

Blue Economy Approach toward Sustainability Of Riau Marine And Coastal Ecosystem

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Abstracts

The increase pressure on marine capture fisheries due to rising demand for seafood, growing population, and a rapid increase in fisheries exploitation, brought about a decline in productivity of many fisheries. Last issues of ocean degradation were related to; overfishing, pollution, habitat destruction (coral reef). FAO (2008) reported that 32% of fish stocks are over-exploited, depleted or recovering from depletion, and this figure is rising every year. This unsustainability of marine and coastal ecosystem were related to overfishing, pollution and waste, habitat destruction (coral reef), climate change, and loss of habitat and biodiversity. Aware of those issues and threats the productive and valuable ocean area lies at risk. Therefore, a concept of Ecosystem Based-Management (EBM) was introduced. The approach lays out a series of principles to guide management toward long-term sustainability of marine and coastal management. Further beyond the sustainability, the term "blue economy" has been used by the Pacific Small Island Developing States Perspective (PSIDS). in effort to highlight the importance of conservation and sustainable use of marine resources.

Keywords: Blue Economy, Coastal Ecosystem, Marine Conservation

Introduction

As an integral part of the planet and an absolutely essential component of human lives, the livelihoods, the ocean play central role. Coastal areas are of major contributors to the global economy and fundamental to regional wellbeing through direct economic activities, provision of environmental services, and a home to the majority of world's population. In fact more than 40% world population inhabit within 100 km of the coast, 13 of the world's 20 megacities lie along the coasts and nearly 700 million people live in low lying coastal less than 10 m above sea level.

It was reported that marine ecosystem face inter-related issues affecting the ocean sustainability, including; unsustainable fishing, climate change and ocean acidification, pollution and waste, and loss of habitats and biodiversity. It is realized that the importance of the ocean as a life support system for human societies, comprises of biological, regulating, cultural and aesthetic service. Those services were mainly contributed on the global blue

economy as suggested in the Rio+20 UNEP (2011)

Fishery scientist have been managing uses of marine and coastal ecosystem for centuries. Last issues of ocean degradation were related to; overfishing, pollution, habitat destruction (coral reef). Aware of those issues and threats, the productive and valuable ocean area lies at risk. Therefore, a concept of blue economy comprehensively was promoted. The approach lays out a series of principles to guide management toward long-term sustainability of marine and coastal management. Blue economy approach have been introduced and promoted by UNESCO (2011) which aim at conserving and sustaining ecosystem services to benefit current and future human generation. It is in accordance with Ecologically Sustainable Fisheries Development (ISFD) concept in that "seeks to integrate short and long-term economic, social and environmental effect in all decision making." It is therefore the most fundamental shift in public policy that has accrued during the last 20 years.

Blue Economy Concept

Blue economy is defined as an integral framework of future economic development of ocean exploitation. This concept includes; protection of and restoration of ocean ecosystems and biodiversity, change in fisheries and aquaculture management, development of blue-carbon market, integrated coastal zone management, adaptation to sea level rise, adoption of ocean carbon sink, and active sea-floor management (FAO 2011).

The term “blue economy” has been used by the Pacific Small Island Developing States Perspective (PSIDS) in New York to refer to their efforts to highlight the importance of the conservation and sustainable management of marine and ocean resources. However, it is understood that the thoughts of the (PSIDS) including on the use of the terminology are preliminary and subject to further dialogue. The meeting in Apia is an opportunity to further develop an understanding of the Rio+20 objectives and concepts as well as priorities. (RIO+20 Pacific, 2011).

Priorities for blue economy focus on three key ocean-related objectives identified by are (1) increasing the share of benefits that PSIDS receive from the use of their marine living resources, (2) reducing over-fishing beyond maximum sustainable yields, destructive fishing practices, and illegal, unreported and unregulated fishing, (3) building the resilience of marine ecosystems, and coral reefs in particular, to the impacts of climate change and ocean acidification, among other impacts. In order to achieve these objectives, the following have been identified as key tasks or activities.

