

The Use of Ecosystem Services Model in Sustainable Coral Reefs Management: Some Legal Reflections

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Abstract. Coral reefs need strong management and protection efforts. However, public awareness and legal instruments concerning coral reefs are still insufficient. An ecosystem service model perspective is needed for the optimum management of that ecosystem. This study examined the relationship between ecosystem services management in international, national and local environmental laws and the coral reef ecosystem. An analytical descriptive qualitative method with the environmental services model and statutory regulation approaches was used. The researcher found a good relationship between the ecosystem services management in the international, national and local environmental laws and the policy planning concerning the sustainable development of the coral reef ecosystem. However, not all of the existing regulations support the environmental services model. It is because the regulatory framework is not complete, and existing norms do not support the efforts to improve people's welfare.

Keywords: Coral reef, environmental law, ecosystem services model, sustainability

1. Introduction

The biodiversity of coral reefs is represented by more than 93,000 species; in fact, it is estimated that more than a million species live in this ecosystem.¹ Coral reefs play an important role in marine ecosystems by becoming the habitat for thousands of marine species, such as ornamental fish, sea turtles, sharks, whales, stingrays, octopuses, and others.^{2,3} Besides, coral reefs also supply raw materials for pharmaceutical, cosmetic industries, and other industries⁴, provide natural protection for the coastal areas⁵ and against coastal pollution, and as a vital role in the ecosystem services of carbonate accumulation in the water.⁶

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- 1 Romimohtarto, K., & Juwana, S. (2001). *Marine biology: The science of marine life (Biologi laut: Ilmu pengetahuan tentang biota laut)*. Djambatan.
- 2 Miala, I., Pratomo, A., & Irawan, H. (2015). Relationship between sea urchins, macroalgae and corals in the waters of Pucung Island (Hubungan Antara Bulu Babi, Makroalgae dan Karang di Perairan Daerah Pulau Pucung). *Repository Umrah*.
- 3 Nybakken, J. W. (2001). *Marine biology: an ecological approach* (Vol. 5). Benjamin Cummings San Francisco.
- 4 Burhanuddin, A. I. (2018). *Pengantar Ilmu Kelautan dan Perikanan*. Deepublish.
- 5 Crabbe, M. J. C. (2008). Climate change, global warming and coral reefs: Modelling the effects of temperature. *Computational Biology and Chemistry*, 32(5), 311–314. <https://doi.org/https://doi.org/10.1016/j.compbiolchem.2008.04.001>
- 6 Titschack, J., Baum, D., De Pol-Holz, R., López Correa, M., Forster, N., Flögel, S., Hebbeln, D., & Freiwald, A. (2015). Aggradation and carbonate accumulation of Holocene Norwegian cold-water coral reefs. *Sedimentology*, 62(7), 1873–1898. <https://doi.org/https://doi.org/10.1111/sed.12206>

The degradation of coral reefs can be caused by human activities (anthropogenic causes) and natural factors.⁷ The anthropogenic causes such as land-based pollutions, spillage from oil tankers and leakage from offshore oil drilling activities⁸, out-of-control transportation activities, fish bombing and coral trade⁹, and excessive tourism activities.¹⁰ Fish bombing has created a 60% destruction to the coral reefs in East Malaysia, the Philippines, and Indonesia.¹¹ In Asian big cities, the destruction of coral reefs is indicated to be caused by the decrease in the quality of seawater, the decrease in variety of coral reefs, and the massive use of corals for urban building infrastructure materials.¹²

Another factors such as foreign invasion of certain species like the crown-of-thorns starfish can become one of the trigger of coral reef destruction.¹³ Besides, the constant increase in seawater temperature causes death to coral reef ecosystem due to coral bleaching.¹⁴ Coral bleaching caused by an unfavorable condition of the water, makes the coral-symbiotic algae zooxanthellae unable to produce food, and it leads to the lack of photosynthesis from the algae. This massive degradation have created vulnerability for millions of people, especially those living along the coastlines and depending their lives on coral reefs as their source of livelihood and food.¹⁵

The degradation of coral reefs is worsened by the government policy executors' inability to correctly implement policies due to their lack of understanding of coral reefs, and also worsened further by ignorance of the coral reef existence. The degradation of coral reefs is often the result of the authority's lack of supervision and the people's low understanding of the coral reef.¹⁶ Community-based coral reef management is not enough to restore the coral reef population or to improve the coral reef resilience against further damage.¹⁷

Therefore, the sustainable development concept should be implemented to protection efforts. It has three main components, namely ecological, social and economic.¹⁸ This is where the ecosystem service needs to be implemented, and it becomes one of the ways to improve the role of sustainable development.¹⁹ The ecosystem services becomes increasingly important in policy making and development planning towards sustainable development. The utilization of ecosystem services, especially concerning the coral reef, is expected to improve the local economic condition. It is also expected that through ecosystem services, the coral reef biodiversity will be maintained to consistently provide raw materials for cosmetic, pharmaceutical and other

