Instituto Nacional
de Ciências e Tecnologia de Timor-Leste

Relatório de
Investigação Científica INCT 2025

Establishment of Guidelines for Marine Protected Areas in Timor-Leste 2025: The Case Study for Community Based Marine Sanctuary of Beloi-Ataúro and Com-Lautem

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Novembro de 2025

Instituto Nacional de Ciências e Tecnologia de Timor-Leste

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The Case Study for Community Based Marine Sanctuary of Beloi-Ataúro and Com-Lautem

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Title of Scientific Research Report INCT 2025:

Establishment of Guidelines for Marine Protected Areas in Timor-Leste 2025: *The Case Study for Community Based Marine Sanctuary of Beloi-Ataúro and Com-Lautem*

Area of Knowledge : Study of Protection and Conservation of Environmental Ecosystems with the Participation of Local Communities (Ambiente.2025.lp1-II)

Year of Completion : 2025

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Acknowledgement

This report would not have been possible either the direct or indirect of sustained support and collaboration. For this reason, we express our sincere thanks to all those who have been supporting us during the completion of this scientific research, from the field research to its finalization. We would like to express our deepest thanks to:

- Leaders of the National Institute of Science and Technology (INCT) for all the support provided throughout the report;
- Employees, administrative technicians, and advisors of INCT for all the support during the implementation of the consultation process;
- All selected coastal communities, village councils, and head of villages for Suco Beloi-Atauro and Suco Com-Lautem who contributed with the field data collection, without them it would not have been possible to implement this scientific research; and
- Co-founders of HACOSTA for their motivation and unconditional support from the submission of project document to the completion of this final report.

Finally, many thanks to all those who have supported and contributed to the completion of this final report.

Dili, 26 November 2025

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Establishment of Guidelines for Marine Protected Areas in Timor-Leste 2025: *The Case Study for Community Based-Marine Sanctuary of Beloi-Ataúro and Com-Lautem*

Abstract

Management guidelines for Community-Marine Protected Areas have a variety of terms in Timor-Leste. However, the term of Community Based-Marine Sanctuary (CB-MS) is a characteristic of participatory approach. It is necessary to establish guidelines for determining the type of Marine Protected Area (MPA), includes measuring the effectiveness of MPA performance. The objectives of this research are a) to define guidelines and build marine protected areas; b) to assess the effectiveness of Community Based-Marine Sanctuary in Suco Beloi-Atauro and Com-Lautem; c) to define the potential typology of MPA (marine national park, aquatic reserve, and fishery resource recovery) in Suco Beloi-Atauro and Com-Lautem. Those objectives are essential because up to date after 2 decades more since 2004, the Government of Timor-leste (GoTL) is not implementing yet the MPA typology-based of Fishery Decree Law No. 6/2004 that stipulated on Article 96 Alinea 2. During the survey, research team were conducting the combination of qualitative data (20 categories and its formula for MPA typologies including the METT scores), and the qualitative data were used for framing questionnaires and to support the various options when deciding to respond upon 34 questions of METT score. In another perspective, site selection and number of sample unit was applying purposive sampling method. Based on the research objectives, the results indicated that both MPA typologies in Beloi-Atauro and Com-Lautem were respectively categorized as Aquatic Reserves. Similarly, the METT score showed that in Beloi-Atauro was 35.1(moderate effectiveness), whereas in Com-Lautem was indicated 21.4 (low effectiveness)

Keywords: *Community Based-Marine Sanctuary (CB-MS), Marine Protected Area (MPA), Management Effectiveness Tracking Tool (METT), MPA Typology*

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List of Acronyms and Abbreviations

Acb	: Accessibility
AIS Forum	: Archipelagic and Island States Forum
AR	: Aquatic Reserve
ATSEA	: Arafura and Timor Seas Ecosystem Action
Ca	: Community aspiration
CB-MS	: Community based-Marine Sanctuary
CN	: Classification Number
CP	: Compliance Percentage
CTI	: Coral Triangle Center
CV	: Compliance value
Eih	: Extend of the ecosystem that has been intervened by humans
Eva	: Area of the ecosystem that is being evaluated
Fcs	: Frequency of cars or ships number
FGD	: Focus Group Discussion
GOAP	: Global Ocean Accounts Partnership
GoTL	: Government of Timor-Leste
GPS	: Global Positioning System
HACOSTA	: Hadomi Costeiro no Tasi
ICM	: Integrated Coastal Management
IUCN	: International Union for Conservation of Nature
LA	: Level of adequacy
LMBO	: Land and Maritime Boundary Office
LMMA	: Locally Managed Marine Area
METT	: Management Effectiveness Tracking Tool
MPA/MPAs	: Marine Protected Areas/Areas
MRA	: Marine Resources Recovery Areas
Na	: Naturalness
NGOs	: Non-Government Organizations
Nit	: Ideal number of ecosystem type in an area
NMP	: National Marine Park
Npa	: Number of people agree
Nr	: Number of respondents
Nta	: Number of ecosystem types in the assessed area
OECM	: Other Effective Area-based Conservation Measures
PA/PAs	: Protected Area/Areas
PEMSEA	: Partnerships in Environmental Management for the Seas of East Asia
Opf	: Optimal frequency
Rep	: Representation
SOP	: Standard Operating Procedure
TCL	: Total Compliance Level
TMSP	: Terrestrial and Marine Spatial Planning (Integrated)
TWV	: Total Weight Value