Blue economy goes beyond sustainability mean, in that of its principles including; (a) Nature efficiency (b) Zero waste: leave nothing to waste – waste for one is a food for another - waste from one process is resource of energy for the other (c) Social inclusiveness: self-sufficiency for all – social equity-more job, more opportunities for the poor (d) Cyclic systems of production: endless generation to regeneration, balancing production and consumption, and

(e) Open-ended innovation and adaptation: the principles of the law of physics and continuous natural adaptation. UNEP Green Economy that relevant to ocean may include; (1) Greening not only increases wealth over the long-term, but also produces a higher rate of GDP growth (2) there is a clear link between poverty eradication and better protection and restoration of habitat, marine fishery resources and biodiversity.

Sustainability and EBM Approach

The IUCN(1987) suggested that conservation of nature would be considered. Conservation, sustainable use and protection of natural resources including plants, animals, mineral deposits, soils, clean water, clean air, and fossil fuels such as coal, petroleum, and natural gas. Natural resources are grouped into two categories, renewable and nonrenewable. A renewable resource is one that may be replaced over time by natural processes, such as fish populations or natural vegetation (forest), or is inexhaustible, such as solar energy. The goal of renewable resource conservation is *to ensure that such resources are not consumed faster than they are replaced*. Nonrenewable resources are those in limited supply that cannot be replaced or can be replaced only over extremely long periods of time. Conservation activities for nonrenewable resources focus *on maintaining an adequate supply of these resources well into the future*.

Coastal and marine resources are conserved for their biological, economic, and recreational values, as well as their natural beauty and importance to local cultures. Coral reef ecosystem are protected for their important role in both global ecology and the economic livelihood of the local culture, as well as its natural beauty for ecotourism. In short, “*sustainable development is defined as development that meet the needs of the present without compromising the ability of future generations to meet their own needs*” (World Commission on Environment and Development, 1987).

Ecosystem Based-Management (EBM) is a place based-approach that goes beyond examining single issues, species, or ecosystem functions in isolation. Rather, it considers ecological systems for what they are (a rich mix of elements that interact each other in important ways). It involves multi-sectors policy including; fisheries, maritime, energy, agriculture, coastal development, eco-tourism, transportation, environmental and other policy (Fig 1).



Figure 1. Multi-sector developmental use coastal and marine areas (UNEP 2011).

EBM is science based that provides key guidance in ecosystem. It is a science based process. The approach is a strategy for the integrated management of land, water and living resources that provides sustainable delivery of ecosystem services in an equitable way. EBM does not require managing all aspects of a system simultaneously. Instead, an EBM initiative founded on good knowledge and understanding of ecological and social systems can allow for thoughtful prioritization of the most important management actions and activities. It is better to manage the most critical elements effectively than to become paralyzed by trying to manage everything else at the same time.

Synergism of Indonesian Development Policy

EBM promotes inter-sectoral coordination including fisheries policy, maritime, energy, coastal development, and environmental policy. It involves changes in management practices (1) each human activity is managed in the context of all ways it interacts with marine ecosystem

(2) multiple activities are being managed for a common outcome.

In accordance with the Vision of Marine and Fisheries Development, of The Indonesian Government, the mission of MFD including; marine resource optimization and industrialization, value added and maintain carrying capacity and environment quality of the resources, and regional specific product development base (Minapolitan). In terms of conservation and restoration of marine resources, the Indonesian government developed Marine Management/Protection Area (MMA/MPA) in each coastal regency, which were established in the regency. Indonesian Government committed to economic growth, people income increase and job opportunity from MF sectors, while it maintains the health of environment, toward blue ocean and blue sky. Blue economy model has been implemented in industry of tuna fish and sea grass product.

Case Study on MPA Batam Zonation and Management Plan

The Zonation Plan of Marine Management Area of Batam was shown in Figure 2 which consists of: Core Zone, Coral Reef Zone, Traditional Use Zone and Pelagic use Zone. Each zone was regulated in accordance with each management plan.

