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by Cek Turnitin UWKS

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Prospect of Protection and Development Sea Grass Ecosystem as Carbon Sink and Carbon Source Due to Climate Change

Ria Tri Vinata[1], Umi Enggarsasi[1], Besse Sugiswati[1] and Ibnu Asqori Pohan[2]
[1]Law Faculty, Wijaya Kusuma Surabaya University, Jalan Dukuh Kupang XXV/54, Surabaya, East Java, Indonesia
2 Faculty of Social and Political Sciences, Brawijaya University, Jalan Veteran Malang, Malang, East Java, Indonesia
riatrivinata@gmail.com, umienggarsasinohan@gmail.com, kitaw53@yahoo.com, ibnuasqoripohan@gmail.com

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Abstract: The sea has an important role in the global carbon cycle, about 93% of the Earths CO2 is circulated and stored through the sea. The sea, including coastal ecosystems, can store large amounts of carbon and over a relatively long period of time. Marine waters have 3 coastal ecosystems that include mangrove ecosystems, seagrass ecosystems and coral reef ecosystems. Indonesia coastal area with a seagrass area of about 30,000 km2, the second largest in the world after West Australia, is likely to have considerable capacity in storing CO2. Given the level of destruction of seagrass beds determine the condition of ecosystem then to determine the level of damage required standard criteria applicable in all regions in Indonesia. This study uses the standard criteria of KMNLH No.200 / 2004. Information on seagrass capacity as carbon storage is still limited, especially in Indonesia, so research on measuring carbon stocks on seagrasses is necessary and seagrass protection as carbon sinks and carbon sources in marine areas need to be re-constructed. Prospects for the protection of the marine environment especially seagrass beds are needed as an effort to protect the sea as carbon sink and carbon source. Indonesia in this case is entitled to pursue long-term strategic interests so as to clarify the role of Indonesia in the world marine fishery policy arena that is beneficial for the sustainability and sustainability of its marine resources. This study focusses on the sea as an absorber and release of carbon dioxide as a result of climate change that can provide protection against the sea through a new policy that must exist. This research method is with normative juridical research type with approach problem of statute approach, conceptual approach, and comparative approach. This study examines and manages the research data by tracing the efforts of establishing international law to the sea as carbon release and absorption and its implementation of the Indonesian marine territory. The result of this research is grouping of seagrasses as carbon sink and carbon source, mapping of seagrass-related sea area as absorbent and release of carbon dioxide, legal reconstruction to protect marine environment especially seagrass as absorbent and release of carbon dioxide.

1 INTRODUCTION

Climate change is a scientific phenomenon that has been scientifically proven. Article 1 The UNFCCC defines climate change as a change in climate caused either directly or indirectly by human activities that alter the composition of the global atmosphere and natural climate variability observed over a period of time. In general, there are four climate change impacts: rainfall, extreme weather, temperature rise and sea level change. Thus, climate change can lead to serious problems such as rob floods, disease vectors and drought that could affect communities, especially poor people who lack the knowledge and capacity to respond to the impacts of climate change. The impacts of climate change will aggravate the conditions that have occurred and reduce the ability of ecosystems to withstand subsequent changes. (Kennedy and Bjork, 2009)

Indonesia is the largest archipelago country in the world, which stretches 5,000 km from the Indian Ocean to the Pacific Ocean and consists of nearly 13,500 islands. Most of the islands are volcanic islands that emerge from deep sea waters. As many as 16% of the world's coral reefs (more than 39,500 km2) are located in Indonesia. Only Australia has larger coral reefs (42,000 km2).

Marine waters have 3 coastal ecosystems that include mangrove ecosystem, seagrass ecosystem and coral reef ecosystem. The seagrass ecosystem is

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located between the two coastal ecosystems that occur mutually beneficial interactions. Indonesia's coastal territory with a seagrass area of about 30,000 km2, the second largest in the world after East Australia, seagrass capability holds excess carbon production in the sediment, as well as a relatively long-term accumulation capability that makes the seagrass role in storing carbon stocks more significant compared to measurement based on the area of cover and net primary production only. (Gacia and Duarte, 2001)

Thus, seagrass beds can act as carbon sinks or carbon sinks. Associated with climate change, seagrasses become one of the most impacted ecosystems.