1. INTRODUCTION

1.1. Contextualization

Community-Based Marine Sanctuary (CB-MS) defined as coastal and marine areas that are selected and designated to be permanently closed to fishing activities and resource extraction managed by local communities (Casia, 2000). During its implementation, this definition was then expressed as appropriate adopted for all marine waters of Timor-Leste, from the launch of the CB-MS in 2005 until 2015 (over a decade), eventually the government of Timor-Leste through a Ministerial Diploma of the MAP No. 5/GM/I/2015 for Batugade and No. 6/GM/I/2015 for Vila-Maumeta where 2 national Marine Protected Areas (MPAs) were officially launched, while for the CB-MS, which was initiated and jointly managed by Non-Governmental Organizations (NGOs) and local communities through village/suco regulations. At the national level, the government has still not established a properly defined guidance for MPA (Fonseca, 2022).

For example, the Fisheries Decree-Law No. 6/2004 has not detailed yet for the derived regulations to establish guidelines for determining candidates for the MPA model, as well as Decree-Law No. 5/2016 which stipulated the national system of protected areas has not yet included the typology of protected areas on land and at sea for 44 protected areas composed of only 2 MPAs. Therefore, no applicable provision by the government, the respective development partner in the field of conservation would carry out any good MPA practices (Fajariyanto, 2021) and (Pereira, 2013), only as pilot projects, there has been no official guidance provided by the government of Timor-Leste to launch a nationally MPA program. In fact, recently the IUCN published guidelines for the determination of the MPA (Day, 2019); (Konservasi, 2017); (Kelleher, 1999); (KKP, 2020) that can be adopted voluntarily. Hoping that the ninth constitutional government can prioritize the development of the blue economy (Constitucional, 2021), which is in line with the strategic plan of the INCT (2022-2030) for thematic areas of environment, biodiversity, and climate change (Rangel, 2025).

From the perspective of the effectiveness of managing the CB-MS scale at the level of villages and the MPA scale at the national level, the research team focuses solely on the results of the main conclusions from the doctoral research reference for integrated coastal management projected from 112 coastal villages scattered across 34 sub-districts and 11 municipalities in

Timor-Leste (Cabral, 2020), while at the local level based on the results of undergraduate research for CB-MS in Beloi, and Com (Araujo, 2023); (Xavier, 2023). As part of this background thinking, it is quite clear to limit the central issues to three subjects that will be investigated by the independent researcher of HACOSTA teams in the next 6 months (May-November 2025).

Some of the main reasons for this research is because currently there has been not any technical guidelines in the field regarding the criteria for determining MPA typologies and the guidelines for applying METT. As a result, there is an overlap of best practices in MPA implementation procedures and methods for evaluating MPA effectiveness carried out by government counterparts such as international NGOs. Therefore, it is an urgent need for guidelines of determining MPA typologies that serve as a primary reference for government agencies such as the Directorate General of Aquaculture and Fisheries, Ministry of Agriculture, Livestock, Fisheries, and Forestry.

1.2. Literature Review

The background for the literature review in this research will be describing the theoretical-practical of the CB-MS concept, followed by the equivalent term of MPA. The researcher intends to compare those terms that are more often interpreted the similarity meaning as the CB-MS and MPA concepts, only to find that in practice there are real differences depending on the users of the terms, namely LMMA and OECM. After explaining these four basic concepts, the next step is how the researcher describes two key concepts in this study, namely MPA Typology and METT Score. Therefore, the six theoretical-practical frameworks are outlined as follows:

1.2.1. CB-MS

Definition of Community Based-Marine Sanctuary (CB-MS) is generally defined in the literature as a relatively small no- take zone or permanent closed area managed by the local community. Often these "sanctuaries" or core zones are surrounded by a buffer zone with limited restrictions on human use. Overall, by definition, it means a protected marine area where the local community is actively involved in its planning, implementation, and management. Commonly, the sanctuaries are established through a participatory process to conserve marine biodiversity and habitats (Crawford, 2000).

Key characteristic of CB-MS: 1) Community involvement: Local communities are central to the process from identifying the problems and to creating management plans and enforcing regulations. 2) Participatory process: The establishment involves community organizing, education, leadership development, and collaborative decision-making to address the needs of local users and promote conservation. 3) Sustainable resource management: The goals are to manage and develop coastal resources sustainably, balancing the needs of conservation with the economic and socio-cultural of the community.

1.2.2. MPA

Marine Protected Area (MPA) is a clearly defined geographical space, recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values (Kellerher, 1992). In Timor-Leste, MPA typically take the form of 'no-take' areas with buffers or nearby zones in which extractive and non-extractive uses are regulated. Practically its concept being implementing by Conservation International Timor-Leste (CI Timor-Leste), and Coral Triangle Center (CTC).

1.2.3. LMMA

Locally Manage Marine Area (LMMA) define as all area of coastal lands and marine water that are managed by a local community and, where appropriate, in collaboration with government or non-governmental organizations (Gombos, 2013). In the best practices, LMMAs can be a tool for any or all of the following: fisheries management, biodiversity conservation, threatened species management, ecotourism development, and climate change adaptation. Currently, this concept has been adopted by Blue Ventures Timor-Leste.