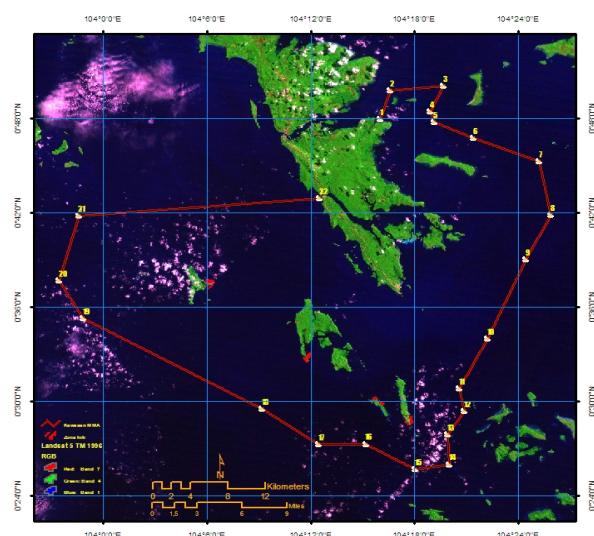


Figure 2. Core Zone of Marine Management Area of Kota Batam.

Core Zone

The core zone were defined from spatial operation by applying *index overlay model*. The core zone situated in coastal waters where reef ecosystem exist. The zone were preserved permanently as a fish reserve and as biodiversity spots. In addition, the zone were physically functioned as coastal protection. The zone where definitively ***no-take and no-visit zone***, distributed in several localities (Figure 2).

Coral Reef Zone

The Coral Reef Zone were established to avoid misperception of local community in that of core zone. Distributed out of core zone, the reef zone has lower of index overlay model than that of core zone. However, the reef zone were also need protection from unsustainable and destructive fishing practice in order to maintain the balance of coastal ecosystem. In short, all reef ecosystem, located out of core zone of MMA, were included into reef zone (Figure 3).

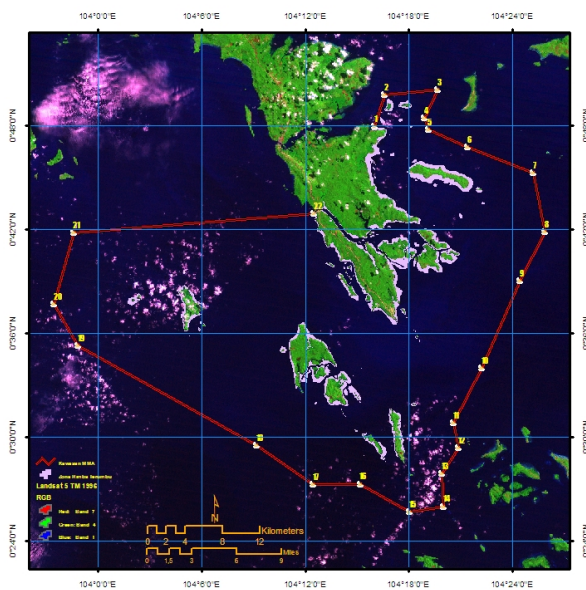


Figure 3. Coral Reef Zone, MMA Batam

Traditional Use Zone

The traditional use zone were planned and managed by local community. Its functions were similar with that of MMA core zone. However they are different in that of management plan. Core zone of MMA were based on scientific study

on bio-physics (ecological), socioeconomics, and local community perception. Traditional use zonewere identified only based on experience and perception of local fishermen. Traditional use zone were distributed in PulauAbang, (Figure 4) , PulauGalangBaru (Figure 5), PulauKaras (Figure 6).

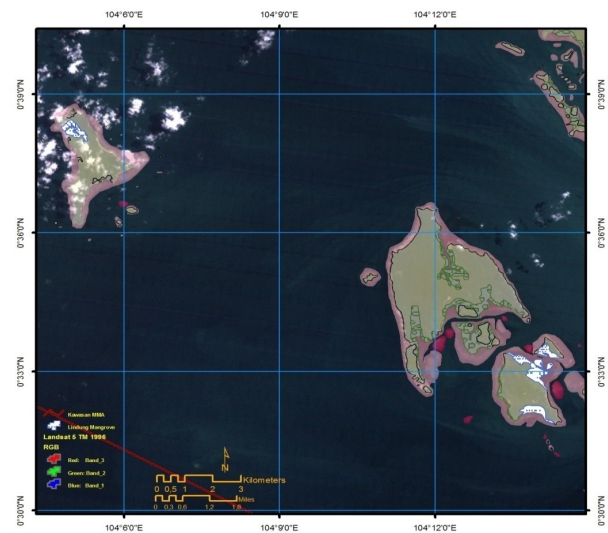


Figure 4. Traditional Use Zone of Marine Management Area of Batam in Pulau Abang.

