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Regulations on Measured Fishing in Indonesia from the Perspective of UNCLOS 1982 and UNFSA 1995, Examined of the Precautionary Approach

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Abstract: Indonesia's recently enacted Measured Fishing (PIT) policy represents an important development in national fisheries governance, transitioning from administrative licensing toward catch limit based management. This article evaluates the policy's compliance with international obligations established under UNCLOS 1982 and UNFSA 1995, using normative legal analysis. The research confirms that Measured Fishing implements the allowable catch concept and incorporates science-based management through quota systems calculated from fish stock assessments. Nevertheless, critical gaps remain. Government Regulation No. 11 of 2023 does not explicitly adopt the precautionary approach required by UNFSA, particularly regarding the management of scientific uncertainty and the establishment of precautionary reference points. The regulation assumes data availability but lacks guidance for situations involving insufficient or unreliable information. To achieve full international compliance, this article recommends: (1) explicitly integrating the precautionary principle into national fisheries legislation; (2) establishing target and limit reference points as specified in UNFSA Annex II; (3) strengthening scientific stock assessment mechanisms; and (4) enhancing vessel monitoring and enforcement systems. By implementing these recommendations, Indonesia can transform Measured Fishing into a comprehensive precautionary fisheries management regime that ensures both legal compliance and ecological sustainability.

Keywords: Measured Fishing, Fisheries, UNCLOS, UNFSA, Precautionary Approach

INTRODUCTION

Indonesia officially ratified the UNCLOS through the enactment of Act No. 17 of 1985. This made the provisions of UNCLOS a key foundation for formulating and interpreting Indonesia's national maritime law (Muhammad Farhan, 2025). Indonesia has The National Fisheries Management Areas of the Republic of Indonesia (WPPNRI) and Measured Fishing (PIT). Indonesia acts as a coastal State with both sovereign rights and conservation obligations. As stipulated in Article 56 of UNCLOS and Articles 61 and 62 of UNCLOS, the conservation of marine living resources under UNCLOS 1982 primarily involves the obligation to determine

allowable catch, prevent over-exploitation, and use the best available scientific evidence (Echebarria Fernández et al., 2020).

The legal bases for the establishment of a domestic legal framework for Fisheries conservation and management in the EEZ are set out in LOSC Articles 61 and 62.(Bankes, 2020) Articles 61 and 62 of the UNCLOS delineate a series of determinations that coastal states must make concerning the establishment of total allowable catches, fishing restrictions, the fishing capacity of coastal states, and additional issues such as the potential for fishing access by other states and the terms, conditions, and agreements regulating such access. As an archipelagic nation, Indonesia possesses a strategic interest in the stewardship of maritime living resources, especially fish populations. Fish stocks has economic significance and are interconnected with food security, the well-being of fishermen, coastal development, and the sustainability of marine ecosystems. Therefore, fisheries management can no longer be understood solely as an economic exploitation activity but must be situated within a legal framework of conservation and sustainable use (Orrego Vicuña, 2003). Furthermore, the 1995 UNFSA serves as a specific regulation clarifying the conservation of transboundary fish and highly migratory fish (Echebarria Fernández et al., 2020).

Indonesia ratified the UNFSA through Law No. 21 of 2009. The UNFSA strengthens the stipulations of UNCLOS, in particular to conserving and management of straddle and highly migratory fish. This instrument underscores the significance of the precautionary principle, the utilization of the best available scientific evidence, international collaboration, vessel oversight, and the obligations of flag nations. The UNFSA is particularly relevant because fish stocks are not always confined to a single management area; rather, they may migrate across Indonesia's Exclusive Economic Zone (EEZ), the EEZs of other countries, and the high seas, and may even be affected by climate change (Richard Caddell & Erik J Molenaar, 2019)

The UNFSA reinforces the conservation obligations of UNCLOS 1982 through several key principles, including the application of the precautionary approach in Article 6 of the UNFSA and Annex II to the UNFSA. This means that, under the UNFSA regime, scientific uncertainty is not a reason to delay conservation measures; rather, it serves as a reason to tighten fisheries management. The FAO asserts that the UNFSA aims to ensure the long-term preservation and sustainable utilization of straddling and highly migratory fish stocks within the framework of UNCLOS (*UN Fish Stocks Agreement)*.