1.2.4. OECM

Other Effective Area-based Conservation Measure (OECM) is defined as an area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the *in-situ* conservation of biodiversity with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values. The key characteristic of an OECM is that it can be governed, managed, and used on a

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sustained basis for a range of purposes, if this results in important biodiversity being effectively conserved, *in-situ*, over the long term (Jonas, 2024). In another words, the OECMs are also defining by (Mora et al., 2020) as *"a geographically defined area that is not a protected area and that it is governed and managed in such a way, as to achieve sustained positive and lasting results for the conservation of biological diversity in situ, with associated ecosystem functions and services, and where appropriate, cultural, spiritual, socioeconomic, and other locally relevant values."*

1.2.5. MPA Typology

Marine conservation areas are established based on ecological, socio-cultural, and economic criteria. The ecological criteria include biodiversity, naturalness, ecological connectivity, representativeness, uniqueness, productivity, spawning areas, habitats for rare fish, breeding grounds, and nursery areas. The socio-cultural criteria include community support, potential conflicts of interest, potential threats, and local wisdom and customs. The economic criteria include the importance of fisheries, recreational and tourism potential, aesthetics, and accessibility to the area (DKKJK, 2014). Commonly the MPA typology has been applied in the territorial waters of Indonesia.
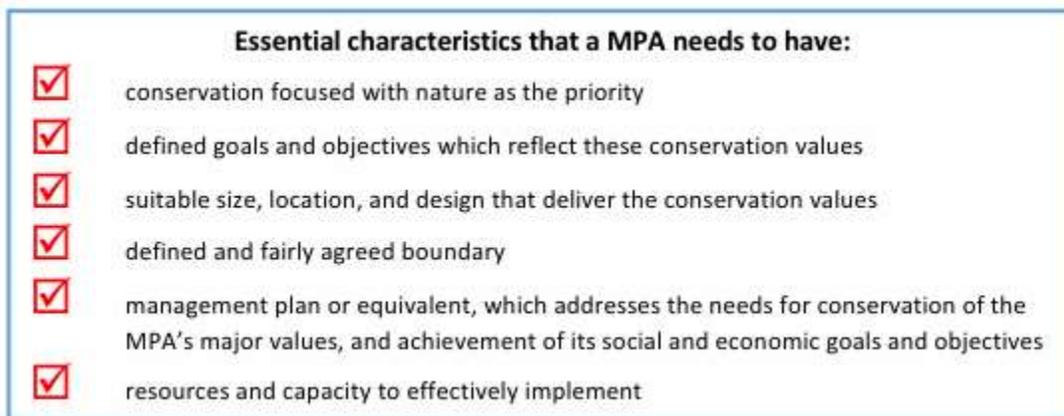
Essential characteristics that a MPA needs to have:

- ☑ conservation focused with nature as the priority
- ☑ defined goals and objectives which reflect these conservation values
- ☑ suitable size, location, and design that deliver the conservation values
- ☑ defined and fairly agreed boundary
- ☑ management plan or equivalent, which addresses the needs for conservation of the MPA's major values, and achievement of its social and economic goals and objectives
- ☑ resources and capacity to effectively implement

Figure 1. Essential characteristics of a MPA need

Source: IUCN WCPA, 2018

1.2.6. METT Score

The METT is one of a series of management effectiveness assessment tools aimed at supporting implementation of the World Commission on Protected Areas' (WCPA) "framework for assessment." Designed in the early 2000s, the WCPA framework aims to provide guidance in the development of assessment systems and to encourage standards for assessment and reporting (Stolton, S., Dudley, N. and Hockings, M., 2021).

1.2.7. Criteria of MPA establishment

There are 4 criteria below can be used to evaluate and improve the performance of MPAs in Timor-Leste (Garcia et al., 2022).

A. Good Governance

- Recognizes and promotes the rights of indigenous peoples and local communities.
- Has clearly defined, legitimate, equitable and functional governance arrangements.
- Fairly represents and addresses the interests of civil society, rights holders, and legitimate stakeholders.
- Has governance arrangements and decision-making processes that are transparent and appropriately communicated, and responsibilities for their implementation are clear.

B. Sound Planning and Design

- Meets the IUCN MPA definition and is accurately assigned to an IUCN of Protected Area category.
- Has clear, long-term conservation goals and objectives, based on a sound understanding of natural, cultural, and socio-economic values and context.
- Is well-sited and with a defined boundary.
- Has a management plan, or equivalent documentation, with a periodic plan review and amendment process for updating/refining goal and objectives, conservation targets, and management prescriptions in response to changing needs and conditions.
- Is not vertically zoned.
- Individually, or as part of a network of MPAs, incorporates significant no-take areas; and where in a network, the no-take areas are distributed across MPAs.

- Is large enough to achieve the conservation objectives and goals individually or as part of a network of MPAs.

C. **Effective Management**

- Has well-constructed and defined objectives and goals for nature conservation.

- Addresses the threats to marine biodiversity and so overall, has activities and uses that are compatible with, and support the conservation objectives and goals.

- Has extractive activities (where these occur) that have low ecological impact, are compatible with the MPA's objective(s), are compatible with the IUCN definition and categories, and that are well managed as part of an integrated approach.

- Does not have any environmentally damaging industrial activities or infrastructural developments located in, adjacent to, or otherwise negatively affecting it.

- Regulates fisheries activities (where these occur) that are low impact, assessed and managed to the highest standards, and that do not impact the ecological integrity of the area, species levels and trophic structure. Any fishing gear used should not significantly impact other species or other ecological values.

- Has adequate resourcing, including staff capacity, as this is shown to be a key determinant for management effectiveness and success.

- Has sufficient investment in compliance.

