of research on these articles is normative juridical or legal doctrine studies. In this research, the authors would like to explain the fact that environmental laws and regulations in Indonesia have not further regulated the protection of blue carbon as a coastal ecosystem that plays an important role in dealing with climate change. The approach used in this study is like a knife surgery for an in-depth study and study of the legal issue. The approach used is the statutory approach, in which the author studies laws and regulations related to environmental law, especially regarding strengthening the protection of blue carbon ecosystems. Conceptual Approach, in which the author studies legal concepts, especially those related to strengthening blue carbon ecosystem protection mechanisms. Comparative approach, in which the author compares how the blue carbon ecosystem protection law is strengthened in other countries with Indonesia.

## 3. Results and discussion

### Blue carbon ecosystems in Indonesia

Blue Carbon is a term coined in 2009 to draw attention to the degradation of marine and coastal ecosystems and the need to conserve and restore them to mitigate climate change and for the other ecosystem services they provide. Blue Carbon has many meanings, which we wish to explain here, reflecting the original description of the draft including (1) all organic matter captured by marine organisms, and (2) how marine ecosystems can be managed to reduce greenhouse gas emissions and thereby contribute to the mitigation and conservation of climate change. [8] Blue carbon is one of the terms (limitation) used to describe the environmental services of mangroves. Other ecosystems that can contribute to blue carbon include tidal swamps and seagrass beds. The blue carbon coastal ecosystem is one of the most threatened ecosystems on earth, with around 340,000 to 980,000 hectares of this ecosystem being destroyed every year. It is estimated that up to 67% and at least 35% and 29% of the total global coverage of mangroves, tidal swamps, and grasslands, respectively, have been lost. If this continues at a constant rate, 30-40% of tidal swamps, seagrass beds, and almost all of the unprotected mangroves will be lost in the next 100 years. When degraded or lost, this ecosystem will become a source of large amounts of carbon dioxide greenhouse gas (GHG) emissions [9].

Blue carbon provides new opportunities to encourage and support the preservation (restoration and protection) of coastal ecosystems globally to maintain the various benefits provided by these ecosystems. Apart from that, the utilization of blue carbon is also a form of implementation of sustainable development goals (SDGs, point 14: life bellows water - life lower sea, preserving and protecting the preservation of the sea and marine life sources for sustainable development). Therefore, blue carbon sequestration is recommended as a natural climate solution. [10]

The forest and land sector in Indonesia is a sector that contributes to emissions and has the potential to reduce large emissions. Seeing this condition, Indonesia has a clear commitment to positioning REDD+ as the main effort to achieve its commitment. REDD+ is an international objective incentive mechanism to encourage policies and actions in developing forest-owning countries to reduce deforestation and forest degradation. REDD+ focuses on forest issues, namely how forest management is carried out within the framework of reducing CO<sub>2</sub> emissions through efforts to reduce and prevent deforestation and forest degradation and or protection forests to increase the quantity of forest cover or carbon stocks, given the symbol (+) because it includes conservation efforts and sustainable forest management. [11]

Indonesia is a country that has abundant natural wealth, natural wealth is on the surface of the earth and the bowels of the earth. [12] Indonesia is an archipelago with a long coastline that has the largest mangrove forest in the world. In 2006, Indonesia's mangrove forest area was 4.3 million hectares. In 2005 the area of Indonesia's mangrove forests was 3,062,300 hectares, this constituted 19% of the total area of mangrove forests worldwide. 15 Mangrove forests in Indonesia are spread across every province

in Indonesia, the largest area in 2016 was in the province of Papua, namely 1.1 million hectares or 29.05% of the mangrove area in Indonesia. Meanwhile, the smallest area of mangroves is in DI Yogyakarta Province, which is 40.10 hectares. The area of Indonesia's mangrove forests in 2014 was 4.4 million hectares, in 2015 it was 3.7 million hectares and in 2016 it was 3.9 million hectares. Mangrove damage in 2016 amounted to 52%. The biggest damage was found in South Sulawesi Province. This will be a big profession for the Indonesian government in dealing with the condition of extensive mangrove forests that tend to fluctuate. The area of mangrove forests is spread unevenly in every province in Indonesia, where the government's attention is not only on the province with the widest mangrove forest area but also on even the smallest mangrove forest area on how to increase the extent of the mangrove ecosystem and reduce the occurrence of disturbing factors. in the sustainability of the mangrove ecosystem. Considering that mangrove forests are included as Blue Carbon, Indonesia's role is very important in efforts to achieve the NDC target. However, based on the research results of the Paris Agreement which was passed through Law Number 16 of 2016 since the Law was promulgated, the Paris Agreement law has been in effect in Indonesia and has become positive law in Indonesia. The legal problems found in the implementation of the blue carbon-based REDD+ program in Indonesia are that law enforcement is still weak and certain laws are in the form of legal instruments in terms of protecting and managing mangrove forests.

