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Measurable Fishing as an Attempt of Preventing Overfishing Phenomenon in Indonesian Waters

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Abstract

This research focuses on analyzing the effectiveness of the provision about the measurable fishing as specified in the Government Regulation Number 11 of 2023 as an attempt of preventing overfishing and maintaining the sustainability of biodiversity in Indonesian waters and sea territory. This study is normative research with statute approach. The data used was secondary one consisting of primary legal, secondary legal, and non-legal materials. Overfishing phenomenon is a serious problem endangering ocean resource and environment. Some countries have reported the overfishing problems damaging the sea ecosystem. Indonesia is one of countries predictably encountering overfishing phenomenon, particularly in northern Java water territory. The indicators of overfishing phenomenon are smaller size of fish and fewer fish

caught requiring the fishermen to go farther to catch fish. The fact of overfishing leads to a policy of zone-based measurable fishing and catching quotas. This policy can cease the overfishing phenomenon because it can control and monitor fish catch, thereby making resources and the environment better in water or sea territory. Considering the conclusion of the research, the concept of measurable fishing formulated by Indonesia is based on zone and quota. Zone base prioritizes equal share for the fishermen, promotes economic growth, and determines the capacity of catch allowed for a certain species, while quota base focuses on the limitation of fish catching level based on the potency of fish caught that can control the fishing rate according to the fish resource.

KEYWORDS *Overfishing, Measurable Fishing, Waters Environment, Ocean Resources, Indonesia*

Introduction

This research departed from the appearance of the overfishing phenomenon occurring in the Northern Java coastal area. Considering the Report on Legal Analysis and Evaluation on Coastal Area Management and Small Islands by the National Legal Plan and Development Center of the National Agency for Legal Building of the RI's Ministry of Law and Human Rights in 2015, it can be explained that the overfishing phenomenon occurring in Malacca Strait, Northern Java Beach, Bali Strait, and Southern Sulawesi Beach is due to the fishing level surpassing the sustainable potency of fish stock.[1] In addition to considering the report, the overfishing phenomenon in Northern Java Beach has been confirmed through the research implemented in the region. From the result of previous research, it can be concluded that not only the Northern Java coastal region but also up to 12 miles from northern Java water territory do encounter a decrease of resources, with smaller sizes of fish and fewer fish. It requires the fishermen to sail farther (about 60 miles) to catch the fish.[2] The data of several species encountering overfishing phenomenon in

[1] PPPHN Kemenkumham, "Laporan Analisis Dan Evaluasi Hukum Tentang Pengelolaan Wilayah Pesisir Dan Pulau-Pulau Kecil," 2015, 17, https://www.bphn.go.id/data/documents/ae_tentang_pengelolaan_wilayah_pesisir_dan_pulau-pulau_kecil.pdf.

[2] Kholis Roisah et al., "Legal Development in the Overcoming Overfishing in Indonesian Coastal Areas," *Journal of Indonesian Legal Studies* 8, no. 2 (2023): 1083–84, https://doi.org/10.15294/jils.v8i2.69358.

Northern Java Water found by the previous studies, are consistently that Bawal, Ranjungan, Tenggiri, dan Tongkol fish decreased in production volume in 2018 – 2020. Then Gabus fish and shrimp also decreased significantly in production volume in 2020, while Cucut and Setuhuk fish were no longer found in 2020.[3] This phenomenon is in line with the status of world fishery in 2018, in which 33% of fish stock was caught beyond its sustainable limit. The stock represents only 1% of the total species caught and the figure will likely indicate overfishing throughout the world.[4]

Overfishing is the act of catching fish from waters at a level that cannot be met by a fish species. It then causes a decrease in the population of such fish species. The overfishing phenomenon is often overridden more than climate change, air pollution, or water pollution phenomenon, and thereby men still catch the fish species excessively leading to reduced ocean resources in the future.[5] Overfishing occurs due to human activities in catching fish species more quickly than the fish's reproducing ability. This activity results in the vulnerability of sea ecosystem and can contribute to the reduction of other sea species.[6] There is an assumption that the fish species with bigger body will have lower maximum population growth and it cannot replace the volume lost due to overfishing.[7] Chain reaction or domino arises from overfishing, such as attenuating habitat and main species, encouraging the growth of non-surviving species, and sustainable exploitation.[8] Overfishing has some very serious consequences: lost income from alternative resource use, fluctuation risk and higher vulnerability, social and economic conflict, and reallocation and

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3 Roisah et al., 1085–86.