- 7 Rembet, U. N. W. J. (2012). Simbiosis Zooxanthellae dan Karang Sebagai Indikator Kualitas Ekosistem Terumbu Karang. *Jurnal Ilmiah Platax*, 1(1), 37–44.
- 8 Robertua, V., & Karyoprawiro, B. L. (2019). Reasoning Criminal–Implikasi Limbah Hasil Operasional Kapal Terhadap Ekosistem Laut di Selat Malaka. *Jurnal Asia Pacific Studies*, 3(2). <https://doi.org/https://doi.org/10.33541/japs.v3i2.1347>
- 9 Syafrie, H. (2018). Ecological Study In Relation To Tourism Activities In Bunaken Sea National Park, North Sulawesi Province (Kajian Ekologis Dalam Kaitannya Dengan Aktifitas Pariwisata Di Taman Nasional Laut Bunaken, Provinsi Sulawesi Utara). *Jurnal Satya Minabahari*, 03(02). <http://perikanan.usni.ac.id/>
- 10 Gazi, M. Y., Mowsumi, T. J., & Ahmed, M. K. (2020). Detection of Coral Reefs Degradation using Geospatial Techniques around Saint Martin's Island, Bay of Bengal. *Ocean Science Journal*, 55(3), 419–431. <https://doi.org/10.1007/s12601-020-0029-3>
- 11 Rani, F., & Afrina, Y. (2018). Moratory Policy Of Capture Fishery Business Licensing In The State Fisheries Management Area Of The Republic Of Indonesia 2014-2015 (Kebijakan Moratorium Perizinan Usaha Perikanan Tangkap Di Wilayah Pengelolaan Perikanan Negara Republik Indonesia 2014-2015). *EcoNews*, 1(1), 27–43.
- 12 Heery, E. C., Hoeksema, B. W., Browne, N. K., Reimer, J. D., Ang, P. O., Huang, D., Friess, D. A., Chou, L. M., Loke, L. H. L., Saksena-Taylor, P., Alsagoff, N., Yeemin, T., Sutthacheep, M., Vo, S. T., Bos, A. R., Gumanao, G. S., Syed Hussein, M. A., Waheed, Z., Lane, D. J. W., ... Todd, P. A. (2018). Urban coral reefs: Degradation and resilience of hard coral assemblages in coastal cities of East and Southeast Asia. *Marine Pollution Bulletin*, 135, 654–681.
- 13 Supriatna, J. (2018). *Konservasi Biodiversitas: Teori dan Praktik di Indonesia*. Yayasan Pustaka Obor Indonesia.
- 14 Skirving, W., Marsh, B., De La Cour, J., Liu, G., Harris, A., Maturi, E., Geiger, E., & Eakin, C. M. (2020). CoralTemp and the Coral Reef Watch Coral Bleaching Heat Stress Product Suite Version 3.1. In *Remote Sensing* (Vol. 12, Issue 23).
- 15 Morrison, T. H., Adger, N., Barnett, J., Brown, K., Possingham, H., & Hughes, T. (2020). Advancing Coral Reef Governance into the Anthropocene. *One Earth*, 2(1), 64–74. <https://doi.org/https://doi.org/10.1016/j.oneear.2019.12.014>
- 16 Sibirian, R., & Haba, J. (2016). *Mangrove conservation and community welfare (Konservasi mangrove dan kesejahteraan masyarakat)*. Yayasan Pustaka Obor Indonesia.
- 17 Bruno, J. F., & Valdivia, A. (2016). Coral reef degradation is not correlated with local human population density. *Scientific Reports*, 6(1), 29778. <https://doi.org/10.1038/srep29778>
- 18 Hickel, Jason. (2019). The contradiction of the sustainable development goals: Growth versus ecology on a finite planet. *Sustainable Development*. doi:10.1002/sd.1947
- 19 Chintantya, D., & Maryono, M. (2017). The role of ecosystem services in urban public policy planning (Peranan jasa ekosistem dalam perencanaan kebijakan publik di perkotaan). *Proceeding Biology Education Conference: Biology, Science, Environmental, and Learning*, 14(1), 144–147.

industries. Next, ecosystem services can improve the people’s welfare through the profit and value gained from utilizing the coral reef ecosystem. However, a protection instrument is needed to prevent the coral reef ecosystem from massive exploitative activities. This shows that, implementing the ecosystem services is essential to view the perspective of the international, regional, national and local laws and the legal texts concerning ecosystem protection.

Implementing the legal instruments, especially those that support the concept of sustainable development, becomes significantly important in protecting the coral reefs and in sustaining the benefits from the coral reef existence. An example of the effort to protect coral reefs is the Coral Triangle Initiative on Coral Reefs, Fisheries, Food Security (CTI-CFF), which is a multilateral initiative instrument created by countries with common goals and points of view. Although this international legal instrument is still in the form of soft law, it is still beneficial in reducing the threats faced by coral reefs. International treaties are examples of strong legal instruments that implement hard law to give a better protection to coral reefs. In the national level, the existence of both soft and hard legal instruments is expected to give a strong impact in the implementation of national laws for coral reef protection.

The need for legal instruments is based on the fact that coral reefs have been unsustainably utilized due to lack of sufficient legal instruments. This factual information should be the base of policy making in planning, utilizing and managing natural resources. One of the ways in making use of the above-mentioned factual information is by viewing the perspective of environmental services model approach. This model is expected to improve the role of the coral reef ecosystem. To achieve this goal, the model has to be supported by sufficient policy and legal instruments. This study was aimed at finding the relationship between the international and regional environmental laws concerning the ecosystem services management and the regional and local environmental laws concerning the ecosystem services management in relations with the coral reef ecosystem. It is hoped that this study can contribute to the protection of coral reefs and their biodiversity.

2. Methods

This study used an analytical qualitative descriptive method with the environmental services model approach from Alexander PE van Oudenhoven (2015), inspired by De Groot et al. (2010a) and Haines Young and Protchin (2010).²⁰ This model provides a systematic solution and is more straightforward, and can be applied from a legal perspective. The schematic diagram is as followed (Illustration 1):

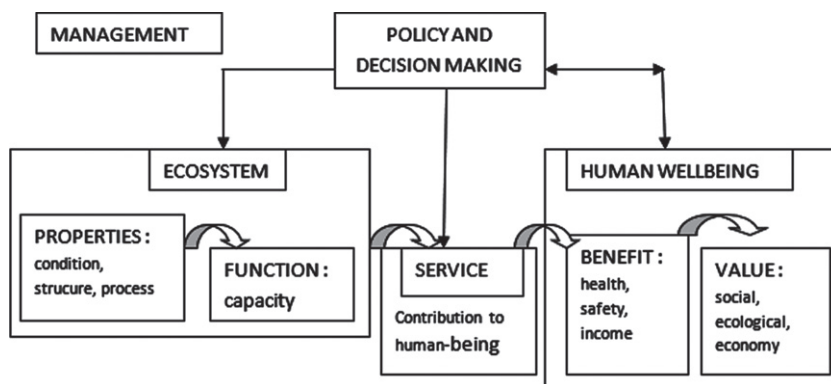


Illustration 1. Ecosystem Services Model Approach (Source: Alexander PE van Oudenhoven (2015), inspired by De Groot et al (2010a) and Haines Young and Protchin (2010)).

20 Van Oudenhoven, A. P. E., Siahainenia, A. J., Sualia, I., Tonneijck, F. H., van der Ploeg, S., de Groot, R. S., ... Leemans, R. (2015). Effects of different management regimes on mangrove ecosystem services in Java, Indonesia. *Ocean & Coastal Management*, 116, 353–367. doi:10.1016/j.ocecoaman.2015.08.003.

Furthermore, because qualitative descriptive research is a continuous research process, every data collection, processing and analysis in this study was done gradually. It is expected that this research can describe the condition of coral reefs from the perspectives of ecosystem services, protecting law instruments and sustainable development concept. Another approach used in this study was the statutory regulation approach, mainly focusing on the regulations' framework by analyzing documents from legal sources that regulate coral reef protection.

3. Results and discussion

The results of the study were divided into the analysis of the global soft law and hard law instruments; the analysis of regional legal instruments; the analysis of national legal instruments; and the analysis of local legal instruments.

3.1. Analysis of global legal instruments

The study reviewed two forms of global law instruments. The first is the soft law, which is a form of an international agreement on common and fundamental aspects of the coral reef ecosystem protection. The analysis of the global law instruments is presented in Table 1 (Annex Table 1), which shows analysis from: the Stockholm Declaration of 1972²¹, the Rio Declaration of 1992²², the Agenda 21, the Johannesburg Declaration of 2002²³, the Rio plus 20²⁴, and the SDGs 2015²⁵.

The second is hard law instruments (Annex Table 2), includes Ramsar Convention 1971²⁶, World Heritage 1972²⁷, CITES 1973²⁸, UNCLOS 1982²⁹, CMS 1990³⁰, and UNCBD 1992³¹.