As a form of its implications for Indonesia as a member country of the Paris Agreement, Indonesia is bound by the Paris Agreement and is obliged to obey and respect the Paris Agreement. Carry out the obligations contained in the Paris Agreement. In implementing the Paris Agreement, Indonesia has previously gone through the approval process to be bound by the Paris Agreement. According to Article 1 point b of the 1969 Vienna Convention, self-binding or consent to be bound can be done through ratification, accession, acceptance or acceptance, and approval. In the Paris Agreement, each country is required to reduce and limit greenhouse gas emissions, then the form of commitment of each country is stated in the contribution determined nationally. The Paris Agreement contains the obligations implied in Article 4 (2) (9) (13), Article 13 (7) letters a, b. Article 4, contains the obligations of all countries to implement and establish NDCs as a form of commitment by each country through mitigation efforts, to achieve targets in their NDCs, to report the results of NDC achievements every five years, and to be responsible for the implementation of the NDCs. NDC. According to Article 13 (7) letter a, b, it is mandatory for all countries to report the results of a national greenhouse gas inventory regularly and to report information related to the progress of the implementation of the NDC.

The Paris Agreement has been legalized into Indonesian national law through Law Number 16 of 2016 concerning the Ratification of the Paris Agreement to the UNFCCC, having previously been signed by the Indonesian government on April 22, 2016, in New York, United States. The entry into force of the Paris Agreement through the Constitution through ratification by the President previously drafted the ratification of the Constitution which had been approved and discussed jointly by the DPR and the President. In this way, the Paris Agreement will occur and become part of Indonesian national law, and will take effect since Law Number 16 of 2016 was promulgated, namely on October 25, 2016.

Basically, everyone living on this earth has the right to live in safety and avoid the dangers of climate change. This right is a universal right for humans, it is regulated in the Indonesian constitution. The right to a good and healthy environment is one of the human rights as stipulated in Article 28H paragraph (1) of the 1945 Constitution of the Republic of Indonesia, which states: that: "Everyone has the right" to live in physical and spiritual prosperity, get a good and healthy environment and have the right to health services." The environment itself is very important to discuss because the environment is a unitary space with all objects, forces, circumstances, and living things, including humans and their behavior, which affect nature. of course, the survival and welfare of humans and other living things. To create a prosperous life it is very important to strive for protection and implementation of development with due regard to environmental sustainability. [13]

The main obligation that has been carried out by Indonesia is the obligation to provide contributions that are determined nationally. Indonesia has assigned its first National Contribution/NDC since November 2016 to the UNFCCC Secretariat Body. Indonesia's NDC contains Indonesia's mitigation

efforts to reduce greenhouse gas emissions by 29% by own efforts and 41% by collaborating with international efforts in 2030. There are 5 sectors included in the NDC, namely the forestry sector at 17.2%, and the energy sector at 11%, the agricultural sector by 0.32%, the industrial sector by 0.10%, and the waste sector by 0.38%. In Indonesia's NDC, the forestry sector is the main sector for Indonesia to achieve the NDC. As implied In Article 5 of the Paris Agreement, each country is urged to take conservation actions and increase carbon sequestration and carbon storage. Given this, Indonesia has made REDD+ activities part of the forestry sector to achieve NDC.

Law Number 1 of 2014 concerning Amendments to the 2007 Law concerning the Management of Coastal Areas and Small Islands. Law No. 1 of 2014 confirms that the Management of Coastal Zone and Small Islands is coordination of planning, utilization, supervision, and control of resources for coastal and small islands activities carried out by the Government and Regional Government, between sectors, between terrestrial and marine ecosystems, as well as between knowledge and management to improve people's welfare so that cross-sectoral involvement and coordination is needed to oversee the process of managing coastal areas, especially those on small islands. Law Number 23 of 2014 concerning Regional Autonomy where the permit for the management of coastal areas is in the hands of the Provincial Government while in 2014 concerning permits for the management of Coastal and Small Islands Management of coastal areas can be carried out by the local government. [14]

Presidential Regulation Number 73 of 2012 contains a national strategy that will be carried out by the central government and regions to manage mangrove ecosystems, this is followed up by the issuance of regional regulations as a form of regional autonomy by each regional head. However, it can be seen that the reality of the mandate from Presidential Regulation Number 73 of 2012 is not running as it should. Some rules obtained from several areas related to Mangrove management, including Regional Regulation of South Sulawesi Province, Maros Regency Number 03 of 2015 concerning Mangrove Conservation, West Java Regional Regulation Number 6 of 2011 concerning Management of Mangrove Forests and Coastal Forests, Regional Regulation of Raja Regency Ampat Number 8 of 2012 concerning Protection of Mangrove Forests and Coastal Forests, Gorontalo Provincial Government Regulation Number 7 of 2016 concerning Management of Mangrove Ecosystems, West Java Governor Regulation Number 28 of 2013 concerning Instructions for Implementing Regional Regulations of West Java Province Number 6 of 2011 concerning Mangrove Forest Management and Coastal Forest. Mimika Regional Regulation Number 12 of 2014 concerning Protection and Management of Mangrove Ecosystems.