4 Charlotte L.A. Gough et al., "Evidence of Overfishing in Small-Scale Fisheries in Madagascar," *Frontiers in Marine Science* 7, no. June (2020): 1–17, https://doi.org/10.3389/fmars.2020.00317.

5 Yuanyang Du, Jiale Sun, and Guoyun Zhang, "The Impact of Overfishing on Environmental Resources and the Evaluation of Current Policies and Future Guideline," *Proceedings of the 2021 International Conference on Public Relations and Social Sciences (ICPRSS 2021)* 586, no. Icprss (2021): 1120–24, https://doi.org/10.2991/assehr.k.211020.316.

6 United Nations Environment Programme, "Overfishing, a Major Threat to the Global Marine Ecology," *Environment Alert Bulletin*, 2004.

7 Nicholas K. Dulvy et al., "Overfishing Drives over One-Third of All Sharks and Rays toward a Global Extinction Crisis," *Current Biology* 31, no. 21 (2021): 4773–87, https://doi.org/10.1016/j.cub.2021.08.062.

8 Jason S. Link, "Evidence of Ecosystem Overfishing in U.S. Large Marine Ecosystems," *ICES Journal of Marine Science* 78, no. 9 (2021): 3176–3201, https://doi.org/10.1093/icesjms/fsab185.

management costs.[9] In addition, overfishing can reduce the fish stock and the water resource's ability to adapt to climate change. This phenomenon relates to adverse fishing practices including illegal unreported and unregulated fishing. Overfishing can occur when the fishing technique is implemented using hazardous tools damaging the bottom of the sea.[10]

In relation to the causes of overfishing, several irresponsible fishermen still use fishing tools damaging the bottom of the sea to fish in Northern Java Water territory. It has been confirmed in previous studies, finding that several irresponsible fishermen deliberately used fishing tools such as cantrang and cotok (seine and trawl nets) in the area 12 miles from Northern Java Waters. The banned fishing tools belong to micro-sized trawl,[11] and those should have been banned in the provision of Indonesian legislation, the Ministry of Maritime and Fishery's Regulation Number 18 of 2021.[12] Trawl is designed to catch sea species with the target located close to, in and in the bottom of sea.[13] This fishing technique using trawl is criticized widely for damaging the environment.[14] In addition, biological communities decline the technique due to its increasing impact on the sea species, such as high additional catch level, carbon dioxide emission from fuel, and potential contribution to greenhouse emission due to the emission of carbon existing in the sea bottom sediment. The concern with the impact makes some states restrict and ban the use of trawl effectively,[15] one of which is Indonesia.

The impact of trawl fishing tools that can damage the environment and is still used by irresponsible fishermen leads to the fact that it is not easy to replace

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9 Max Aquero, "Economic Consequences of Excessive Effort," no. 359 (n.d.): 164–69.

10 Ca Van Pham et al., "The Threshold Effect of Overfishing on Global Fishery Outputs: International Evidence from a Sustainable Fishery Perspective," *Fishes* 8, no. 2 (2023), https://doi.org/10.3390/fishes8020071.

11 Roisah et al., "Legal Development in the Overcoming Overfishing in Indonesian Coastal Areas," 1083–84.

12 Kementerian Kelautan dan Perikanan Republik Indonesia, "Peraturan Menteri Kelautan Dan Perikanan Nomor 18 Tahun 2021 Tentang Penempatan Alat Penangkapan Ikan Dan Alat Bantu Penangkapan Ikan Di Wilayah Pengelolaan Perikanan Negara Republik Indonesia Dan Laut Lepas Serta Penataan Andon Penangkapan Ikan" (2021).

13 R Hilborn et al., "Evaluating the Sustainability and Environmental Impacts of Tr a Wling Compared to Other Food Production Systems," no. October 2022 (2023): 1–13, https://doi.org/10.1093/icesjms/fsad115.

14 J. B. Jones, "Environmental Impact of Trawling on the Seabed: A Review," *New Zealand Journal of Marine and Freshwater Research* 26, no. 1 (1992): 59–67, https://doi.org/10.1080/00288330.1992.9516500.