3.2. Analysis of regional legal instruments

The regional legal instruments consist of UNEP Regional Sea Conventions, Coral Reef Triangle Initiative Guiding Principles³², and ASEAN Documents. The analysis of these legal instruments is presented in the following Table 3 (Annex Table 3).

- 21 United Nations Conference on Human Environment. (1972). Report of the United Nations Conference on the Human Environment. UN Doc. A/CONF. 48/14, at 2 and Corr. 1.
- 22 United Nations Conference on Environment and Development. (1992). Agenda 21, Rio Declaration, Forest Principles. New York: United Nations.
- 23 World Summit on Sustainable Development, & United Nations. (2003). Johannesburg Declaration on Sustainable Development and Plan of Implementation of the World Summit on Sustainable Development: The final text of agreements negotiated by governments at the World Summit on Sustainable Development, 26 August-4 September 2002, Johannesburg, South Africa. New York: United Nations Department of Public Information.
- 24 United Nations Conference on Sustainable Development, Rio+20. (2012). The future we want. [online] pp.1-53. <https://sustainabledevelopment.un.org/rio20.html>. Accessed 28 November 2021.
- 25 United Nations General Assembly. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. New York: UN Publishing.
- 26 Ramsar Convention Secretariat. (2013). The Ramsar Convention Manual: a guide to the Convention on Wetlands (Ramsar, Iran, 1971), 6th ed. Ramsar Convention Secretariat: Gland, Switzerland.
- 27 United Nations Educational, Scientific and Cultural Organization. (1972). Convention concerning the Protection of the World Cultural and Natural Heritage. Paris: UNESCO.
- 28 CITES. (1973) Convention on international trade in endangered species of wild fauna and flora. <http://www.cites.org/>. (Accessed 28 November 2021).
- 29 United Nation General Assembly. (1982). Convention on the Law of the Sea. <https://www.refworld.org/docid/3dd8fd1b4.html>. (Accessed 28 November 2021).
- 30 United Nations Environmental Programme. (1990). Convention on Migratory Species (CMS).
- 31 United Nations Convention on Biological Diversity. (1992). UN: Rio de Janeiro.
- 32 CTI-CFF. (2016). Regional Plan Of Action Coral Triangle Initiative On Coral Reefs, Fisheries, and Food Security (CTI-CFF). CTI-CFF Regional Secretariat: Indonesia.

Table 1
Analysis of Soft Law Global Legal Instruments

Ecosystem Services Component	Soft Law Global Legal Instruments					
	Stockholm Declaration of 1972	Rio Declaration of 1992	Agenda 21	Johannesburg Declaration of 2002	Rio plus 20	SDGs 2015
Policy and Law	There are 26 principles	There are 27 principles	Chapter 17	Johannesburg Plan of Implementation (JPOI)	Future We Want Document	Goals 1, 14 and 15
Ecosystem Management	Principles 2, 3, 4, 5, 6, 7, 8, 11, 13, 17, 18, 19, 20, 21, 23, 24	Principles 2, 4, 7, 8, 11, 13, 15, 17, 19, 23	Document Sub Chapters: 17.1, 17.2, 17.3, 17.5, 17.6	Document number: 58.b	Document numbers: 158, 161, 165, 172	SDGs 14.1; 14.2; 14.4; 14.5; 15.5; 15.7 and 15.8
Ecosystem Services	Principles 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 17, 18, 19, 20, 21, 24, 25	Principles 5, 8, 9, 11, 12, 16, 17, 19, 23	17.1, 17.2, 17.5	58.g, 58.i	168	SDGs. 14.4; 14.7; 15.6; 15.7
Welfare	Principles 2, 3, 5, 8, 9, 11, 2, 13, 14, 15, 17, 18, 19, 20, 21, 23, 24, 25	Principles 1, 3, 5, 7, 8, 9, 10, 15, 16, 17, 20, 21, 22, 23	17.1, 17.2	58.g, 58.h	105, 166	SDGs 14.7 and 15.9
Feedback	If used, this principle will strengthen the national law	If used, this principle will strengthen the national law				SDGs will improve the commitment to Law of the Sea

Source: Result of analysis.

3.3. Analysis of national legal instruments

The national legal instruments consist of Law Number 9/1985 on Fisheries³³; Law Number 45/2009 on Fisheries³⁴; The Law of the Sea Convention 1982 (Law Number 17/1985); Law Number 5/1990 on Conservation of Biological Natural Resources and their Ecosystems³⁵; Government Regulation Number 7/1999 on Preserving Flora and Fauna Species³⁶; Government Regulation Number 8/1999 on Wild Flora and Fauna Exploitation³⁷; Government Regulation Number 60/2007 on Conservation of Fish Resources³⁸; Presidential

33 Undang-Undang Republik Indonesia Nomor 9 Tahun 1985 *Perikanan*. 19 Juni 1985. Lembaran Negara Republik Indonesia Tahun 1985 Nomor 46. Jakarta.

34 Undang-Undang Republik Indonesia Nomor 45 Tahun 2009 *Perikanan*. 29 Oktober 2009. Lembaran Negara Republik Indonesia Tahun 2009 Nomor 154. Jakarta.

35 Undang-Undang Republik Indonesia Nomor 45 Tahun 2009 *Perikanan*. 29 Oktober 2009. Lembaran Negara Republik Indonesia Tahun 2009 Nomor 154. Jakarta.

36 Peraturan Pemerintah Republik Indonesia Nomor 7 Tahun 1999 *Pengawetan Jenis Tumbuhan dan Satwa*. 27 Januari 1999. Lembaran Negara Republik Indonesia Tahun 1999 Nomor 14. Jakarta.

37 Peraturan Pemerintah Republik Indonesia Nomor 8 Tahun 1999 *Pemanfaatan Jenis Tumbuhan dan Satwa Liar*. 27 Januari 1999. Lembaran Negara Republik Indonesia Tahun 1999 Nomor 15. Jakarta.

38 Peraturan Pemerintah Republik Indonesia Nomor 60 Tahun 2007 *Konservasi Sumber Daya Ikan*. 16 November 2007. Lembaran Negara Republik Indonesia Tahun 2007 Nomor 134. Jakarta.

Table 2
Analysis of Hard Law Global Law Instruments

Ecosystem Services Component	Hard Law Global Law Instruments					
	Ramsar Convention 1971	World Heritage 1972	CITES 1973	UNCLOS 1982	CMS 1990	UNCBD 1992
Policy and Law	Articles 1, 2, 5	Preamble, Article 5	Preamble	Articles 58, 59, 60, 62, 63, 64, 65, 66, 67, 119, 120	Preamble	Preamble, Articles 3, 5
Ecosystem Management	Articles 2, 3, 4, 6	Articles 5, 11, 24, 25, 26	Article 3	Articles 58, 59, 60, 62, 63, 64, 65, 66, 67, 68, 119, 120	Articles 2, 3,4	Preamble, Articles 2, 6, 8, 9
Ecosystem Services	Preamble	Articles 24, 25, 26	Article 1	Articles 61, 62	Articles 3, 4, 5, 6	Preamble, Articles 2, 8, 9
Welfare	Preamble	Preamble, Articles 15, 22, 24, 25, 26	—	Articles 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 116, 119, 120, 136, 160	Preamble	Preamble, Articles 2, 8, 9, 10, 11
Feedback	Articles 2, 3, 4, 5, 6, 7, 8	Articles 4, 10, 27, 28 dan 29	Articles 10, 14	Articles 193, 194, 195, 204, 205, 206	Articles 12	Preamble, Articles 12, 13, 15, 16, 17, 18, 20, 21

Source: Result of analysis.