Under national law, the Indonesian government has established a policy on sustainable fishing through Government Regulation No. 11 of 2023 (Baharudin et al., 2024). This policy governs regulated and proportionate fishing according to designated zones and quotas, aiming to conserve fish populations and their habitats while fostering equitable national economic development. Normatively, Measured Fishing signifies a transition in fisheries management from a permit-centric model to a quota-centric model. These quotas can be interpreted as a national mechanism pertaining to the concept of permissible catch in UNCLOS 1982 (Kamiński & Karski, 2025).

Nevertheless, the legal framework for managed fishing needs to be reviewed. The issue not merely of a quota system, but in whether such quotas actually function as conservation instruments consistent with international legal obligations. UNCLOS 1982 requires catch limits to be set on the basis of the best available scientific evidence, whilst UNFSA 1995 emphasises the importance of a precautionary approach and international cooperation (Azmi et al., 2022; H. Salim HS And Erlies Septiana Nurbani, 2013). It is imperative to undertake a thorough analysis to ascertain whether the stipulated fishing arrangements have satisfied the requisite standards, particularly with respect to the establishment of quotas, the implementation of catch control measures, the utilisation of vessel monitoring systems, and The execution of

strategies to guarantee the sustained conservation of fish populations via the adoption of a precautionary approach.

In view of the aforementioned points, further research is required into Measured Fishing in the Indonesian WPPNRI from the perspective of UNCLOS 1982 and the obligation to conserve marine biological resources. The present study will employ a normative legal research approach and an analysis of international law in order to examine the compatibility of the regulated fishing framework with conservation obligations under UNCLOS 1982, UNFSA 1995, and related international instruments. The legal gap to be examined lies in the normative relationship between Measured Fishing quotas in national law and the concepts of allowable catch, the principle of best scientific evidence, the precautionary approach, and international cooperation.

METHOD

This research is doctrinal analysis concentrating on the evaluation of legal norms. (H. Salim HS and Erlies Septiana Nurbani, 2013; Peter Mahmud Marzuki, 2014) which governs sustainable fishing in Indonesia via the lens of international marine law, employing both a legislative and a conceptual framework. A regulatory framework is employed to examine the stipulations (Peter Mahmud Marzuki, 2014) as stipulated in Government Regulation No. 11 of 2023 regarding Sustainable Fishing, Minister of Marine Affairs and Fisheries Regulation No. 28 of 2023, Law No. 31 of 2004 on Fisheries, as amended by Law No. 45 of 2009, and other pertinent regulations. The international treaty framework is employed to analyze commitments pertaining to the conservation of marine biological resources as delineated in the United Nations Convention on the Law of the Sea (UNCLOS) 1982 and the United Nations Fish Stocks Agreement (UNFSA) 1995. A conceptual framework is employed to comprehend and analyze pertinent legal ideas, including permitted catch, best scientific evidence available, science-based fisheries management, the precautionary approach, precautionary reference points, and sustainable fisheries management.

The legal materials used consist of primary, secondary and tertiary legal materials, The primary legal materials comprise the following: United Nations Convention on the Law of the Sea (UNCLOS) 1982, United Nations Fish Stocks Area (UNFSA) 1995, Act No. 17 of 1985 on the Ratification of UNCLOS 1982, Law No. 21 of 2009 on the Ratification of the UNFSA 1995, Act No. 31 of 2004 on Fisheries as amended by Law No. 45 of 2009, Government Regulation No. 11 of 2023 on Measured Fishing, Regulation of the Minister of Marine Affairs and Fisheries No. 28 of 2023, and Decision of the Minister of Marine Affairs and Fisheries No. 19 of 2022 on the Estimation of Fish Resource Potential, Permitted Catch Levels, and the Utilisation Rate of Fish Resources in the WPPNRI. Secondary legal materials consist of books, scientific journal articles, reports from international organisations, and documents (Nadia E Nedzel, 2021)from the FAO relating to international fisheries law and the conservation of fish resources. Tertiary legal materials encompass legal dictionaries, legal encyclopedia, and more pertinent reference sources.