Many seagrasses disappear primarily in the mouth of the river and in shallow water. The main cause is the rise in temperature in some shallow water habitats. (Nontji, 2008)

Increased temperature effect on distribution and reproduction process of seagrass. The decline in the area and the destruction of seagrass ecosystems in Indonesia occurs in line with the number of turbulence on the surface of the water due to activities for the purpose of economic improvement that resulted in pollution that impact on the damaged seagrass ecosystem.

Seagrass beds, one of the coastal ecosystem constituent communities, have ecological functions and economic value, are also habitats with high biodiversity of marine life. The ecological functions of seagrass ecosystems include hatcheries of various species of fish, where various marine life foraging, connecting terrestrial habitats and other marine habitats, and stabilizing sediments to prevent coastal erosion, etc

Seagrass beds also have a key function that can be considered as carbon sinks. Based on the absorption rate of Blue Carbon and carbon storage is proportional to (and often higher than) the level of carbon sequestration rich in terrestrial ecosystems such as tropical rainforests or peatlands.

A recent report released by UNEP, IOC-UNESCO, IUCN and FAO shows that as much as 7% of carbon dioxide (CO2) reduction is needed to keep atmospheric concentrations below 450 ppm (a level that the majority of scientists think will provide a 50% chance of maintaining warming global within two-degree boundary] can be achieved by protecting and rehabilitating mangroves, salt marshes and seaweed communities, in the hope of being achieved by REDD.

Seagrass is good and free from pollution of the marine environment able to support the local and national economy. Therefore, the Government of Indonesia should immediately provide legal protection related to the marine environment especially seagrass beds as a balancing climate change. Information on seagrass capacity as carbon storage is still limited, especially in Indonesia, so research on the measurement of carbon stocks on seagrasses needs to be done and seagrass protection as carbon sinks and carbon sources in marine areas need to be re-constructed.

2 RESULTS AND DISCUSSION

A recent study of the extent of seagrass beds in Indonesia by the LIPI Oceanographic Research Center (2017) shows that seagrass area throughout Indonesia is 150,693 16 ha. In the western part of Indonesia, it is 4,409.48 hectares, while in the eastern part of Indonesia it is 146,283.68 ha.

The condition of seagrass beds in Indonesia, when based on Ministerial Decree No. 200 in 2004, can be divided into three categories: healthy (seagrass cover> 60%), less healthy (30-59.9%) and unhealthy (0-29.9%). The study of LIPI Oceanographic Research Center (2017), which is based on 166 stations across Indonesia, shows that the average seagrass cover is 41.79%, which means "lack of health" (Guinotte and Fabry, 2008).

World Ocean Conference as an implementation of the United Nation Framework of Climate Change Convention is still very poor attention by stakeholders and society, especially the sea as a regulator of climate change. Can be proved by the absence of clear regulation related to the sea as an absorbent and release of carbon dioxide. Therefore, this research will classify seagrass and mangrove as carbon net sink and carbon source.

Policy is an action plan to guide decisions and achieve results. Governments from countries around the world are working on designing policies that will stop climate change, helping people make adjustments to past changes, and make better preparations for future changes. Negotiations work through international organizations that help governments work together to make policy on many important issues covering climate change (Harris, 1998). The international organization that leads international policy-making is the United Nations (UN), which covers 192 countries-almost every country in the world.

Within the United Nations, a body called the United Nations Framework Convention on Climate Change (UNFCCC) is working on governing

countries to design climate change policies. The UNFCCC holds important policy-making meetings annually. Each UNFCCC country sends delegates or representatives to participate in this policy meeting to negotiate and make decisions on how to deal with climate change. Non-governmental organizations (NGOs), private parties, and special interest groups, such as indigenous people's organizations, also attend this meeting to present their opinions and influence decisions. However, only government delegates make decisions at the UNFCCC.

The most important action being undertaken by the UNFCCC at the moment is the policy of assisting countries to halt or mitigate climate change and make adjustments to the ongoing effects of climate change. This policy creates plans, encourages research, and supports countries with money and technology to take action in solving problems that come with climate change.