- Has monitoring to track performance and inform adaptive management. Such monitoring should be standardized across MPAs in the network to document and demonstrate management effectiveness, and to report that conservation goals, objectives, and defined biodiversity conservation targets are being achieved.

D. **Conservation outcomes**

- Meets or exceeds the stated nature conservation objectives and goals.

- Demonstrates successful long-term conservation of major natural values, with associated ecosystem services and cultural values.

When these 4 criteria check lists are not meet then the management effectiveness will be needed to solve immediately into the government policy and regulation.

1.3. Problematization

The 3 main issues can be summarized as follows:

A. What is the extent of protection stages and governance model of the CB-MS based on IUCN standards in Beloi-Atauro and Com-Lautem;

B. How many scores of management effectiveness of the SM-BC in Beloi-Atauro and Com-Lautem based on the METT method;

C. How many scores to determine the typology of CB-MS in Beloi-Atauro and Com-Lautem based on the Fisheries Law of Timor-Leste No. 6/2004, Article 96, paragraph 2.

1.4. Objective

Objective of this report is divided into general objective and specific objectives as follows:

1.4.1. Geral Objective

The overall of this research will be focusing on the protected marine areas and maintaining the potential of this resource and will be used for specific objectives. These specific Objectives are follows:

1.4.2. Specific Objectives

The specific objectives are:

A. Define guidelines and build protected marine areas;

B. To assess the effectiveness of community-based protected marine areas in Suco Beloi-Atauro and Suco Com-Lautem; and

C. Define the potential typology of protected marine areas (marine national park, aquatic reserve, and fishery resource recovery) in Suco Beloi-Atauro and Suco Com-Lautem.

1.5. Importance of the Research

The main reason why the Department of Fisheries and Aquaculture was created in 2002 is that up to this day there are no guidelines yet for the MPA, although it was mentioned in the Fisheries Decree-Law; no. 6/2004 on articles 96 to 98, which only discussed the definition and typology of MPA. This research focuses on providing recommendations to the government to implement guidelines for MPA in Timor-Leste, based on the current IUCN reference, and the

standard for establishing marine protected areas worldwide for the four levels of protection and four government bodies. Related to this issue, the research will present scores for the marine protected areas effectiveness by using the METT method for marine protected areas and a combination of surveys on ecological, social, and economic aspects. Then, once the values are obtained, they will be applied to three types (marine national park, aquatic reserve, and fishery resource reserve).

With this investigation, it is possible to assess in a case study of community-based marine protected areas in the Suco of Beloi-Atauro and Com-Lautem, because during this time the government did not have guidelines to determine marine protected areas in the territorial sea of Timor-Leste, for example, other development partners (Conservation International, Coral Triangle Center, Blue Ventures) have their own standards for marine protected areas, and in fact, the government has the power to regulate this standard, which is uniform to be used in marine protected areas for territorial waters. Therefore, this research is conducted to establish a guideline for marine protected areas in the future.

1.6. Organization of the Work

The following of writing structures consisting of 4 main sections, namely section of introduction, methodology, discussion of results, conclusion, and recommendations. Meanwhile in section ONE there are seven subsections such as contextualization, literature review, problematization, objective, importance of the research, organization of the work, and geographic location, and for the section TWO, it has four subsections, namely research method, population and sampling, techniques and instrument of data collection, transcript of data, and data analyses. In the section THREE there are six subsections that will be describing on MPA typologies, METT scores, combination of MPAs typology and METT scores, and regulation-based classification system for MPAs. The last section FOUR consisting of two subsections such as conclusions and recommendations.

1.7. Geographic location of study area

There are 2 selected sites to conduct the case study as an indicator for representing the model of CB-MS in Timor-Leste. These 2 *in-situ* conservations have been applying at 4 terms of marine