15 Hilborn et al., "Evaluating the Sustainability and Environmental Impacts of Tr a Wling Compared to Other Food Production Systems."

such fishing tools. Even, some modified trawl tools emerge to deceive the provisions that have regulated the trawl ban.[16] In the field context, it is not easy to replace the fishing tool because fishermen worry that their catch will decrease. The concern with welfare or economic factors is the reason why irresponsible fishermen are still found using such trawl tools today.[17] In addition, fishery management implemented today still ignores the consideration of social and economic dimensions, while inadequate attention is paid to the ecological foundation underlying the continuous exploitation.[18]

To maintain the sea balance and conservation from the impact of damaging fishing tools and to maintain the fishermen's welfare, the Indonesian government has issued a policy about measurable fishing as mentioned in Government Regulation Number 11 of 2023 about the Measurable Fishing.[19] The policy of measurable fishing as mentioned in the legislation emphasizes fish resource conservation, overfishing prevention, local development, increased non-tax state revenue, fishermen welfare, job opportunity realization, improved fishery industry at home, improved fishery product, improved credibility of fishery industry, and tourism development in the local region.[20]

Considering the phenomenon explained above, this research focuses on the analysis of the measurable fishing concept as governed in the legislation. The analysis in this study aims to measure the effectiveness of measurable fishing concepts in an attempt to prevent the overfishing phenomenon in Indonesian waters territory. It is important to preserve the conservation of the sea environment that has been damaged due to continuous fishing activity regardless of sea environment factors and ocean resource sustainability in maintaining the balance of the sea environment and the availability of food sources for the next generation. This research emphasizes objectively the environmental aspect and of course, the welfare of fishermen, so that the basic problem can be solved well.

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[16] Arisandi, "Inkonsistensi Kebijakan Penggunaan Jaring Trawl (Studi Kasus Penggunaan Jaring Trawl Oleh Nelayan Wilayah Perairan Gresik)," *Jurnal Kebijakan Dan Manajemen Publik* 4, no. 1 (2016), https://doi.org/https://doi.org/10.21070/jkmp.v4i1.195.

[17] Roisah et al., "Legal Development in the Overcoming Overfishing in Indonesian Coastal Areas," 1083–84.

[18] Paul S. Kemp et al., "Future Advances in UK Marine Fisheries Policy: Integrated Nexus Management, Technological Advance, and Shifting Public Opinion," *Marine Policy* 147, no. October 2022 (2023): 105335, https://doi.org/10.1016/j.marpol.2022.105335.

[19] Republic of Indonesia, "Peraturan Pemerintah Nomor 11 Tahun 2023 Tentang Penangkapan Ikan Terukur" (2023).

[20] Sakti Wahyu Trenggono, "Penangkapan Ikan Terukur Berbasis Kuota Untuk Keberlanjutan Sumber Daya Perikanan Di Indonesia," *Jurnal Kelautan Dan Perikanan Terapan (JKPT)* 1 (2023): 1, https://doi.org/10.15578/jkpt.v1i0.12057.

This study is normative legal research[21] with statute approach.[22] The type of data used was secondary data[23] with the data source including primary legal material (Government Regulation Number 11 of 2023 about Measurable Fishing), secondary legal material such as legal books, legal scientific journals, and legal experts' writing, and non-legal material such as books, scientific journals, and expert's writing related to overfishing. Data collection was carried out using library study to be processed later using selection, classification, and systematic organization,[24] and analyzed qualitatively[25] to provide valid data. Data confirmation was also carried out in this study by interviewing the Chairperson of the Legal Division of the Republic of Indonesia's Ministry of Maritime and Fishery.

This research analyzes the concept of measurable fishing in an attempt to prevent overfishing using environmental justice theory. This theory integrates the moral consideration of non-human nature into the care about environmental justice. The justice extends to the relationship between humans and nature in its terminology, from environmental justice to ecological justice. Schlosberg, in the context of environmental justice theory, argues that individual organisms and natural systems are entitled to a just share of necessities, recognition as part of a wide community, development and fulfillment of developing ability, and some inclusion measures in the political process.[26]

Overfishing as The Threat of Sea Environment Damage

Overfishing is the act of catching too many fish up to the level where the fish population is incapable of reproducing themselves sustainably. It is a problem that can affect sea ecosystems throughout the world.[27] Overfishing has occurred in most hemispheres and affects very significantly the sea ecosystem.