The method of collecting legal materials involved a literature review, which entailed cataloguing, identifying and classifying various legal instruments and literature relevant to the research topic (Donald R Rothwell & Tim Stephens, 2023; Suteki & Galang Taufani, 2018). Subsequently, the legal materials that had been collected were analysed qualitatively using legal interpretation and prescriptive analysis. The analysis compared the norms set forth in Indonesia's regulation of fishing policies with the conservation standards outlined in UNCLOS 1982 and UNFSA 1995, focusing on the obligation to employ available scientific evidence, the establishment of allowable catch boundaries, the control of scientific uncertainty, precautionary reference points, and the application of the precautionary approach in fisheries management. This analysis seeks to ascertain the degree of alignment between the PIT

legislation and international legal requirements, as well as to identify any inherent normative deficiencies in the legal framework of Indonesis fish stock protection.

RESULT AND DISCUSSION

Obligations regarding the conservation of marine biological resources under UNCLOS 1982 and UNFSA 1995

The 1982 UNCLOS grants coastal states the right to exploit fishery resources, but this right is subject to obligations regarding conservation, scientific basis and international cooperation (Kamiński & Karski, 2025)Coastal states retain exclusive rights to exploitation and management over fishing resources in almost all their marine environments. however, Article 61 of UNCLOS 1982 mandates that these states ascertain the permissible catch and safeguard marine living resources from over-exploitation, utilizing the best available scientific evidence. Article 62 of UNCLOS 1982 governs the efficient utilization of marine living resources, while ensuring that conservation commitments are not overlooked. Consequently, UNCLOS 1982 establishes an equilibrium between the entitlement to exploit and the duty to preserve the sustainability of fish supplies (Donald R Rothwell & Tim Stephens, 2023).

In modern international law, fisheries management is not merely a matter of limiting catch levels; it must also ensure:

a) sustainability of fish stocks (Bürkert, 2023)
b) habitat protection (Yoshifumi Tanaka, 2023)
c) protection of vulnerable species (Bürkert, 2023)
d) the ecosystem approach (Chomariyah, 2014; Richard Caddell & Erik J Molenaar, 2019).

The broad criteria delineated in the UNCLOS are subsequently elaborated upon by a number of international fisheries protocols, the Fish Stocks Agreement. This encompasses both legal and non-legally enforceable instruments adopted FAO sustainable fisheries management. Examples of such instruments include the Compliance Agreement, the PSM Agreement, the Code of Conduct and the IPOA-IUU. (Richard Caddell & Erik J Molenaar, 2019). Under this framework, conservation serves as a normative constraint on the right to exploit fish resources. Coastal governments are required to possess the authority to regulate fishing, establish catch limits, safeguard fish species from over-exploitation, and ground their policy-making in scientific data. From the standpoint of international law, legitimate fisheries management include not only the generation of economic advantages but also the preservation of the sustainability of marine biological assets.

The conservation obligations under UNCLOS 1982 were subsequently reinforced by the 1995 United Nations Fish Stocks Agreement (UNFSA 1995). This instrument specifically regulates the conservation and administration of straddle stocks of fish and significant migratory fish, indicating that the duties under this instrument are a significant component of the evaluation of national fisheries law (Chomariyah, 2014). The UNFSA clarifies conservation obligations by emphasising several key principles, namely the use of the best available scientific evidence, the application of the precautionary approach, the protection of relevant species and ecosystems, the prevention of overfishing, and the implementation of conservation measures through monitoring, control and surveillance systems (UNFSA, 2023). This provision signifies that the preservation of fish stocks involves not merely the restriction of catch levels, but also includes ecosystem management, international collaboration, and the enforcement of compliance.