conservation, such as CB-MS, community-based MPA or MPA, LMMA and currently promoting OECM. These 2 sites are Beloi-Atauro and Com-Lautem (DGE, 2019) with the geodetic position for the respective, e.g., Beloi-Atauro located at Latitude of 8º 13' 7" S and Longitude of 125º 34' 34" Eand Com-Lautem is located at Latitude of 8º 21' 30" S and Longitude of 127º 3' 33" E (https://mapcosta.com). For the description detail please referring to figure 2 and figure 3 below:
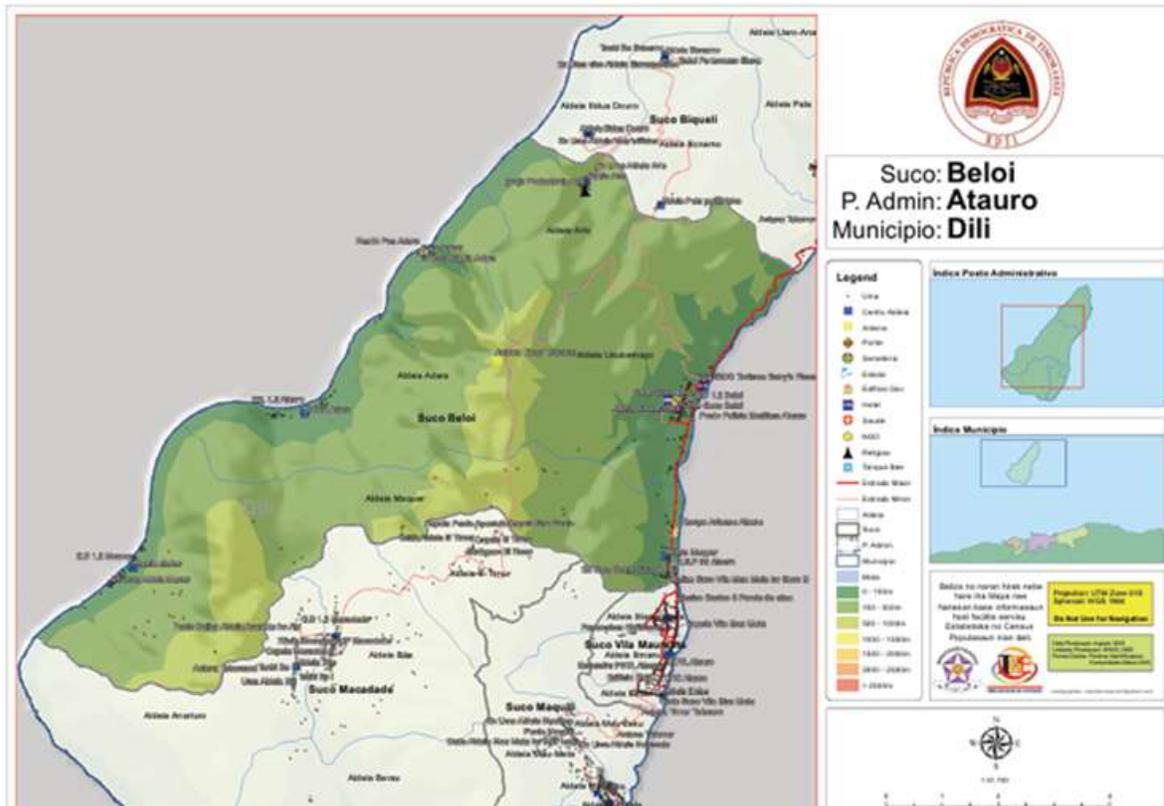
Figure 2. Map of Suco Beloi-Atauro

Figure 3. Map of Suco Com-Lautem

2. METHODOLOGY

2.1. Research Method

The method of determining the location and the sampling procedure for each of them can be carried out through teleological sampling methods and by using a participatory approach with non-random samples. Additionally, the calculation of the effectiveness score using the 4th edition of METT (Stolton & Dudley, 2021), combined with the implementation of E-KKP3K (Ministry of Marine Affairs and Fisheries, 2012), including the collection of secondary data based on 12 ecological criteria, 7 social and cultural criteria, and 5 economic criteria to determine the type of MPAs in 3 sampling locations.

Figure 4. Data collection stages

The qualitative, quantitative, and mixed methods applied for data collection which is easy to describe the case study in the research sites of Beloi-Atauro and Com-Lautem. The qualitative research begins with assumptions and the use of interpretive/theoretical frameworks that inform the study of research problems addressing the meaning individuals or groups ascribe to a social or human problem. To study this problem, qualitative researchers use an emerging qualitative approach to inquiry, the collection of data in a natural setting sensitive to the people and places

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under study, and data analyses that are both inductive and deductive and establishes patterns or themes. Qualitative method is used to help describing the data gap as quantitatively. During the survey, research teams were conducting the combination of quantitative data (20 formula for MPA typologies including the METT scores) and the qualitative data were used for framing questionnaires and to support the various options when deciding to respond upon 34 questions of METT's score. In another perspectives, site selection and number of sample unit is applying purposive sampling method. There are 3 components when considering to approach the survey, namely: 1) high marine biodiversity abundancy, 2) has experienced for implementing CB-MS, and 3) representing the marine environment between main land and an island.

These qualitative data collections were based on a questionnaire formula that consisting of 34 questions (METT assessment in the annexes) in the form of closed questions. Additionally, the scoring method uses the following value criteria: 1) when the total METT score was below 33%, the management of the MPA was declared ineffective; 2) when the total METT score ranges from 33% to 66%, the management of the MPA was declared less effective; 3) when the total METT score was above 66%, the management of the MPA was considered effective. Next, the mechanism to determine the level of protection of the MPA and the level of management of MPA was carried out through a Focus Group Discussion (FGD) for the target beneficiaries comprised of MPA management committees spread across 2 each site in Beloi and Com. The results of the FGD then were quantitatively analyzed using 21 criteria (ecological, socio-cultural, economic for the type of MPA). There is also a range of criterion values depending on the space-time conditions for case studies at each research site.

2.2.   Population & Sampling

This research was conducting in 2 coastal villages of Beloi-Atauro and Com-Lautem that presenting the representation of population (DGE, 2019) in both study sites as the reference for sampling. However, the target respondents were sampled based on the presentation of the total fishing center in Timor-Leste of 162, and as part of percentage then the overall samples quantity were selected, besides on purposive sampling methods for the marine rapid assessment targeted to 15-20 respondents for completing questionnaire of MPA typology (See annex 2) and METT scores

(See annex 3). This consideration was applied for 3 days duration of the field survey in each research site as marine rapid assessment.

2.1.1. Population

Total population of Beloi-Atauro based on Census 2022 were (<u>total population</u>: 1,675; <u>coverage area</u>: 56.49 km²; <u>population density</u>: 675, 29.65/km²). In the same circumstances, Com-Lautem were (<u>total population</u>: 2,717; <u>coverage area</u>: 59.64 km²; <u>population density</u>: 45.56/km² (*https://www.citypopulation.de/en/timor/admin/*). Those total population were only a reference to set up certain total samples based on the purposive sampling method.