Decree Number 43/1978 dated December 15, 1978 on Ratification of CITES³⁹; Decree of the Ministry of Maritime and Fishery Affairs Number 38/MEN/2004 on General Guidelines for the Management of Coral Reefs⁴⁰; Circular Letter of the Minister of Development Supervision and Environment Number 408/MNPPLH/4/1979, dated April 30, 1979, on Prohibition on Taking Corals which may Destroy the Marine Ecosystem (sent to all Governors in Indonesia)⁴¹; Circular Letter of the Directorate General of Fisheries Number E.I/5/5/11/1979, dated May 28, 1979, on Prohibition on Taking Corals which may Damage the Marine Ecosystem, (sent to Heads of the Provincial Fishery Offices in Indonesia)⁴²; and Circular Letter of the Directorate General of Fisheries Number IK.220/D4.T44/91, on Fishing with Prohibited Materials/Equipment (sent to Heads of the Provincial Fishery Offices in Indonesia)⁴³. The analysis of these national legal instruments is presented in the following Table 4 (Annex Table 4).

39 Keputusan Presiden Republik Indonesia Nomor 43 Tahun 1978 *Mengesahkan "Convention on International Trade In Endangered Species of Wild Fauna And Flora"*, yang Telah ditandatangani di Washington Pada Tanggal 3 Maret 1973. 15 Desember 1978. Lembaran Negara Republik Indonesia Tahun 1978 Nomor 51. Jakarta.

40 Keputusan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 38 Tahun 2004 *Pedoman Umum Pengelolaan Terumbu Karang*. 17 November 2004. Jakarta.

41 Surat Edaran Menteri Lingkungan Hidup Republik Indonesia Nomor 48 Tahun 1979.

42 Surat Edaran Direktur Jenderal Perikanan Republik Indonesia Nomor 11 Tahun 1979.

43 Surat Edaran Direktur Jenderal Perikanan Republik Indonesia Nomor 220 Tahun 1991.

Table 3
Analysis of Regional Legal Instruments

Ecosystem Services Component	Regional Legal Instruments		
	UNEP Regional Sea Conventions *)	Coral Reef Triangle Initiative: Guiding Principles	ASEAN Documents **)
Policy and Law	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Principles 3, 5	1, 3
Ecosystem Management	1, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14	Principle 7	2, 3, 5
Ecosystem Services	4, 5, 7, 8, 9, 12, 13, 14	Principle 8	1, 3
Welfare	4, 5, 7, 12, 13	Principles 1, 2	1, 2, 3
Feedback	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Principle 4	4

Source: Result of analysis. *)UNEP Regional Seas Conventions. 1. Convention on the Conservation of Antarctic Marine Living Resources (CAMLR Convention). 2. Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention). 3. Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention). 4. Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (Nairobi Convention). 5. Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention). 6. Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention). 7. Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the North-East Pacific (Antigua Convention). 8. Convention on Conservation of Nature in the South Pacific (Apia Convention). 9. Convention for the Protection of Natural Resources and Environment of the South Pacific Region (Noumea Convention). 10. Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (Jeddah Convention). 11. Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution (Kuwait Convention). 12. Convention for the Protection of the Marine Environment and Coastal Zones of the South-East Pacific (Lima Convention). 13. Convention for the Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (Abidjan Convention). 14. Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention). **)ASEAN Documents. 1. Agreement on the Conservation of Nature and Natural Resources 1985. 2. ASEAN Declaration on Heritage Parks and Reserves 1984. 3. Agreement on The Establishment of The ASEAN Centre For Biodiversity 2005. 4. Declaration for A Decade of Coastal and Marine Environmental Protection In The South China Sea (2017–2027). 5. Bangkok Declaration on Combating Marine Debris In ASEAN Region 2019.

3.4. Analysis of regency/municipality legal instruments

The regency/municipality legal instruments analyzed are taken from two regions: Bintan Regency of the Riau Islands Province, and Sabang City of Aceh Province. The regulations in Bintan Regency consist of Bintan Regency Government Regulation Number 12/2008 on Coral Reef Management⁴⁴; Bintan Regent Regulation Number 13/II/2009 on Strategic Plan (RENSTRA) for Coral Reef Management in Bintan Regency 2009–2014⁴⁵; Bintan Regent Decree Number 261/VIII/2007⁴⁶; and Bintan Regent Regulation Number 7/2009⁴⁷. Meanwhile, the regency/municipality legal instruments in Sabang City consist of Sabang Mayor Regulation Number 7/2013 on Management and Zonation Plan in the Eastern Coastline of Weh Island of the Sabang City⁴⁸; and the Decree of the Sabang City Head of Maritime and Fishery Office Number 523/80/2012⁴⁹. The analysis of these legal instruments is presented in the following Table 5 (Annex Table 5).

- 44 Peraturan Daerah Kabupaten Bintan Nomor 12 Tahun 2008 *Pengelolaan Terumbu Karang*. 19 Agustus 2008. Lembaran Daerah Kabupaten Bintan Tahun 2008 Nomor 12. Kijang.
- 45 Peraturan Bupati Bintan Nomor 13 Tahun 2009 *Rencana Strategis Pengelolaan Terumbu Karang Kabupaten Bintan Tahun 2009 -2014*. Kijang.
- 46 Surat Keputusan Bupati Bintan Nomor 261 Tahun 2007 *Kawasan Konservasi Perairan Daerah di Bintan*. 23 Agustus 2007. Kijang.
- 47 Peraturan Bupati Bintan Nomor 7 Tahun 2009 *Pembentukan Organisasi Unit Pelaksana Teknis pada Dinas Daerah dan Lembaga Teknis Daerah di Lingkungan Pemerintah Kabupaten Bintan*. 5 Januari 2009. Berita Daerah Kabupaten Bintan Tahun 2009 Nomor 7. Kijang.
- 48 Peraturan Walikota Sabang Nomor 7 Tahun 2013 *Rencana Pengelolaan dan Zonasi Kawasan Konservasi Perairan Pesisir Timur Pulau Weh, Kota Sabang*. 23 Februari 2013. Berita Daerah Kota Sabang Tahun 2013 Nomor 7. Sabang.
- 49 Keputusan Kepala Dinas Kelautan dan Perikanan Kota Sabang Nomor 523/80 Tahun 2012 *Penunjukan/Penetapan Badan Pengelolaan Kawasan Konservasi Perairan Pesisir Timur Pulau Weh, Sabang*. 17 Februari 2012. Sabang.