Thus, from the perspective of UNCLOS 1982 and UNFSA 1995, the obligation to conserve marine living resources encompasses at least five elements. Firstly, it is incumbent impels states to impose restrictions on the number of fish that may be fished. Secondly, the establishment of such limits must be grounded in the most robust scientific evidence and underpinned by a precautionary approach. Thirdly, states have a responsibility to avert

excessive exploitation and excessive capacity in fisheries. Fourthly, states are mandated to collaborate in the control of border fish stocks and highly migratory. The fifth obligation of states is to ascertain the oversight and execution of fishing activities. These elements serve as the normative criteria for assessing the regulation of Measured Fishing within Indonesian national law. Due to international law, the management of fishery resources is based not only on the rights of nations to take advantage of marine living resources but also on the implementation of science-based fisheries control, but also on the concomitant obligation to impose limits on catches, to utilise scientific evidence, to adopt the precautionary principle, to engage in international cooperation, and to forestall the occurrence of overfishing by implementing the principles of precautionary fisheries management.

Measured Fishing Quotas as an Implementation of Allowable Catch and Best Scientific Evidence

Quotas are a key element of sustainable fishing (Hafel et al., 2025). From an international law standpoint, the presence of such quotas is associated with allowable catch as delineated in Article 61 of LOS Convention. This article mandates coastal governments to ascertain the permissible capture for living resources inside their Exclusive Economic Zone. Consequently, conceptually, the Measured Fishing Quota can be understood as a national legal instrument for implementing the obligation to establish an allowable catch under the 1982 UNCLOS (Rafaly, 2022). Under the 1982 UNCLOS, The concept of the allowable catch can be considered a conservation measure, which aims to prevent the overexploitation of marine living resources. Consequently, quotas under the Measured Fishing Scheme can only be considered consistent with the allowable catch if they are established as binding ecological limits, rather than merely serving as a basis for licensing or the allocation of business activities.

The next important aspect is the use of the best scientific evidence available *(Lennan, 2023)*. The 1982 UNCLOS requires that coastal states' conservation measures be based on the best available scientific evidence (Hilde Woker, 2020). This requirement is important because catch limits cannot be set on the basis of economic considerations alone. Quotas must be based on fish stock data, utilisation rates, regenerative capacity, fishing pressure, and the condition of the aquatic ecosystem.

The 1995 UNFSA reinforces these standards by requiring that conservation and management measures be based on the best available scientific evidence and designed to maintain or restore fish stocks at levels capable of producing the maximum sustainable yield *(Tahindro, 2018)*. The UNFSA also calls for the application of a precautionary approach, an assessment of the impact of fishing activities on target species, non-target species and ecosystems, and the collection of comprehensive and accurate fisheries data. (Engler, 2020) Based on these standards, Measured Fishing quotas must be assessed from several aspects. Firstly, is the quota setting based on up-to-date and verifiable scientific data (Oktivana, 2023). Secondly, does the quota take into account the specific circumstances of each non-resident taxpayer (Dwi Pratiwi et al., 2022). Thirdly, is there a mechanism for periodic evaluation in the event of changes in fish stocks or indications of overfishing (*Population Assessments and Fish Stocks | NOAA Fisheries*, n.d.). Fourthly, are there clear legal consequences if the quota is exceeded. Fifthly, does the quota also take into account non-target species and the impact on marine ecosystems(Zhou et al., 2010).

Consequently, the Measured Fishing Quota can be regarded as an implementation of the allowable catch only if it meets the substantive standards of international law. These standards include the best available scientific evidence, a binding nature as a catch limit, the implementation of the cautionary principle, regular assessment, and adherence monitoring. Without these elements, the quota risks becoming merely an administrative instrument that does not fully address the obligation to conserve marine biological resources.

Sustainable Fishing within the National Fisheries Legal Framework and the Perspectives of UNCLOS 1982 and UNFSA 1995, Examined through the Lens of the Precautionary Approach.