2.1.2. Sampling

Sampling targeted to the possibility of coastal community who engaged in the CB-MS in both villages were consist of 1 sub-villages of Usubemaço that out of 4 sub-villages of Beloi Village (Adara, Arlo, Maquer, and Usubemaço), and 3 sub-villages of Lohomato, Muapusso, and Vailovaia that out of 6 sub-villages (Etepiti, Ira'ono, Lohomatu, Muapusso, Pitileti, and Vailovaia). Total selected participant as part of key informants and targeted respondents were totally amount in the range of 15-20 people, but in this case, there were 24 respondents respectively in each sampling site.

2.3. Techniques and Instruments of Data Collection

The instruments used in this study are questionnaires, observations, and analytical tools for ecological, sociocultural, and economic criteria as follows:

A. <u>Ecological criteria (12):</u>
- Contribute to the maintenance of important ecological processes or life-supporting systems
- A habitat for raring or endangered animals
- Protect genetic diversity
- **Naturalness:** it has a physical and biological condition that has not experienced damage and has not diminished in quality or quantity, whether due to external and internal factors
- **Ecological connections:** there is a functional relationship between habitats and ecosystems in an area

- **Representation:** it reflects the biodiversity of marine ecosystems from which this biodiversity originates
- **Singularity:** forming of the singularity of species, ecosystems, biodiversity, or natural landscapes
- **Productive:** an area that has ideal productivity
- **Juvenile area:** a migration area for a type of fish or certain mammals
- **Habitat for raring:** a suitable habitat that inhabited by rare/unique/endemic/distinctive/protected fish
- **Spawning area:** a suitable and optimal habitat for fish to breed
- **Raring area:** having optimal ecosystem conditions for the growth of biota

B. <u>Socio-cultural Criteria (5):</u>

- **Community support:** this condition is used to assess whether community support for conservation activities is good
- **Potential conflicts of interest:** the potential for conflicts of interest in the management and use of natural resources is important to see if the management of the area can function well
- **Potential threats:** threaten factors for the sustainability of biodiversity resources and coastal areas
- **Local knowledge:** verifying when there is a certain local knowledge/traditional knowledge that can help to preserve natural resources
- **Customs:** the existence of community customs and habits that can support conservation activities

C. <u>Economic criteria (4):</u>

- **Important value of fishing:** the important value of the fishing sector in a certain area
- **Recreational and tourist potential:** an area that has potential in recreation and tourism that supports conservation activities
- **Aesthetics:** the form of the natural beauty of a water body and/or biota that has a certain attraction
- **Ease of access to the location:** an access and ease of reaching the area from various regions

2.4. Data Collection, Transcript of data and Data Analyses

These sections are consisting of data collection, transcript of data, and data analyses as follows:

2.4.1. Data Collection

The instruments used in this study are questionnaires, observations, and analysis instruments for ecological (12), socio-cultural (5), and economic criteria (3). Including supporting instruments such as GPS, base Map, Google Earth Pro, other Software applications, camera, android mobile phone.

Table 1. Summary of 20 indicators for CB-MS

Ecological (12 criteria)	Socio-cultural (5 criteria)	(Economic (3 criteria)
Biodiversity Naturalness Representation Uniqueness Migration corridor Habitat of unique/rare and endemic fish Fish and non-fish protection Fish that nee to be protected Spawning ground Nursery ground Productivity Ecological linkages	Cultural uniqueness Community support Potential conflict of interest Potential threatened Local wisdom	Potential recreation and tourism Utilization area for tourism Facility to local access

Table 2. Guideline for the typology of MPA in Beloi-Atauro

No	Criteria	Evaluation	NMP	RA	MRA
1	Biodiversity	2	3	3	2
2	Naturalness	2	3	3	2
3	Representative	2	3	3	2
4	Uniqueness	2	3	3	3
5	Migration Corridor	2	2	3	3
6	Habitat of unique/rare and endemic fish	3	3	3	3
7	Fish and non-fish to be protected	3	3	3	3
8	Fish that need to be protected	3	2	2	3
	Sub total -A	19	22	23	21

No	Criteria	Evaluation	MNP	AR	MRA
9	Spawning ground	2	3	3	3
10	Nursery ground	2	2	3	3
11	Productivity	2	3	2	2
12	Ecological linkages	2	2	2	3
13	Cultural uniqueness	2	3	2	1
14	Community support	3	3	2	1
15	Potential conflict of interest	2	3	3	2
	Sub TOTAL -B	15	19	17	15

No	Criteria	Evaluation	NMP	AR	MRA
16	Potential threatened	2	2	2	2
17	Local wisdom	3	3	2	2
18	Potential recreation and tourism	3	3	2	1
19	Utilization area for tourism	3	3	2	1
20	Facility to local access	2	3	1	1
	Sub TOTAL-C	13	14	9	7
	Grand TOTAL (A+B+C)	47	55	48	42

Formula for MPA typology

According to the criteria for the value of the type of column of conservation area.

- Then, the percentage compliance value is calculated using the formula: from various regions
  CP = LA/TLC x 100%

Note:

Compliance Percentage (PC); The Level of Adequacy in each region (LA); Total Compliance Level of all regions (TCL).

- Collection, Analysis and Transcription of Data:

  CV = CP x TVW x CN x 100

Note:
Compliance Value (CV); Compliance Percentage (CP); Total Weight Value (TWV); Classification Number (CN).