Seeing these conditions, there are very few areas where the government has not finished making regulations related to the protection of mangrove forests in their government areas. Through the principle of regional autonomy, local governments are obliged to maintain and manage mangroves. In this case, the government area plays a very important role in the management of mangrove ecosystems. Whereas in Law Number 32 of 2009, organizers who neglect to manage mangrove areas can be subject to sanctions. However, it is still limited to regulations that have not been effectively implemented. Judging from the regulations issued government areas related to mangrove forests are still a product of the Kyoto Protocol regime so regulations under the Paris Agreement regime regarding mangrove protection are still not visible at this time. Regulations made to protect mangrove ecosystems in coastal areas are very prone to environmental damage. To preserve mangrove forests including conservation and rehabilitation, the role is needed not only from the regional government center, but a very important role is the role of the community around the coastal area.

### **The Urgency of Strengthening Ecosystem Regulation Blue carbon in Indonesia is used to realize sustainable development in Indonesia**

Internationally, the plan for sustainable development was developed through the report of the World Commission on Environment Life and Development (The World Commission on Environment and Development) in 1987, which is better known as the Brundtland Report with the title Our Common Future. It is reported that there is a requirement for every country to apply the development plan of the concept of sustainable development. The definition of sustainable development according to WCED

means development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. the needs of the present generation without neglecting the needs of future generations). According to Konrad Ginther and Paul JIM de Waart, the definition of WCED is considered the most adequate as can be seen from his statement that the concept of sustainable development has been widely discussed, but no agreement has been reached on the definition of sustainable development beyond and more suitable than that in the Brundtland Report. The difficulty of defining sustainable development is also pointed out by several experts who can only identify the characteristics of sustainable development, as stated by Otto Soemarwoto, Emil Salim, Lamont C. Hempel, Johan Galtung, and David Brower as follows:

1. Otto Soemarwoto argued that sustainable development must be ecologically, socially, and economically sustainable
2. Emil Salim said sustainable development requires natural resources that we manage rationally. That is, natural resources can be processed, as long as it is rational and wise. For this reason, a development approach with environmental development is needed, namely eco-development;
3. Lamont C. Hempel proposed a sustainable development design as a policy that combines the interests of environmental protection for the benefit of economic growth. [15]

Sustainable Development Goals (SDGs) with environmentally sustainable development is one of the frameworks carried out by the United Nations (UN) as an important step in achieving global development. The SDGs were agreed upon in 2015 by world leaders under the auspices of the United Nations, including Indonesia, to achieve three main goals, namely ending poverty, fighting inequality, and stopping global climate change. The SDGs contain 17 GOALS and 169 targets that are expected to be achieved by 2030. Efforts to achieve the 17 goals cannot be separated from the participation of various parties, including the government, the private sector, civil society organizations, academics, and the community. Even though the government is the policy stick holder in implementing the SDGs, the community as the largest community is the main driver in determining the level of achievement of the SDG targets. [16]

As stated in SDGs (Sustainable Development Goals) Points 14 and 15 reads:

Goal 14: "Sustainable Utilization and Preservation of Oceans, Oceans, and Marine Resources to Fulfill Sustainable Development".

Goal 15: "Renew, promote and protect ecosystems and the strength of land resources sustainably, halt the loss of biodiversity, reverse land degradation, combat desertification and manage forests sustainably". [17]

Law is part of human creation that is used to uphold human dignity. Relevance to the basic values of nationality is to realize a civilized conception of justice, such as the second precept of the Pancasila. Therefore, the law as a means of development and renewal of society must be realized in the formation of laws (regulations) in strategic fields related to the management of the environment and natural resources. Related to the function of the rule of law, Sudikno Mertokusumo said the function of the rule of law is essential to protect human interests. Law enforcement is tasked with seeking a balance of arrangements in society and legal certainty to achieve the goal of the law, namely public order. For human interests to be protected, the law must be implemented. The implementation of the law can take place normally and peacefully, but it can also occur due to violations of the law. In this case, it is the law that has been violated that must be upheld. Through law enforcement here, the law becomes a reality. The many rules or norms stipulated in environmental and natural resource legislation are supposed to protect human behavior from the exploitation of natural resources and environmental destruction, such as forest fires, and river and ocean pollution. [18]