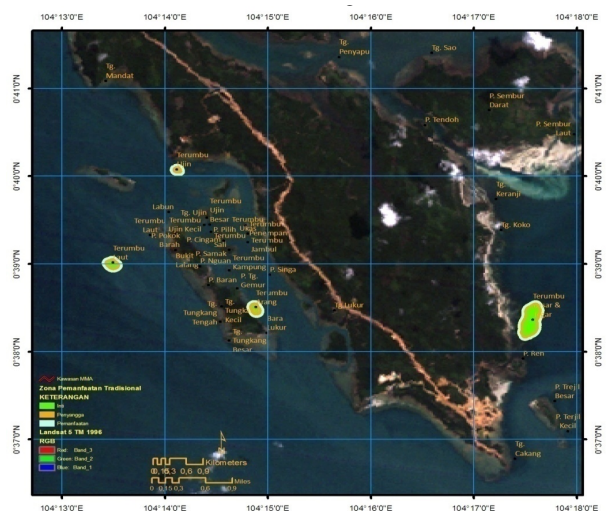
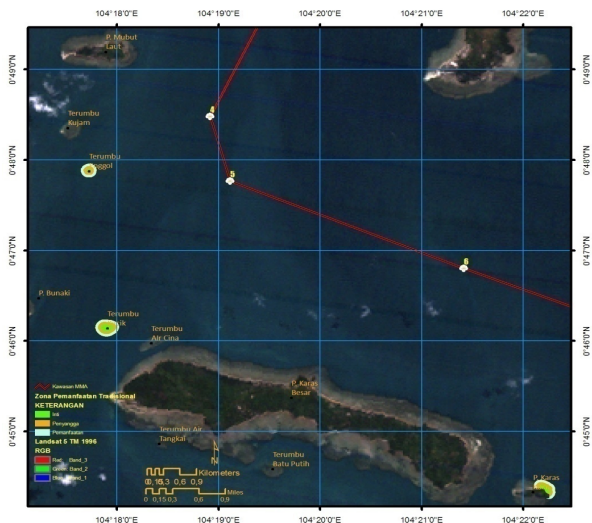
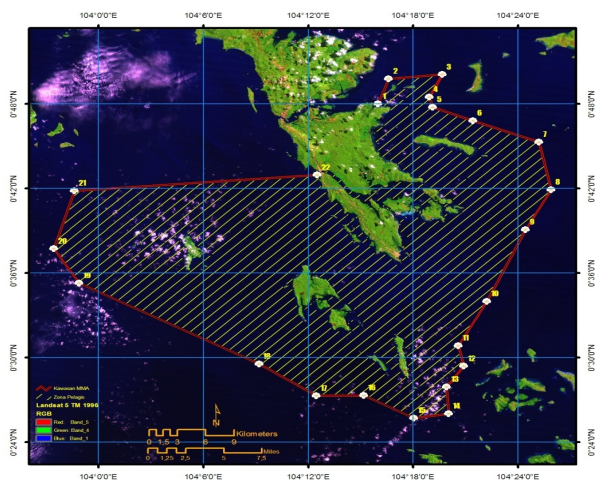


Figure 5. Traditional Use Zone of MMA of Batam in Pulau Galang Baru.



Pelagic Zone

The Pelagic zone were intended for limited commercial fishing ground of pelagic traditional fishing. The local fishermen has traditionally use the area for gill net fishing, trammel net, trap net and other traditional small scale fishing. Pelagic zone in addition, could also be used for research, educational and recreational purpose. All those means are definitely include into eco-friendly activities. In contrary, destructive fishing (cyanid and exlosive fishing) and garbage discharge are not allowed in this zone. Pelagic zone of MMA Batam were illustrated in Figure 6.