The adequacy value (CP) of the type of candidate for conservation is as follows:

1. Main recommendation: The highest value of the species is the type of conservation area that is most suitable based on the assessment that was made. The primary recommendation is the Marine National Park (MNP);
2. Second recommendation: The highest value of consistency number 2 is the second recommendation, that is, Aquatic Reserve (AR);
3. Third recommendation: The value of compliance with the highest value number 3 is the third recommendation, which takes the form of Marine Resources Recovery (MRR).

Describing the formulae (20 criteria)

1. Biodiversity:

The biodiversity criteria will use the formula of the Shannon-Wiener index:

$$H' = -\sum n_i/N \times \log(n_i/N)$$

Note:

H'	= biodiversity index
ni	= Number of individuals in genus-i
N	= Total number of individuals, where:
H < 1	= low value of the biodiversity index (score 1)
H > 1-3	= moderate value of the biodiversity index (score 2)
H > 3	= high value of the biodiversity index (score 3)

2. Naturalness:

The calculation of the naturalness of the ecosystem is done using the formula:

$$Na = (1-Eih/Eva \times 100\%)$$

Note:

Na	= naturalness (%)
Eih	= extent of the ecosystem that has been intervened by humans
Eva	= area of the ecosystem that is being evaluated

The value given to the results of the calculation of naturalness is:
- >75% = natural (score 3)
- $50 \leq Na \leq 75\%$ = moderately natural (score 2)
- $\leq 50\%$ = unnatural (score 1)

3. Representation:

This parameter is assessed considering the ecosystem involved in the protected area (The ecosystems that may exist in the research location are seagrasses, mangroves, coral reefs, lagoons, estuaries, mudflats, and sandy beaches).

Rep = Nta/Nit x 100%

Note:
Rep   = Representation
Nta   = Number of ecosystem types in the assessed area
Nit   = Ideal number of ecosystem types in an area

The criteria:
- Rep >/= 75% = represented (score 3)
- 40 </= 40 Rep < 75% = well represented (score 2)
- Rep < 40% = not represented (score 1)

4. Singularity:

The value given for each level is:
- exclusive = found only in one region of Timor-Leste (score 3)
- unique moderate = found in various areas within the same biogeographic region (score 2)
- not unique = many are found in the region of Timor-Leste (score 1)

5. Migration corridor:

The aquatic areas that are high migration routes in this parameter.

- the assessment of this parameter is: many (>2) types of fish and non-fish that migrate = (score 3)
- few (1) types of fish and non-fish that migrate = (score 2)
- no fish and non-fish that migrate = (score 1)

6. Habitat of unique/rare and endemic fish:

For the assessment of typical/rare/unique/endemic fish:

- there are several >/=3) types of typical/rare/unique/endemic fish = (score 3)
- only one or two types of typical/rare/unique/endemic fish = (score 2)
- no typical/rare/unique/endemic fish = (score 1)

7. Protected fish and non-fish species:

This parameter is determined based on the presence of fish and non-fish species that are protected by law or ministerial regulations. For the investigation of fish and non-fish:

- there are several (>/=3) types of fish and non-fish that are protected in large numbers = (score 3)
- there are several (2) types of fish and non-fish that are protected to a small extent = (score 2)

- there is one type of fish and non-fish that are protected to a small extent = (score 1)

8. Fish that need to be protected:

This parameter is determined based on the existence of fish species that need to be protected. Furthermore, this parameter is also determined based on the abundance of each type of fish that needs to be protected.

- there are several (>/=3) types of fish and non-fish that are protected in large quantities = (score 3)
- there are several (2) types of fish and non-fish that are protected in a small way = (score 2)
- there is one type of fish and non-fish that are protected in a small way = (score 1)

9. Fish spawning ground:

This parameter can be assessed from a body of water that is a suitable habitat for various types of fish that are important for spawning. Other factors that are also considered in the assessment of fish spawning areas include the abundance of spawning fish species and the economic value of the fish.

- there are (>/=3) fish spawning areas, in large quantities, types of economically important fish that are consumed = (score 3)
- there are (2) fish spawning areas, in small quantities, types of economically important fish that are consumed = (score 2)
- there are (1) fish spawning areas, in small quantities, types of not economically important fish = (score 1)

10. Nursery Ground:

Nutritional areas are regional conditions that have optimal ecosystem conditions for fish growth; this condition can be observed from the existence of existing ecosystems, such as mangroves, seagrasses, and coral reefs. In this assessment, only mangrove and seagrass ecosystems are evaluated due to their significant role in fish spawning areas.

- there are mangrove and seagrass ecosystems = (score 3)
- there is only one ecosystem of mangroves and seagrasses = (score 2)
- there are no mangrove and seagrass ecosystems = score 1)

11. Productivity: (see explanation in the additional description for potential area analysis)

12. Ecological connections: (see explanation in the additional description for potential area analysis)

13. Cultural uniqueness:

Cultural attractions are one of the potential tourist magnets to be explored. Local wisdom regarding prospective conservation areas can preserve the existing culture so that it is not lost to modernization.