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[21] Muhaimin, *Metode Penelitian Hukum* (Mataram: Mataram University Press, 2020).

[22] Peter Mahmud Marzuki, *Penelitian Hukum: Edisi Revisi* (Jakarta: Prenadamedia Group, 2005).

[23] Mukti; Yulianto Achmad Fajar, *Dualisme Penelitian Hukum Normatif & Empiris* (Yogyakarta: Pustaka Pelajar, 2019).

[24] Fajar.

[25] Muhaimin, *Metode Penelitian Hukum.*

[26] Peter F. Cannavo, "Defining Environmental Justice: Theories, Movements, and Nature, David Schlosberg (New York: Oxford University Press, 2007)," *Ethics & International Affairs* 22, no. 3 (2008).

[27] Lord Wright, "The Impact of Overfishing on Marine Ecosystems," *Poultry, Fisheries & Wildlife Sciences* 11, no. 1 (2023), https://doi.org/10.35248/2375-446X.23.11.221.

Intergovernmental Panel on Climate Change states that human beings affect the climate system and CO2 emission has an impact on the sea environment at an unprecedented level.[28] Overfishing is factual not only in the context of catching too many fish compared with what is produced sustainably by nature but also in the context of catching valued and high-valued fish species massively thereby stopping the food chain cycle. In addition, in some problems occurring, the use of hazardous fishing tools can destroy the sea environment as well.[29]

Historically, overfishing can aggravate the impact of the sea environment leading to the small scale of fishing and the decrease in fish catch volume in local regions.[30] It, then, will result domino effect on the sea ecosystem that in turn will generate imbalance. When a fish population decreases, the species in the food chain depending on the fish population will be disturbed and it requires the species to migrate to a new region to look for food. This sequence will, of course, disturb the sea ecosystem balance and can result in the extinction of certain fish species. The decrease in fish population and the extinction of certain fish species will affect the fishermen's occupation which will lead to decreased income and even the lost job.[31]

The potency to recover fishing from the presence of overfishing is determined by comprehensive supportability and a variety of ecological conditions relevant to the recovery method.[32] The recovery act should be packaged into a preventive measure to protect the sustainability of ocean resources. There is a fact that aquatic species have no opportunity to survive due to overfishing; therefore, a provision is required to be specified with appropriate legislation to protect the ocean resource. Individual, national government, and global government efforts should be elaborated to protect the ocean resource. It

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[28] Ibrahim Issifu et al., "Impact of Ocean Warming, Overfishing and Mercury on European Fisheries: A Risk Assessment and Policy Solution Framework," *Frontiers in Marine Science* 8, no. February (2022): 1–13, https://doi.org/10.3389/fmars.2021.770805.

[29] U. Rashid Sumaila and Travis C. Tai, "End Overfishing and Increase the Resilience of the Ocean to Climate Change," *Frontiers in Marine Science* 7, no. July (2020): 1–8, https://doi.org/10.3389/fmars.2020.00523.

[30] Francisco Ramírez et al., "Overfishing Species on the Move May Burden Seafood Provision in the Low-Latitude Atlantic Ocean," *Science of the Total Environment* 836, no. November 2021 (2022), https://doi.org/10.1016/j.scitotenv.2022.155480.

[31] Wright, "The Impact of Overfishing on Marine Ecosystems."

[32] Ali Carl Ehsan, "Brief Note on Insights on Environmental Impact of Fishing," *Fisheries and Aquaculture Journal* 12, no. 7 (2021): 1, https://www.longdom.org/open-access/brief-note-on-insights-on-environmental-impact-of-fishing.pdf.

can be achieved by organizing the regulation of fishing or the conservation of almost extinct species in strict legislation.[33]

Concept of Measurable Fishing

The increased concern with the phenomenon of overfishing input distribution has generated some problems in fishing capacity management. The problems lie in several ships or the excessive fishing ability for the increased number of fisheries. Food and Agriculture Organization of the United Nations (FAO) shows that overfishing has occurred 35% of the time referring to the whole primary marine fishery.[34] Therefore, FAO, through Article 6.3 of the Code of Conduct for Responsible Fisheries 1995,[35] recommends that every state is obliged to prevent overfishing and excessive fishing capacity, and take controlling measures to ascertain the fishing attempt that is balanced/equal to the productive capacity of fishery resources and sustainable exploitation.[36]