Table 4
Analysis of National Legal Instruments

National Legal Instruments	Ecosystem Services Component				
	Policy and Law	Ecosystem Management	Ecosystem Services	Welfare	Feedback
Law No. 9/1985	Article 31	Articles 3, 4, 5, 6, 7, 8, 14, 15, 16, 17, 18, 19, 20, 21, 22, 31	Articles 7, 23	Articles 9, 10, 11, 12, 19	Articles 21, 22, 23
Law No. 45/2009	Articles 27, 28, 28A, 35A, 36, 41, 44	Articles 2, 7, 9, 14, 15A, 18, 23, 25, 25B, 25C, 27, 28, 41A, 42, 46, 46A, 65, 66, 66A, 66B, 66C, 73A	Articles 2, 7, 9, 14, 15A, 18, 23, 41, 41A, 42, 66B	Articles 2, 7, 25, 25A, 25B, 25C, 41A, 42, 48, 50	Article 46
Law No. 5/1990	Articles 9, 25, 38, 39	Articles 4, 5, 8, 10, 14, 16, 17, 22, 23, 25, 29, 30, 31, 32, 33, 34, 35, 38, 39	Articles 2, 3, 5, 6, 7, 8, 11, 12, 13, 15, 17, 20, 26, 27, 28, 29, 33, 34, 36	Articles 3, 7, 8, 17, 34, 37	Articles 10, 19, 21, 22, 23
Government Regulation No. 7/1999	Articles 7, 25	Articles 2, 3, 8, 9, 10, 11, 12, 13, 14, 15, 20, 22, 23, 24	Articles 2, 3, 4, 5, 6, 12, 13, 15, 16, 17, 18, 20, 21, 26	Articles 2, 3, 12, 20	Articles 19, 27
Government Regulation No. 8/1999	Articles 9, 14, 24, 42, 43	Articles 3, 4, 5, 6, 8, 9, 15, 19, 20, 29, 30, 41, 43, 65, 66	Articles 2, 3, 4, 5, 6, 7, 13, 16, 25, 30, 31, 32, 34, 35, 40	Articles 2, 10, 11, 17, 18, 37	Articles 12, 26, 38, 67
Government Regulation No. 60/2007	Articles 31, 32, 33, 34, 35, 36	Articles 2, 3, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20	Articles 2, 4, 5, 6, 7, 8, 9, 11, 14, 21, 22, 23, 25, 26, 29, 30, 37, 45	Articles 2, 10, 33, 38, 39, 40, 46	Articles 10, 11, 41, 47
Presidential Decree Number 43/1978 Decree of the Ministry of Maritime and Fishery Affairs No. 38/2004	Article 1 CITES 1973 Policy 4 Strategy 7	Article 2 CITES 1973 General strategy, Policy 2, Policy 4, Strategy 4, Strategy 5, Strategy 6, Strategy 8, Chapter V,	— Background, Policy 1, Policy 3, Policy 6, Policy 7, Strategy 2, Strategy 3	— Aims and objectives, Policy 5, Strategy 1	— Targets
Circular Letter of the Minister of Development Supervision and Environment No.408/1979	Dictum 1	—	—	—	—
Circular Letter of the Directorate General of Fisheries No. 11/1979	Dictum 1	—	—	—	—
Circular Letter of the Directorate General of Fisheries No. 220/1991	Dictum 1	—	—	—	—

Source: Result of analysis.

Table 5
Analysis of Regency/Municipality Legal Instruments

Ecosystem Services Component	Regency/Municipality Legal Instruments					
	Bintan Regency Government Regulation 12/2008	Bintan Regent Regulation 13/2009	Bintan Regent Decree 261/2007	Sabang Mayor Regulation 7/2013	Bintan Regent Regulation 7/ 2009	Decree of the Sabang City Head of Maritime and Fishery Office 523/2012
Policy and Law	Articles 2, 6, 7, 22, 23, 24, 35, 38	Articles 1 and 2	Articles 1 and 2	Articles 1 and 2	Articles 1 and 2	The Third Decision
Ecosystem Management	Articles 2, 5, 8, 9, 10, 11, 15, 18, 19, 20, 29, 30, 31, 32, 33, 34, 37, 40, 44	Article 1	Article 1	Article 1	Article 1	The First Decision, The Second Decision
Ecosystem Services	Articles 3, 12, 13, 18, 20, 21, 34, 35, 38	—	—	Article 2, Appendix 1 and Appendix 2	—	The Second Decision
Welfare	Articles 10, 14, 17, 25	—	—	—	—	—
Feedback	Articles 4, 26, 27, 28	—	—	—	—	—

Source: Result of analysis.

The government, non-governmental organizations, higher education institutions and communities have to be involved in the coral reef conservation efforts in the local level. The local government can allocate a certain area in the coastline to be reserved as a conservation area with a Regency/Municipality Government Regulation. As an example, in Bintan Region, the management of the conservation area is based on Bintan Regency Government Regulation Number 12/2008 on Coral Reef Management; Bintan Regent Regulation Number 13/II/2009 on Strategic Plan (RENSTRA) for Coral Reef Management in Bintan Regency 2009–2014; and Bintan Regent Decree Number 261/VIII/2007. Those are the legal instruments used in managing and deciding the zonation. Likewise, in Sabang City, the conservation zonation is based on Sabang Mayor Regulation Number 7/2013 on Management and Zonation Plan in the Eastern Coastline of Weh Island of the Sabang City. In implementation, the government of Bintan established the Local Technical Implementation Unit Organization based on the Bintan Regent Regulation Number 7/2009. Likewise, the government of Sabang City established the Local Conservation Area Management Agency based on the Decree of the Sabang City Head of Maritime and Fishery Office Number 523/80/2012. Both organizations work under the local government in supervising and implementing coastal area and coral reef conservation management.⁵⁰

To disseminate the local government regulations concerning the management of coastal area resources, the local government, the Local Conservation Area Management Agency, and other governmental organizations can provide outreach trainings. In Sabang City, the outreach training is done by the Ministry of Maritime Affairs and Fisheries Office and the Local Financial Management Board (Illustration 2). In Bintan Region, the conservation area management efforts have been done since 2007. With the initial zoning arrangement activity in 2007, the conservation efforts were continued in 2008 with coral reef management and MMA (Marine Management Area) activities for the areas of Gunung Kijang and Bintan Pesisir districts. Next, in 2009, the conservations activities done were the zoning and management planning for Bintan Region, and the installment of sea markers and signs in the MMA areas in Tambelan district and East Coast Bintan.⁵¹ In Batam City, the KKD management is done

50 Darmawan, A., S.B. Lubis dan Suraji. 2014. Status of Effective Management of Marine, Coastal and Small Islands Conservation Areas in Indonesia (Status Pengelolaan Efektif Kawasan Konservasi Perairan, Pesisir dan Pulau-Pulau Kecil di Indonesia). Kementerian Kelautan dan Perikanan. Jakarta.