Zone Regulation and Management Plan of MMA Batam

Based on area suitability analysis, core zones of coral reef were reserved based on bio-ecological and socio-economic consideration. No fishing and no visit and no fish culture, are allowed to the core zone. Scientific research could be conducted with special permit from local government. Pelagic zone were reserved serve for limited commercial fishing, leisure fishing, and research activities. Fishing that destruct marine ecosystems including cyanidfihing, explosive fishing, garbage discharge, are prohibited.

The Coral Reef Zone were developed to avoid misperception of local community in that of core zone. Reef zone which scattered within the planning region (outside core zone) were ecologically important and need to balance the adjacent ecosystem. Harvesting alive and death coral are prohibited within the reef zone. Marine exploitation that destruct ecosystems including cyanidfishing, explosive fishing, garbage discharge, are prohibited.

Traditional fishing gears (angling, trap net, static gear) are allowed to operate with register and permit from local people, in the traditional use zone. Activities such as transportation, harboring are allowed with local permit.

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Manuscript Template

TITLE (Font Style “TIMES NEW ROMAN, size 16”). The title should accurately, clearly and concisely reflect the emphasis and content of the paper. The title must be brief and grammatically correct.

(No name need for this part because of manuscript blind review)

ABSTRACT: (size 11). The abstract should briefly state the problem or purpose of the research, indicate the theoretical or experimental plan used, summarize the principal findings, and point out the major conclusions. Maximal length of the abstract is 200 words; no literature references should be contained in the abstract. Emphasis should be on what was found, not what was done.

KEYWORDS (size 10). Up to 10 key words that describe the subject matter of their paper should be supplied after the Abstract for indexing purposes. Provide significant keywords to aid the reader in literature retrieval.

Introduction

The introduction should state the purpose of the investigation and give a short review of the pertinent literature. It should be limited to identifying the gap in scientific knowledge or the problem that the research addressed. No more than 8-10 references should need to be cited.

the gap or problem identified in the introduction. Appropriate statistical analysis of the results is required. Data should be presented as concisely as possible, if appropriate in the form of tables or figures, although very large tables should be avoided.

All figures and tables should be centered and numbered consecutively.

Method and Approach

Sufficient detail or literature references to such methods should be included in the Experimental Procedures section to permit other scientists to repeat or extend the experiments. This section should also contain an overview of the experimental approach used, especially in the case of complex or unusual designs. Appropriate statistical design of experiments is required along with clear distinction of experimental and analytical replicates. Data should not be reported to more significant figures than justified by the experimental procedures used.



Type *Figure* in style box. The caption should be typed in lower case. Choose *center* if the caption fit on one line.

Summary of physical parameters.

No	Segments	Length (km)	Elevation (meter)
1	A-B	25	30
2	B-C	75.15	10
3	C-D	44.75	50
4	D-E	72.5	10
5	E-F	21.25	10

Results and Discussion

The Results and Discussion section should describe and analyze the outcomes of the study and discuss how these outcomes correspond to

Conclusion

The Conclusion section should concisely describe the main contribution/outcome of the results to the advancement of the field; it should not simply summarize each and every point of the study. The Conclusion should also briefly denote potential impact of the results; however, it should not include statements related to future planned research or publications. One to two paragraphs, at the most, should be sufficient for a good Conclusion section.

Acknowledgements.

These should be as brief as possible. Any grant that requires acknowledgement should be mentioned. The names of funding organizations should be written in full.

References

Note that in the case of three or more authors, only the last name of the first author is cited and the others are denoted by “*et al.*”. The same rule is also hold for header title in even page.

References should be numbered in the order in which they appear in the text and listed in numerical order as:

References with correct punctuation should be styled as follows:

From journal articles

- [1] JayakodyKPK, Shimaoka T, KomiyaT, Ehler P (2014) Laboratory Determination of Water Retention Characteristics and Poresize Distribution in Simulated MSW Landfill Under Settlement. *Int. J. Environ. Res.*, 8(1):79-84.

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