With the controlling measure in ascertaining the fishing attempt in a balanced/equal manner, there are principles and measures in terms of conservation and management in the sea area. These principles and measures are intended to ascertain the long-term sustainability related to highly migratory species; the availability of scientific evidence validity in the term of caution approach; targeted stock, non-target species, and species coming from the same interdependent ecosystem; to minimize waste, rubbish, catch resulting from the lost or neglected fishing tools, pollution resulting from fishing ship and non-target species; the protection of biodiversity in sea environment; the prevention of overfishing and overfishing capacity; the interest of subsistent traditional fishermen; and monitoring, controlling, and supervision.[37] The principle and measure can be the basis for the states to formulate the provision of national law to maintain and protect ocean resources and the environment. Some countries have developed a concept by calculating the status of fish stock as part of their fishery management system. The calculation of fish stock status is used to measure the performance and to evaluate whether or not an act of managing is

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[33] Daniel Jonathan Bardey, "Overfishing: Pressure on Our Oceans," *Research in Agriculture, Livestock and Fisheries* 6, no. 3 (2019).

[34] S Pascoe and D Gréboval, *Measuring Capacity in Fisheries*, *FAO Fisheries Techical Paper. No. 445.*, 2003.

[35] United Nations Food and Agriculture Organization, "Food and Agriculture Organization of the United Nations, Code of Conduct for Responsible Fisheries" (1995).

[36] Pascoe and Gréboval, *Measuring Capacity in Fisheries.*

[37] R. Pramoda et al., "Fisheries Management Policy in Indonesia's Exclusive Economic Zone Area," *IOP Conference Series: Earth and Environmental Science* 869, no. 1 (2021), https://doi.org/10.1088/1755-1315/869/1/012001.

required. It is an indicator to see the abundant fish stock or the estimated fishing with a specified target or limit. Designing and calculating an indicator should identify its objective and use. It can be based on the maximum sustainable yield designed to indicate the performance in providing sustainable products.[38]

The measurement concept technique in the term of fishing has been developed in such a way that adapts to the condition of fisheries and waters in individual countries. For example, the European Union countries measure the fishery conservation technique to influence how and where the fishing is done by encouraging selective fishing and protecting the parts of the ocean ecosystem.[39] Furthermore, in Iceland, fishing activity was conceptualized openly to all ships with a management system based on fishing attempts up to the 1950s. Iceland then changed the system into fishery management based on a quota called Individual Transferable Quotas (ITQ) in 1976, which has provided substantial economic benefit.[40] In addition to Iceland, New Zealand is a leading country in experimenting with quota-based fishery. ITQ is a system aiming to improve economic efficiency, to reduce fishery waste, and to prevent overfishing.[41] The system also serves as an attempt to reduce fishing significantly to maintain the sustainable stock of fish. ITQ also gives incentives necessary to reduce the catch rate comprehensively and thereby put the fishery in sustainable condition.[42]

Measurable Fishing as An Attempt of Preventing the Overfishing in Indonesian Waters

Indonesia, in an attempt to protect ocean resources and the ocean environment, implements a policy for quota- and zone-based measurable fishing. This policy has a primary objective, to manage capture fisheries better

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[38] Ray Hilborn, "Measuring Fisheries Management Performance," *ICES Journal of Marine Science* 77, no. 7–8 (2020): 2432–38, https://doi.org/10.1093/icesjms/fsaa119.

[39] Stuart A. Reeves, "Lessons from The Past for The Future of Technical Measures," in *Workshop on A New Technical Measures Framework for The New Common Fisheries Policy* (European Union, 2015), https://doi.org/10.2861/650920.

[40] Stefan B. Gunnlaugsson and Hordur Saevaldsson, "The Icelandic Fishing Industry: Its Development and Financial Performance under a Uniform Individual Quota System," *Marine Policy* 71 (2016): 73–81, https://doi.org/10.1016/j.marpol.2016.05.018.