51 Ibid 78.

Table 6
Analysis of Other Legal Instruments

Ecosystem Services Component	Other Legal Instruments		
	Simeulue Area of Aceh	Sabang City of Aceh	The Bajo Tribe of Gorontalo
Policy and Law	Abstinence from Going to Sea Day in PiSiSi areas (Conservation areas of Perairan Pinang, Siumat, and Simanaha)	“Panglima Laot” generally has three types of authority, namely establishing and enforcing the customary law of the sea, managing the marine resources utilization, and managing the customary law of sea trials.	“mamia kadialo”, a tradition with which decisions are made about the group of people who go to the sea for a certain period of time and the types of boats used for that purpose
Ecosystem Management	The traditional institution regulates the Abstinence from Going to Sea Day with the involvement of the people.	The East Coast of Weh Island consists of two “Lhok”, namely “Panglima Laot Lhok Ie Meulee” and “Panglima Laot Anoe Itam”	There are three traditional groups of “mamia kadialo”, namely “palilibu”, “bapongka”, and “sasakai”.
Ecosystem Services	The Abstinence from Going to Sea Day can prevent people from exploiting the marine resources in the PiSiSi areas.	Trawl nets and compressor tools for fishing are prohibited to use. Allowed fishing tools to be used in the east coast areas are fishing rods, “tonda”, and nets.	During the “mamia kadialo”, it is strictly prohibited to: 1) throw garbage and wastes to the sea; 2) eat sea turtle meat; and 3) fish in the sacred coral cluster area.
Welfare	—	—	Fishermen can sell a part of their catch and give the other part to their family to enjoy.
Feedback	The existence of the traditional regulation is expected to give feedback to the people of Simeulue	Although restricting, the existence of traditions is geared towards the welfare improvement for the Aceh people.	The traditional regulations become an important part of the Bajo people in protecting their environment and economy.

Source: Result of analysis.

by the Local Technical Implementation Unit, the Coral Reef Resource Management Agency (LPSTK), and the Supervisory Community Group (POKMASWAS).⁵²

3.5. Other regulations

Other legal instruments are taken from three areas, namely Simeulue Area of Aceh; Sabang City of Aceh; and the Bajo Tribe of Gorontalo. These areas are homes to three indigenous tribes that have their own regulations concerning conservation efforts. The analysis of these legal instruments is presented in the following Table 6 (Annex Table 6).

As an example, the village-level institutional strengthening strategy and the program implementation in the fields are ineffective because the establishment of the management agencies such as Village Rules and Marine

52 KKP. (n.d.). Conservation Area Data (Data Kawasan Konservasi). Retrieved from Konservasi dan Keanekaragaman Hayati Laut Dirjen Pengelolaan Ruang Laut KKP: <http://kkji.kp3k.kkp.go.id/index.php/basisdata-kawasan-konservasi/details/1/71>

Cultivation Areas often do not take the people's interests into consideration.⁵³

Therefore, it is advisable that the Local Government Regulation also includes the people's involvement in managing the coral reefs and coastal areas. A good example is the Aceh area of Simeulue's local regulation, which includes a very strong cultural/traditional aspect in managing the sea area by actively involving the people.

The traditional institution even declares a *Hari Pantang Melaut*, which means a day when going to sea is prohibited, in the PiSiSi areas (The Conservation areas of Perairan Pinang, Siumat and Simanaha). This customary law of abstinence from going to sea states Prohibitions on special days and Fridays, as stated below⁵⁴:

1. "Khanduri Adat Laot" ("Khanduri Naey" / "Khanduri Ikan"). "Khanduri laot" is done once a year, or at least once in three years at the latest, or depending on the agreement among and the ability of the fishermen. The abstinence from going to sea lasts for 3 days at the event of "Khanduri laot", starting from the dawn of "khanduri" day to the dusk of the third day.
2. Fishing activities are prohibited on Fridays, starting from 6 PM Western Indonesian Time on Thursday to 3 PM Western Indonesian Time on Friday.
3. Fishing activities are prohibited for full three days during the Eid Al-Fitr celebrations, starting from the first to the third day of the holiday.
4. Fishing activities are prohibited for full four days during the Eid Al-Adha celebrations, starting from the first to the fourth day of the holiday.
5. Fishing activities are prohibited on Indonesia's Independence Day on August 17, starting from 6 AM to 6 PM Western Indonesian Time.

Still in Aceh, the Sabang City also has a local fishing community organization which was established by the local community called "Panglima Laot" (Annex Table 6). "Panglima Laot" is the leader of a customary institution formed by the fishermen community in Aceh coastal areas usually known as "Lhok". The person who can be appointed "Panglima Laot" is a prominent figure in the society or a trusted leader of a fishermen community in the coastal areas. The East Coast of Weh Island is divided into two sub-districts ("Lhok"), namely "Panglima Laot Lhok Ie Meulee" and "Panglima Laot Anoe Itam" (Annex Table 6). In general, a "Panglima Laot" has three institutional functions, namely maintaining the security at sea, managing the utilization of the sea resources, and managing the sea environment. In carrying out his functions, a "Panglima Laot" has the authority to enforce the Customary Law of the Sea, to manage the utilization of the sea resources, and to supervise the Customary Law of the Sea trials. In managing sea resources, one of the regulations set up by the "Panglima Laot Ie meulee" dan "Anoe Itam" regulates the fishing gears that can be used for fishing. In both areas, fishing trawls and compressor tools are prohibited to use. Fishing gears that can be used in the eastern coastal areas are fishing rods, "tonda", and fishing nets. With this regulation, supervision comes not only from the government but also from the people themselves.

The Bajo tribe of Gorontalo in Sulawesi Island also shows a local wisdom as the implementation of the people's ecological intelligence in protecting the aquatic ecosystem. One of the traditions that the tribe has is the "mamia kadio" (Annex Table 6), which is a system of grouping people who go to the sea for a certain period of time using a certain type of means/boats. There are three customs in this tradition. They are "palilibu", "bapongka", dan "sasakai" (Annex Table 6). "Palilibu" is the custom of fishing using the traditional rowing boat called "soppe". The fishing activity is done in one or two days. When the fishing activity is completed, the fishermen go back to their village to sell a part of their catch and enjoy the rest with their family. "Bapongka", also called "Babangi", is the custom of fishing that lasts for a couple of weeks or event months, using a bigger

53 Kasim, Faizal. (2011). Coral Reef Conservation for Sustainable Regional Development (Pelestarian Terumbu Karang untuk Pembangunan Daerah Berkelanjutan). *Makalah pada Penyuluhan Kemah Bhakti UNG Desa Olele*. Retrieved from <https://repository.ung.ac.id/get/karyailmiah/265/Pelestarian-Terumbu-Karang-untuk-Pembangunan-Kelautan-Daerah-Berkelanjutan.pdf>