Under Indonesian national law, one of the policies for regulating capture fisheries is Measured Fishing**.** This policy is set out in Government Regulation No. 11 of 2023 on Sustainable Fishing (Sajjadia Luthfia, 2023). This regulation defines 'Measured Fishing' as controlled and proportionate fishing (Roisah et al., 2024) carried out in regulated fishing zones, in accordance with fishing quotas, with a view to preserving fish stocks and their environment, as well as ensuring equitable national economic growth. The Managed Fishing Zone encompasses the WPPNRI. Managed fishing has a different legal character from fisheries management that relies solely on fishing licences. Measured Fishing employs quotas as the primary instrument for controlling fishing activities. With quotas in place, fishing activities should no longer be determined solely by vessel capacity or the number of licences, but also by the permitted catch limits within specific zones (Bahaudin et.al., 2024). Normatively, there are three main elements to managed fishing. The first element is the managed fishing zone, which is the management area where fishing activities take place. The second factor is the fisheries quota, which denotes the maximum allowable catch of fish. The third element is the policy objective, which is to conserve fish stocks and their environment and to support equitable national economic growth. These three elements demonstrate that Measured Fishing serves not only as an administrative instrument, but also has dimensions of conservation and economic distribution. The technical execution of Measured Fishing is additionally governed by rule of the Minister of Marine Affairs and Fisheries No. 28 of 2023, which acts as the implementing rule for Government Regulation No. 11 of 2023. Moreover, quota rules must be associated with Minister Decree No. 19 of 2022 about Estimates of Fish Resource Potential, Permitted Catch Levels, and Fish Resource Utilization Rates in the Indonesian WPPNRI.

From a normative legal perspective, Measured Fishing can be understood as the state's effort to restructure the capture fisheries regime, shifting from a permit based approach to a catch control based approach. This change is important because fishing permits without clear ecological limits can lead to excessive pressure on fish stocks. Conversely, a quota-based approach enables countries to link the exploitation of fish stocks to the carrying capacity of those stocks (Nurhakim, 2017). However, the role of Measured Fishing as a conservation tool cannot be appraised exclusively on the ground of the presence of the term quota in the regulations. Legally, it is necessary to analyse whether these quotas are genuinely set based on scientific estimates of fish stocks and permitted catch levels. If quotas merely serve as a mechanism for allocating fishing access without a strong scientific basis, then Measured Fishing has not yet fully fulfilled its conservation function as required by international law.

Examining the regulations on sustainable fishing in the light of the UNFSA reveals a legal gap, particularly with regard to the lack of explicit integration of the precautionary principle into Indonesia regulations. According to UNFSA 1995, Article 5(c): States shall extensively implement the precautionary approach in the conservation, management, and exploitation of bordering fish populations and highly migratory fish. This means that the precautionary approach is explicitly cited as a principle of fisheries management (Latifah et al., 2018). However, the following terms are not found in Government Regulation No. 11 of 2023:

- Precaution
- precautionary approach
- precautionary principle
- precautionary approach

These laws stipulate that fishing limits are established according to anticipated fish stock availability and permissible capture levels, considering the exploitation rate of fish

stocks. Government Regulation No. 11 of 2023 does not clearly incorporate a cautious approach. Concerning scientific uncertainty, UNFSA 1995 Article 6 (2) stipulates that States must exercise caution when information is uncertain, inaccurate, or insufficient. The UNFSA explicitly that:

- uncertain information
- unreliable information
- inadequate information

Scientific uncertainty forms the basis for legal action. Article 6 of Government Regulation No. 11 of 2023 merely states that fishing quotas are calculated on the basis of the available fish stock potential (PIT) - KNTI). The standard does not specify what steps should be taken in the event of uncertain data, incomplete data, insufficient information, scientific uncertainty or uncertainty. The standard assumes that data is available, but does not explain what should be done when data is unavailable or uncertain. Furthermore, regarding precautionary approach, Annex II of the UNFSA requires countries to establish:

- Target Reference Points
- Limit Reference Points

Meanwhile, Article 6 of Government Regulation No. 11 of 2023 merely stipulates that quotas are calculated based on the potential of available fish stocks and does not set out a mechanism for biological limits. Precautionary reference points are not explicitly regulated, such as target reference points, limit reference points, biological thresholds, spawning biomass thresholds, or stock reference points. Furthermore, Government Regulation No. 11 of 2023 also does not provide guidance on situations where data is insufficient. There are no explicit provisions regarding mitigation measures where scientific data is insufficient, as article 6(6) of the UNFSA states, a lack of scientific information must not be used as a reason to delay conservation measures (Echebarria Fernández et al., 2020).

When compared with the UNFSA standards, Government Regulation No. 11 of 2023 reveals several regulatory gaps.

Components of Precautionary Approach	**UNFSA 1995**	**Government Regulation No. 11 of 2023**
Precautionary approach eksplisit	There are (Articles 5 and 6 of the UNFSA)	No explicit provision was found
Scientific uncertainty	There is (Article 6 of the UNFSA)	No explicit provision was found
Precautionary reference points	There is (Annex II UNFSA)	No standard found
What to do when data is insufficient	There is (Article 6 UNFSA)	No standard found

Government Regulation No. 11 of 2023 has adopted several instruments of science-based fisheries management, in particular through a quota system calculated on the basis of fish stock potential and the level of exploitation. However, this regulation has not yet explicitly incorporated the core elements of the precautionary approach as set out in the 1995 UNFSA, particularly regarding the management of scientific uncertainty, precautionary reference points, and the obligation to take conservation measures when scientific data is insufficient. Consequently, the convergence between Indonesia's measured fishing regime and the UNFSA's precautionary approach remains partial, not full. Thus, measured fishing reflects science-based fisheries management more than precautionary fisheries management.

CONCLUSSION

This study concludes that Indonesia Measured Fishing policy represents an important regulatory shift in national fisheries management, moving from a licence-based approach towards a quota-based and catch control oriented system. From the perspective of UNCLOS 1982, this policy may be regarded as a national legal instrument for implementing the concept of allowable catch, Coastal states must establish catch limits, avert overexploitation, and guarantee the maintenance of marine living resources grounded in the most reliable scientific knowledge available. Nevertheless, the question of whether Measured Fishing is compatible with international fisheries law cannot be answered simply by examining the existence of fishing quotas. Quotas can only fulfil the conservation function required under UNCLOS 1982 and UNFSA 1995 if they are established as binding ecological limits, supported by reliable scientific data, periodically evaluated, and accompanied by effective monitoring, control, and enforcement mechanisms. In this regard, Indonesia's Measured Fishing regime has adopted several elements of science-based fisheries management, especially through the use of fish stock potential, permitted catch levels, and fish resource utilisation rates as the basis for quota calculation. Nevertheless, this study finds that the convergence between Indonesia's Measured Fishing regulations and the precautionary approach under UNFSA 1995 remains partial. Government Regulation No. 11 of 2023 has not explicitly incorporated the precautionary approach, particularly in relation to scientific uncertainty, precautionary reference points, and legal guidance on what measures must be taken when scientific data is insufficient, unreliable, or incomplete. This creates a normative gap between Indonesia's national fisheries regulation and the standards required under UNFSA 1995. Therefore, Measured Fishing should not only be strengthened as a quota-based management system, but also transformed into a precautionary fisheries management regime. In order to address these challenges, it is imperative that Indonesia incorporates the precautionary approach into its fisheries regulations, establishes Specific objective reference points and threshold reference points, strengthens scientific stock assessment, improves vessel monitoring and compliance systems, and enhances Global collaboration for straddle and highly migratory fish. By taking this action, Measured Fishing will be in a position to achieve full alignment with UNCLOS 1982 and UNFSA 1995, while ensuring that fisheries management in Indonesia supports ecological sustainability, legal certainty, and long-term protection of marine living resources.

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