[41] Kristinn Nikulás Edvardsson, Cezara Păstrăv, and Karl Benediktsson, "Mapping the Geographical Consolidation of Fishing Activities in Iceland during the Maturation of the ITQ Fisheries Management System," *Applied Geography* 97, no. October 2017 (2018): 85–97, https://doi.org/10.1016/j.apgeog.2018.05.013.

[42] The Organisation for Economic Co-operation and Development, "Sustaining Iceland's Fisheries Through Tradeable Quotas," *OECD Environment Policy Paper*, no. 9 (2017).

in an attempt to balance the economy and ecology.[43] This policy has been specified in the legislation in the form of Government Regulation Number 11 of 2023 about Measurable Fishing. This policy provides an opportunity for fishing in several fishery management and off-shore territories.[44] The provision concerning measurable fishing is the policy in terms of fishing based on quota (catch limit) and zone. Fishing quotas and zones are limited in an attempt to maintain fish stock and give the fishermen and the actors of the fishery business an economic benefit.[45]

Concerning the zone-based concept, measurable fishing in Indonesia involves two catching zones: the Republic of Indonesia's Fishery Management area (Indonesian: *Wilayah Pengelolaan Perikanan Negara Republik Indonesia*, thereafter called WPPNRI) in marine and off-shore waters.[46] The measurable fishing zone of WPPNRI in marine waters is used merely to be a fishing area and to limit fishing.[47] The fishing area is the territory of the water used to exploit fish resources using fishing tools that can be used perfectly in the region.[48] Meanwhile, the limited fishing area is the area where fishing is implemented using a certain ship size, certain catching tools, or a certain time.[49] Furthermore, in relation to the measurable fishing zone in high seas, it is used as the fishing region corresponding to the provision of each of the Regional Fisheries Management Organization (RFMO).[50] The measurable fishing zone in marine and off-shore waters includes:[51]

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43 Republik Indonesia Kementerian Kelautan dan Perikanan, "Penangkapan Ikan Terukur Berbasis Kuota Utamakan Nelayan Kecil," 2022, https://kkp.go.id/artikel/38386-penangkapan-ikan-terukur-berbasis-kuota-utamakan-nelayan-kecil.

44 Mukti Aprian et al., "Re-Thinking Indonesian Marine Fisheries Quota-Based Policy: A Qualitative Network of Stakeholder Perception at Fisheries Management Area 718," *Ocean and Coastal Management* 243, no. February (2023): 106766, https://doi.org/10.1016/j.ocecoaman.2023.106766.

45 Trenggono, "Penangkapan Ikan Terukur Berbasis Kuota Untuk Keberlanjutan Sumber Daya Perikanan Di Indonesia."

46 Indonesia, Peraturan Pemerintah Nomor 11 Tahun 2023 tentang Penangkapan Ikan Terukur, n. Article 2 clause (1).

47 Indonesia, n. Article 2 clause (2).

48 Domu; Irnawati R; Sitanggang LP; Ernaningsih D; Manopo VEN; Tadjuddah M; Karnan; Mohamad Simbolon, *Pembentukan Daerah Penangkapan Ikan* (Bogor: Departemen Pemanfaatan Sumberdaya Perikanan Fakultas Perikanan dan Ilmu Kelautan Institut Pertanian Bogor, 2009).

49 Indonesia, Peraturan Pemerintah Nomor 11 Tahun 2023 tentang Penangkapan Ikan Terukur, n. Article 1.

50 Indonesia, n. Article 2 clause (3).

51 Indonesia, n. Article 2 clause (5).

1. Zone 01 includes Karimata Strait, Natuna Sea, and North Natuna Sea;
2. Zone 02 includes Sulawesi Sea Waters, northern part of Halmahera Island, Cendrawasih Bay Waters, and Pacific Offshore Ocean;
3. Zone 03 includes Tomini Bay waters, Maluku Seas, Halmahera Sea, Seram Sea, Berau Bay, Aru Sea waters, Arafuru Sea, eastern part of Timor Sea, Tolo Bay waters, and Banda Sea;
4. Zone 04 includes Indonesian Ocean in the western part of Sumatera, Sunda Strait, Indian Ocean in southern part of Java and the southern part of Nusa Tenggara, Sawu Sea, western part of Timor Sea, and off-shore Indian Ocean;
5. Zone 05 includes Malacca Strait and Andaman Sea; and
6. Zone 06 in Java Sea waters, Makassar Strait waters, Bone Bay, Flores Seas, and Bali Sea.