54 Yulindawati. (2017). Traditional Law Of The Laot (Sea) As The Wisdom Of Aceh's Fishing Community In Effort To Preserve The Potential Of Capture Fishery Resources (Hukum Adat Laot [Laut] Sebagai Kearifan Masyarakat Nelayan Aceh Dalam Upaya Melestarikan Potensi Sumberdaya Perikanan Tangkap). *Dusturiyah: Jurnal Hukum Islam, Perundang-undangan, dan Pranata Sosial*, VII(1). Retrieved from <https://jurnal.ar-raniry.ac.id/index.php/dustur/article/download/2333/1690>

boat measuring approximately 4 × 2 meters called “*Leppa*” atau “*Sopek*”. Wives and children are taken along in the fishing journey. Wives often give birth during the trip. The most important aspect of the “*bapongka*” custom is the obedience in following the restrictions. “*Sasakai*” is the custom of going to sea for months using several boats within the inter-island cruising area.⁵⁵

During the “*mamia kadialo*”, there are restrictions that must be obeyed by those who go to the sea and by the family members that they leave behind. The restrictions are that the people are not allowed to throw to seawater things such as the water used for washing sea cucumbers, wood charcoal or kitchen ash, cigarette butts and ash, liquid from chilies, ginger and extract from oranges, and to wash cooking utensils (woks) in seawater. Water used for cleaning or washing and other materials mentioned in the restrictions are to be kept and then later disposed on land after the people go back from the sea. There is also the restriction of not consuming sea turtle meat. Breaking this rule is believed to invite calamities, storms, and disturbances from evil spirits, and even bad luck in getting a good catch. The elder generation of the Bajo people also believe that some coral groups are the place where the spirits of their ancestors stay. The elderly people forbid their family members from catching fish and other biota in those coral group areas, except after a certain ritual of giving offerings to the ancestor spirits is done.⁵⁶

It is advisable that there is a supervision in coordinating the local regulations with the customary regulations in managing coastal areas. Similar to the MPA (Marine Protected Area) policy, “*Batu Pangalle*” area in South Sulawesi applies a no-fishing restriction to protect its large number of coral reefs.⁵⁷

3.6. Ecosystem Services Model for Coral Reef Ecosystem

The points found from combining the results of all of the analysis of the legal instruments are as followed:

1. Policy and Law

Concerning the policy and legal aspects, there have been sufficient number of international, regional, national, local, and even legal instruments. These regulations generally support and sustain the existence of coral reefs as an ecosystem that must be protected.

2. Ecosystem Management

Not all regulations in the international, regional, national, or local levels include coral reef ecosystem management. However, efforts have been made towards ecosystem management in protected areas through the implementation of regulations of zone selection, utilization, control, and law enforcement. However, there are also non-regulatory regulations that only serve to help protect the coral reef ecosystem from damages.

3. Ecosystem Services

Not all regulations in the international, regional, national or local levels provide the opportunity for the utilization of the coral reef ecosystem as a part of ecosystem services. Utilization of the coral reef ecosystem services like utilizing coral reefs for tourism purposes or for other controlled purposes is still minimal. While protecting the ecosystem, there should be efforts to responsibly utilize the coral reefs.

4. Welfare

Not all regulations in the international, regional, national or local levels contribute to people’s welfare. Some regulations help improve people’s welfare through good utilization of natural resources. However, there are more regulations that limit opportunities for welfare improvement. There are areas which are completely closed for the local people to use, but those areas can be legally or illegally used by other parties without contributing anything to the local people’s welfare. Those other parties have the authority to give the local people permission to utilize the areas.

5. Feedback

Feedback is a description of how international, regional, national or local regulations can provide the basic reasons for good utilization of natural resources for the improvement of people’s welfare. The people’s welfare

55 Utina, Ramli. (2012). Ecological Intelligence in the Local Wisdom of the Bajo Community, Torosiaje Village, Gorontalo Province (Kecerdasan Ekologis Dalam Kearifan Lokal Masyarakat Bajo Desa Torosiaje Provinsi Gorontalo). *Prosiding Konferensi Dan Seminar Nasional Pusat Studi Lingkungan Hidup Indonesia Ke 21, 14-20*.

56 Ibid 81.

57 Djahuddin, N.F., R. Alfira, dan M. Anwar. (2009). The Existence of Batu Pangalle as Local Wisdom on Coral Reef Conservation on Balang Lompo Island, Pangkep Regency (Eksistensi Batu Pangalle sebagai Kearifan Lokal Terhadap Pelestarian Terumbu Karang di Pulau Balang Lompo Kabupaten Pangkep). *Karya Tulis Ilmiah COREMAP II*.

improvement aspect that is not provided by some of the existing regulations is expected to be fulfilled by norms in the society.

3.7. Discussion

After studying all of the international, regional, national, regency/municipality and local regulatory instruments, it is found that not all of them support the theory of ecosystem services put forward by Alexander van Oudenhoven.

In this study, several international agreements, both hard law and soft law have shown support for improving community welfare, especially local communities. As explained above, from several international agreements studied, there are hard laws in conventions or agreements such as UNCBD or the ASEAN Agreement. Meanwhile, examples of soft law include the 1972 Stockholm, 1992 Rio, and SDGs declarations. Both are important for Indonesia in carrying out international commitments, especially aspects of international agreements. For example, UNCBD 1992 has provided Directives for the use of biodiversity for the life of local communities. Likewise, the SDG's goals related to climate change, marine and biodiversity also allow local communities to use natural resources and protect their lives.

Meanwhile, in the perspective of national regulations, there are still many insufficiencies of the regulations themselves or the existence of norms that do not support efforts towards welfare. It is very common to find regulations that focus only on prohibitions or restrictions in supposedly usable areas. In the theoretical framework used in this paper, improving welfare is a concern, so it is essential to look at this factor in each regulation related to coral reef conservation at various levels.

For example, the Circular Letter of the Minister of Development Supervision and Environment Number 408/MNPPLH/4/1979, dated April 30, 1979, on Prohibition on Taking Corals which may Destroy the Marine Ecosystem (sent to all Governors in Indonesia). Without providing solutions to the community, this regulation only prohibits taking coral reefs to improve their welfare. The Indonesian government has not revoked the regulation to this day. Therefore, it is crucial to create regulations that incorporate opportunities for the utilization of an area according to its condition.

Some norms covered in various regulations have provided the ecosystem services model opportunities. For example, there are norms covered in international regulations that stress the importance of people's welfare as guided by Sustainable Development Goals (SDGs). Therefore, there are problems in international conventions that are more legally binding and only provide limits on utilization without regard to the lives of local people. For example, CITES 1973 only strictly enforced the international trade system in animals and plants without allowing local communities to further engage in supporting these restrictions and prohibitions.