Regulatory legislation is an important aspect to be used as a guideline for government administrators and the public to create legal certainty which is a factor in the success of blue carbon ecosystem protection programs. Law Number 32 of 2009 concerning Environmental Protection and Management and Law Number 41 of 1999 concerning Forestry are still the references regarding mangrove forests. In addition, this includes Law Number 32 of 2014 concerning Maritime Affairs and Law Number 27 of 2007 concerning the Management of Coastal Areas and Small Islands. In 2012,



Presidential Regulation Number 73 of 2012 was issued concerning the national strategy for managing mangrove ecosystems. This Presidential Decree is the specific rule governing the management of mangrove ecosystems including the protection of mangrove ecosystems. This Presidential Decree was issued within the framework of the Kyoto Protocol 1 and is still used as a reference in the management of mangrove forests. Presidential Regulation Number 73 of 2012 contains a national strategy that will be carried out by the central government and regions to manage mangrove ecosystems, this is followed up by the issuance of regional regulations as a form of regional autonomy by each regional head. However, it can be seen that the reality of the mandate from Presidential Regulation Number 73 of 2012 is not running as it should. Several rules obtained from several areas related to Mangrove management, including Regional Regulation of South Sulawesi Province, Maros Regency Number 03 of 2015 concerning Mangrove Conservation, West Java Regional Regulation Number 6 of 2011 concerning Management of Mangrove Forests and Coastal Forests, Regional Regulation of Raja Regency Ampat Number 8 of 2012 concerning Protection of Mangrove Forests and Coastal Forests, Gorontalo Provincial Government Regulation Number 7 of 2016 concerning Management of Mangrove Ecosystems, West Java Governor Regulation Number 28 of 2013 concerning Instructions for Implementation of Regional Regulations of West Java Province Number 6 of 2011 concerning Mangrove Forest Management and Coastal Forest. Mimika Regional Regulation Number 12 of 2014 concerning Protection and Management of Mangrove Ecosystems.

From the description above, we can conclude that Indonesia is a country consisting of islands, a country that has the largest maritime economy among other ASEAN countries. At the end of 2015, Indonesia recorded 67% of the total added value of the ASEAN maritime industry. Indonesia also dominates 83% of the added value of the marine economy in the fisheries sector vs. 31% in the East Asia Pacific Region. The economic growth of the maritime sector in Indonesia has contributed to strengthening Indonesia's economy after the 1997 Asian financial crisis. Even so, Indonesia's marine health index as stated in the OECD 2021 report yesterday was ranked 137th out of 221 countries. Thus, legal protection efforts are urgently needed for blue carbon ecosystems so that later they can deal with climate change. Laws and Regulations As a manifestation of the government's seriousness in protecting blue carbon ecosystems, it is necessary to have laws and regulations capable of protecting blue carbon ecosystems after the Kyoto protocol and derivatives of the Paris agreement, as well as regional governments capable of making regional regulations regarding ecosystems. mangroves.

Other internationally binding instruments are needed to effectively apply the norms for the protection of the marine environment which are general in UNCLOS 1982, UN CBD 1992, and the IMO Convention. The legal development framework for the protection of marine ecosystems to support the implementation of a sustainable marine economy needs to use consolidated principles as a reference for the legal framework for such development. This development legal framework must be part of the transformation process from an unsustainable ocean economy to a sustainable ocean economy. There are very few facts in areas where **the government has not completed regulations regarding the protection of mangrove forests in its administrative areas.** Through the principle of regional autonomy, local governments are obliged to maintain and manage mangroves. In this case, the government area plays a very important role in the management of mangrove ecosystems. Whereas in Law Number 32 of 2009, organizers who neglect to manage mangrove areas can be subject to sanctions. However, there are still regulations that have not been effectively enforced

#### **4. Conclusion**

As for the conclusion of the discussion above, there are two things, first there are many regulations governing good blue carbon ecosystems in the constitution and various laws and regulations, including Law Number 32 of 2009 concerning the Protection and Management of the Environment and Law Number 41 of 1999 concerning Forestry. In addition, this includes Law Number 32 of 2014 concerning Maritime Affairs and Law Number 27 of 2007 concerning the Management of Coastal Zone and Small Islands as well as various other laws and regulations. However, there are still many areas that have not made regional regulations to protect mangrove areas, resulting the blue carbon ecosystem not being protected optimally. The second, It is very necessary to establish regulations explicitly to protect blue

carbon ecosystems both from laws and regulations, as well as derivative regulations used to protect the use of blue carbon ecosystems to achieve sustainable development in Indonesia.

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