The UNFCCC sets out an overall framework for intergovernmental efforts to address the challenges posed by climate change. The Convention has been ratified (approved) by 192 countries so it almost has universal membership. According to the Convention, governments: collect and share information on greenhouse gas emissions, national policies and best practices, launch a national strategy to address greenhouse gas emissions and make adjustments to expected impacts, including the provision of financial and technological support to the state Development, cooperate in preparing adjustments to the impacts of climate change such as rising sea levels, droughts and floods. The Convention came into force on 21 March 1994. (Fourqurean, 2012)

Countries in the world are increasingly serious about addressing climate change issues. Commenced during the implementation of the UN Conference on Environment and Development (UNCED) in Rio de Jenerio, Brazil, in 1992 or known as the Earth Summit. UNCED then produced signatories to the signing of the United Nations Framework on Climate Change Convention (UNFCCC). The Convention's decision-making body is the Conference of the Parties (COP). In addition, the UN commissioned the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP) to establish the Inter-Governmental Panel on Climate Change (IPCC), which consists of the world's leading scientists for scientific climate change measurement. One of the most famous COP was the 3rd COP in Kyoto, in December 1997 which resulted in the Kyoto Protocol. The Kyoto Protocol aims to stabilize greenhouse gas concentrations (including CO2) at a level not harmful to humans, in which the period from 2008 to 2012. However, until the end of the Kyoto Protocol there is no significant reduction of CO2 emissions into the atmosphere and no binding agreement to extend the Kyoto Protocol. Recent developments show no hope of reducing CO2 emissions to the atmosphere, even some countries that have ratified the Kyoto Protocol have already withdrawn from their commitments. (Church and White, 2006)

For that, it needs a structured effort in adapting to the impacts of climate change, in addition to mitigation campaign efforts continue to be encouraged. Adaptation under the IPCC (2007a) is an adjustment to the natural or human system in response to climate change and its effects, both current and anticipated for future changes, adjustments can be either to reduce the bad or to exploit the profitable opportunities. Various types of adaptation that exist, among others: a. Proactive adaptation conducted before climate change impacts are observed (anticipatory adaptation), b. Adaptation of spontaneity triggered by ecological changes in natural systems and changes in well-being in human systems; c. Planned adaptation, which is the result of policy decisions arising from the awareness that a change is being or is about to take place that requires a concrete step to restore it to its original state or regulate it.

3 CONCLUSIONS

number of concrete actions can be taken to reduce the impacts of climate change on people living in coastal areas such as: Addressing threats to living creatures in the sea that are not sources of climate (e.g. overfishing and using environmentally damaging and polluting) Climate will further exacerbate the threat. Establish and manage effectively marine conservation areas, including: (i) maintaining the integrity of coral reef systems and mangrove forests around the island that can help protect coastal communities from storms; and (ii) maintaining the health of reef fish populations that can provide abundance and replacement Fish stocks that have been depleted in the surrounding area. Rehabilitation of mangroves and coral reefs and other natural habitats that have been damaged. Develop an ecosystem-based fisheries management approach to increase the resilience of fish populations.

REFERENCES

Church J. A., White, N. J., 2006. *A 20th century acceleration in global sea-level rise*. Geophysical Research Letters, 33, L01602

Fourqurean, J. W., 2012. Blue carbon in seagrass ecosystems, *Symposium Blue Carbon, Managing Coastal Ecosystems for Climate Mitigation*. European Parliament, Brussel.

Gacia E., Duarte, S. M., 2001. *Sediment retention by a Miditerranean Posidonia oceanica Meadow: The balance between depositin and resuspension*. Est Coast Shelf.

Guinotte, J. M., Fabry, V. J., 2008. *Ocean Acidification and Its Potential Effects on Marine Ecosystems." (Pengasaman Air Laut dan Kemungkinan Pengaruhnya terhadap Ekosistem Laut)*. Annals of the New York Academy of Sciences.

Harris, D. J., 1998, *Cases and Materials on International Law*, Sweet and Maxwel. London, 5th.ed.

Kennedy, H., Bjork, M., 2009. *Seagrass meadows*. in Laffoley D, Grimsditch G, editor. The Management of Natural Coastal Carbon Sinks. Gland Switzerland: IUCN.

Nontji A., 2008. *Plankton Laut*, Lembaga Ilmu Pengetahuan Indonesia (LIPI) Press. Jakarta.

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