This zone regulating attempt aims to optimize fishing activity, prevent conflict due to the competition for fishing regions between fishermen, and support the concept of sustainable fishing in the future.[52] Furthermore, the measurable fishing zone used as the limited fishing region has specific regulations, the one specified by the Ministry of Maritime and Fishery.[53] The provision builds on some indicators: fish resource, fish resource environment, fishery social-economic condition, or fishery governance.[54] The measurable fishing zone in the limited fishing region can be exploited by small fishermen only or for non-commercial activities.[55]

When the analysis is conducted on the provision, the policy about measurable fishing in the limited fishing region is one of the preventive measures in the attempt to deal with the potentially damaged resource, damaged environment, or overfishing incidence in Indonesian waters area. It can be seen from the clause stating that the Ministry of Maritime and Fishery with its authority will assign the limited fishing region. Before the publication of such stipulation, it can be ensured that a more comprehensive study will be conducted first on fish resources, fish resource environment, social-economic fishery condition, or governance. Following the study, the waters assigned to be the fishing region or the limited fishing region would be mapped. If the

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[52] Onesimus Dhyas Dwi; Domu Simbolon; Budy Wiryawan Atmajaya, "Efektivitas Pemanfaatan Informasi Daerah Penangkapan Handline Yang Berbasis Di Pelabuhan Perikanan Pondokdadap Malang," *Jurnal Kemaritiman: Indonesian Journal of Maritime* 2, no. 1 (2021).

[53] Indonesia, Peraturan Pemerintah Nomor 11 Tahun 2023 tentang Penangkapan Ikan Terukur, n. Article 3 clause (1).

[54] Indonesia, n. Article 3 clause (2).

[55] Indonesia, n. Article 4 clause (1).

mapping provides a water region in which resource damage, environmental damage, and overfishing occur, the water region will belong to the limited fishing category and according to the provision can be used by small fishermen only and for non-commercial activities like research. This concept leads to the law certainty related to the attempt to recover the damaged resource and environment in the waters.[56]

In addition to the assignment of a zone or region to be the basis of the development of measurable fishing concepts in Indonesia, the determination of catching quota also underlies the formulation of such measurable fishing concepts. This catching quota will be assigned annually based on the estimated potency and the volume of fish catch allowed.[57] This quota-assigning technique builds on the available fish resource potency and thereby the catch volume allowed will refer to the level of fish resource exploitation.[58] The Ministry of Maritime and Fishery would assign the quota,[59] while the procedure of calculating fishing quota would be regulated in the more technical regulation, the Ministry of Maritime and Fishery's Regulation.[60] Until today, the technical regulation is still in the process of harmonization concerning other relevant regulations, intended to prevent the overlapping regulation.[61]

Fishing quota in the measurable fishing zone is divided into three: industrial, local fishermen, and non-commercial quotas.[62] The industrial quota will be given to the measurable fishing zone more than 12 miles,[63] while the local fishermen's quota would be given to the measurable fishing zone up to 12 miles.[64] In contrast to the two quotas, the quota in non-commercial activities would be given to the measurable fishing zone up to 12 miles and over 12

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[56] Kholis; Rahayu; Peni Susetyorini; Arnanda Yusliwidaka Roisah, "Data Confirmation Using Interview Method, Informants from Legal Bureau Ministry of Marine Affairs and Fisheries Republic of Indonesia on July 17, 2023.," 2023.

[57] Yulita Dwi Pratiwi et al., "Politik Hukum Penetapan Wilayah Pengelolaan Perikanan Dan Penangkapan Ikan Terukur Dalam Pembangunan Sumber Daya Perikanan Berkelanjutan," *Bina Hukum Lingkungan* 6, no. 3 (2022): 362–85, https://doi.org/10.24970/bhl.v6i3.283.

[58] Indonesia, Peraturan Pemerintah Nomor 11 Tahun 2023 tentang Penangkapan Ikan Terukur, n. Article 6 clause (2).

[59] Indonesia, n. Article 6 clause (3).

[60] Indonesia, n. Article 6 clause (4).