Another example is the Ramsar Convention 1971. Many wetlands are protected and have priceless value, but the 1971 Ramsar Convention has not been included. Some lands that have not been included in the convention list will easily change their designation and function for development purposes. This matter causes the convention to be ineffective, even though it has been made a national regulation. Of course, this will reduce the hope for future generations to get a better environment. Then, Bintan Regent Regulation 13/2009 regulates coral reef zoning, but this regulation is still risky because busy shipping activities often cause pollution in several protected locations. This regulation needs to be integrated with other regulations related to shipping traffic transportation in the area. In the Simeulue Area of Aceh customary regulations, it turns out that it has not focused on efforts to improve the welfare of indigenous peoples. This condition is because this regulation places more emphasis on conservation efforts.

Several national laws have also demonstrated a commitment to improving welfare, particularly concerning the use of coral reefs. In the Fisheries Law, Number 45 of 2009, equity and sustainable development principles will also be related to welfare. There are quite some activities in the field of fisheries, but in essence, the various conservation and utilization carried out under this law are expected to provide welfare for the surrounding community. Preservation, such as carrying out conservation actions in certain areas where there are many coral reefs, seagrass beds, and mangroves, must still be done so that the available fishery resources do not quickly disappear or even become extinct. Actual conservation actions are taken, such as the designation of a Marine Protection Area to be a valuable place for developing fishery resources. The area can act as a protected place

starting from spawning to birth until it develops and spreads outside the protected area, then utilized by all interested parties. Various types of fish, both commercial and non-commercial, are needed to increase biodiversity.

Indonesia has also ratified the 1992 Convention on Biological Diversity/UNCBD, which demonstrates Indonesia's commitment to the world's biodiversity and as the basis for protecting biodiversity in Indonesia. Protecting biodiversity is not only terrestrial but also marine and coastal biodiversity. The model for protecting biodiversity, starting from existing policies, developing ecosystem services to protect biodiversity and improve welfare, especially the welfare of local communities, is fundamental.

This is intended so that feedback can occur because the use of biodiversity through the availability of diverse fishery resources has benefited local communities. These conditions can encourage local communities to act more on improving their protection so that this feedback will provide the overall benefit of the system developed from this theory. Protected areas, such as around the Coral Triangle Area (CTI), already have policies and regulations to develop coral reef ecosystem services through tourism areas. The benefits began to be felt by the local community with the arrival of tourists who care about coral reefs. In this way, efforts to further protect the area where local communities are located will provide feedback for the entire system in the area.

The existence of various regional regulations in Indonesia to support the preservation of coral reefs and the community's welfare is also very important. Regional regulations in Indonesia have various forms such as Qanun, Provincial Regulations, Regency/City Regulations, Governor Regulations, Governor Decrees, Governor Instructions, Governor Circulars, Regent/Mayor Regulations, Regent/Mayor Decrees, Circulars, and so on. Not to mention the Village Regulations, which can be in the form of Village Head Regulations, Village Head Decrees, to customary village regulations if the village is a traditional village. In indigenous peoples, written and unwritten customary law applies.

The number of regulations in the regions reflects the support for national regulations, even international commitments. It can be seen in Regulation of the Regent of Bintan No. 12 of 2008, which regulates the management of coral reefs. Coral reef management is part of ecosystem management regulated by laws and regulations at the central level. These various regulations from the Bintan Regent make coral reefs a vital part of efforts to protect the environment and manage ecosystems through the existence of policies and laws. This includes utilizing ecosystem services and improving welfare for the people of Bintan to restore the management to be better due to the attention of the community and the fishing community of Bintan.

Regional Regulations also give the region the power to take actions that damage and pollute the environment. Several local regulations related to coral reefs allow the community to form a Monitoring Group whose function is to monitor and supervise various activities related to coral reefs and the marine environment in the vicinity. This is important, considering that the position of the surrounding community is the closest to marine activities in the vicinity. Communities can participate in protecting their seas from harmful actions, such as pollution and damage. The community also has space to provide assistance and support, especially law enforcement officers. Community participation can facilitate the work of law enforcers who are very limited to always being present at the location. The existence of institutions in the community is also essential, especially in helping to agree and share the results achieved in coral reef management activities.

In indigenous peoples in several regions in Indonesia, there are also similar institutions that supervise and assist the community in marine activities. Protecting coral reefs is also carried out by indigenous people far from being monitored by law enforcement officials. The institutional strength of indigenous peoples is even more critical in some areas because it has become a tradition that developed long ago in the colonial period. Certain customary areas even have complete tools for dealing with marine issues, especially coral reefs. For example, in Maluku, the practice of "Sasi" has long been regulated by indigenous peoples, especially when fishing and conserving fish habitat in customary areas. In Aceh, Panglima Laot is well respected, especially in protecting the sea around indigenous peoples so that there are no losses or opportunities for indigenous peoples. If these opportunities are lost, there will be no prosperity for the region's indigenous peoples.

The above shows how important the status of traditional institutions is, especially in efforts to protect coral reef ecosystems. Although many customs or customs have begun to disappear or diminish in modern times, efforts to maintain the life of indigenous peoples are still guaranteed through the constitution and national laws and regulations. The decision of the Constitutional Court has even emphasized the attention of indigenous peoples as part of society that must be protected by the government, both at the central and regional levels. The Constitutional Court's decision is essential and has confirmed support for indigenous peoples in Indonesia.

Some national, regency/city, or even local regulations have also been in line with the ecosystem services model, but they have different application levels. Some regulations permit people to utilize an area, while others prohibit people from entering an area. Some achievements in efforts to conserve coral reefs and improve community welfare in the form of policies should be appreciated. However, these various achievements do not necessarily eliminate the environmental and social welfare problems that still occur today. The discontinuity between policy and practice is still common today. Some international rules are often not even in line with national rules and daily practice.

It is very important that ecosystem services as a mean to improve the people's welfare be analyzed further in relation with the international regulations in the form of international treaties or customs, or with the national regulations in the form of laws or regency/city regulations. Should also be included in the analysis are written regulations made by the government and unwritten regulations like the customary laws. Although their age is limited by the life of the flora and fauna that dwell in them, coral reefs have economic value because of their beauty. This potential of coral reefs should be utilized as a service that can protect their ecosystem. Not all countries have beautiful coral reefs that can be economically utilized to improve the welfare of the people and to increase the national income.

Ultimately, an international, regional, national, regency/city or local legal instrument should be able to give social and environmental protection, as well as welfare improvement for the people. For this purpose, the concept of sustainable development can be carried out through the implementation of sufficient regulations and norms.

4. Conclusion

The ecosystem services management in international environmental laws, in connection with national and local environmental laws, and the policy planning concerning the coral reef ecosystem sustainable development are found to be sufficiently related. However, not all regulations support the theory of ecosystem services put forward by Alexander van Oudenhoven. The result of this study is still in the form of identification, but the stages of the identification process are a crucial part in decision making. A decision-making process that does not follow the right stages of identification will result in a wrong decision. It is hoped that the result of this study, which involved the process of identifying legal instruments that support ecosystem services model, can be used as an important element in further analysis of coral reef ecosystem services decision making.

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