[61] Roisah, "Data Confirmation Using Interview Method, Informants from Legal Bureau Ministry of Marine Affairs and Fisheries Republic of Indonesia on July 17, 2023."

[62] Indonesia, Peraturan Pemerintah Nomor 11 Tahun 2023 tentang Penangkapan Ikan Terukur, n. Article 7 clause (1).

[63] Indonesia, n. Article 8 clause (1).

[64] Indonesia, n. Article 9 clause (1).

miles.[65] This concept of quota determination can, of course, prevent the overfishing phenomenon and likewise, the damaged fish resource, water environment, or sea environment. It is related to quota-based fishing as the commodities give the actors of fishing the right to do their activity in a certain proportion of the total catch allowed over certain fish species. It aims to remove the phenomenon of competition for fishing that can generate overfishing and improve economic growth.[66]

With the measurable fishing activity in the off-shore zone, when Indonesia is affiliated with RFMO as an international organization interested in fishing in a region,[67] participation in RFMO generates the demand for the members' compliance aspect that will be used as a criterion in determining the fishing quota. If the quota surplus is detected, RFMO will take a corrective measure and a policy of corrective action will appear utilizing restoring the quota,[68] It is, of course, an appropriate action to prevent overfishing incidents that can harm fish resources and the sea environment. Because of quota limitations made by seeing the potency of fish to be caught, the fishing conducted by the actors can be monitored well.

The concept of zone-based measurable fish and the fishing quota specified in the provision of Indonesian Government Regulation is believed to be able to prevent overfishing incidents. However, the technical follow-up provision is still required in the form of the Minister of Maritime and Fishery's Regulation as the part of entire concept of measurable fishing in Indonesia. It is important to implement measurable fishing up to the technical level. In addition, sustainable socialization and tight supervision are required in introducing the concept of measurable fishing to all stakeholders and actors of fishing. It is intended to prevent fraud in the implementation of measurable fishing concepts. The fraud is possible due to the presence of fishers at the industrial quota level surpassing their quota capacity, who then still do fishing using a technique of entrusting

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[65] Indonesia, n. Article 10 clause (1).

[66] Magnus Hansten, Päivi Haapasaari, and Sakari Kuikka, "A Realist Evaluation of the Individual Transferable Quota System Used in Finnish Herring Fisheries," *ICES Journal of Marine Science* 78, no. 10 (2021): 3603–14, https://doi.org/10.1093/icesjms/fsab196.

[67] Direktoral Jenderal Perikanan Tangkap Direktorat Pengelolaan Sumber Daya Ikan, "Partisipasi Indonesia Di RFMOS," accessed July 31, 2023, https://kkp.go.id/djpt/ditpsdi/page/5561-partisipasi-indonesia-di-rfmos.

[68] Rachma Indriyani, Asmar Binti Abdul Rahim, and Ruzita Binti Azmi, "Fishing Quota and International Obligation: Why Has Indonesia Been Indicated as a Non-Compliant State," *Hasanuddin Law Review* 7, no. 2 (2021): 89–104, https://doi.org/10.20956/halrev.v7i2.2841.

to local fishermen or small fishermen who still have fishing quotas.[69] Tight supervision over measurable fishing is very important, in addition to the attempt to manage the fishing that does not stop after the concept is stipulated in the legislation.

Conclusion

Indonesia, in an attempt to prevent overfishing in both waters and ocean regions, has assigned the concept of zone- and quota-based measurable fishing in the legislation, Government Regulation Number 11 of 2023. The zone-based measurable fishing prioritizes the even distribution for the fishers to promote economic growth, and to determine the catching capacity allowed in a certain species. Meanwhile, quota-based measurable fishing emphasizes the limitation of fishing level based on the potential fish to be caught and thereby can control the fishing rate according to the fish resource. The concept of measurable fishing assigned in Indonesia is predictably successful because many countries have long implemented such a concept. Although the measurable fishing concept has been assigned, a technical regulation is still required to govern technical matters in the concept and thereby generate law certainty in its implementation. In addition, a tight supervision concept is required to prevent fraud from being done by the actors of fishing in implementing the provision of measurable fishing.

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"The only ones to profit from illegal, unreported and unregulated fishing are the owners of the fishing fleets who remain hidden behind veils of corporate secrecy."

Achim Steiner
Administrator of United Nations Development Program

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