- there are (>/=3) uses for tourism with visitors from local, national, and foreign countries = (score 3)
- there are ((>/=2) cultural attractions, not the routine of the local community = (score 2)
- there are no cultural attractions = score 1)

14. Community support: (see explanation in the additional description for potential area analysis)

15. Potential conflicts of interest: (see explanation in the additional description for potential area analysis)

16. Potential threats: (see explanation in the additional description for potential area analysis)

17. Local wisdom: (see explanation in the additional description for potential area analysis)

18. Potential for recreation and tourism:

The aspects to consider regarding the potential for leisure and tourism are as follows:
a) The location of the prospective conservation area is situated parallel to the reach of the existing tourist destination.
b) It has unique or endemic types of fish and non-fish that are not found in other areas.
c) It has unique for natural phenomena.
- high potential if (at least two points from a/b/c) = (score 3)
- sufficient potential if (at least one point from a/b/c) = (score 2)
- less potential if (no potential) = (score 1)

19. Use of the area for tourism:

The use for tourism in the prospective concession area is as follows:
a) Local visitor tourism
b) National visitor tourism
c) Foreign visitor tourism
- there are (>/=3) uses for tourism with visitors from local, national, and foreign countries = (score 3)
- there are (>/=1) uses for tourism with visitors from local and national countries = (score 2)
- there is no usefulness for tourism = (score 1)

20. Ease of access to the location:

Accessibility can be assessed by paying attention to the availability of access roads, both by land and by sea, from the nearest cities to the tourist attractions in the evaluated area. The

entrance considered is the entrance to the area in question. The calculation of the ideal car and the cruise ship is adjusted to the distance and the income of the local community (especially those who are traveling) divided by the seating capacity of the car or ship.
Formula:

Acb = Fcs/Opf x 100

<u>Note:</u>
Accessibility (Acb); Frequency of the cars or ships number heading to the tourist attraction (Fcn); Optimal frequency of cars or ships going to the tourist attraction (Opf) Evaluation criteria:
- >/= 75% = easy to reach (score 3)
- 40 - 75% = achievable (score 2)
- < 40% = difficult to reach (score 1)

The additional description for the potential area analysis (score value 6):

a. **Productivity:**
Assessment of chlorophyll and plankton indicators (alternative sampling if secondary data exists):
- optimal productivity = score 3
- moderate productivity = score 2
- low productivity or overcapacity = score 1

While the assessment of the fish biomass indicator is
- high productivity (>1,200 kg/ha) = score 3
- moderate productivity (600 – 1,200 kg/ha) = score 2
- low productivity (<600 kg/ha) = score 1

b. **Ecological links:**
- 75 - 100% ecologically related components of the ecosystem = score 3
- 50 - 70% ecologically related components of the ecosystem = score 2
- <50% ecologically related components of the ecosystem = score 1

c. **Community support:**
Formula:

Ca = Npa/Nr x 100

<u>Note:</u>
Community aspirations (Ca); Number of people who agree (Npa); Number of respondents (Nr)
Evaluation criteria:
- >/= 75% = supports (score 3)
- 40 - 75% = less supports (score 2)
- < 40% = does not support (score 1)

d. Potential conflicts of interest:

Evaluation of potential conflict is:
- high potential for conflict = score 1
- moderate potential for conflict = score 2
- low potential for conflict = score 3

e. Potential threats:

The potential threats in each prospective conservation area are in the form of overfishing, destructive fishing practices, habitat degradation, pollution, and climate change.

Assessment of potential conflict is:
- potentially high threat with more than 5 threat factors presents = 1
- potentially moderate threat with 2 to 5 threat factors presents = 2
- potentially low threat with less than 2 threat factors presents = 3

f. Local knowledge:

Assessment of this parameter is:
- has local knowledge that supports conservation = score 3
- has local knowledge but it is not effective = score 2
- does not have local knowledge = score 1

2.4.2. Transcript of Data

Converting the results of interviews with key informant and results of FGD and direct observations into text for analysis. During the filed data collection in the respective villages of Beloi-Atauro and Com-Lautem, the researcher team finally consolidate such raw data such unstructured of hand writing, sound and video recorders for easy step on data processing and analyzing. Such data and information derived from Focus Group Discussion (FGD) and key informant interviews for MPAs typologies and METT scores in Com-Lautem and Beloi-Atauro.

2.4.3. Data Analyses

Using the combination of both quantitative data analyses of formulae were 20 criteria of MPAs typologies (Table 3 and table 4) and METT scores based of 34 closed questionnaires (See annex 2).

Table 3. Weighting for the MPA typology in Beloi-Atauro and Com-Lautem

No	Criteria	Beloi-Atauro	Suitable Value	Com-Lautem	Suitable Value
1	Biodiversity	3		3	
2	Naturalness	1		3	
3	Representative	2		2	
4	Uniqueness	2		2	
5	Migration Corridor	3		3	
6	Habitat of unique/rare and endemic fish	2		2	
7	Fish and non-fish to be protected	3		3	
8	Fish that need to be protected	3		3	

No	Criteria	Beloi-Atauro	Suitable Value	Com-Lautem	Suitable Value
9	Spawning ground	3		2	
10	Nursery ground	3		2	
11	Productivity	2		2	
12	Ecological linkages	2		2	
13	Cultural uniqueness	2		2	
14	Community support	3		2	
15	Potential conflict of interest	3		2	
16	Potential threatened	2		2	

No	Criteria	Beloi-Atauro	Suitable Value	Com-Lautem	Suitable Value
17	Local wisdom	2		2	
18	Potential recreation and tourism	3		3	
19	Utilization area for tourism	3		3	
20	Facility to local access	2		3	
	Total scores	49	48	48	47

PC = NA/NTC x 100%

Note:

Compliance Percentage (PC); The Level of Adequacy in each region (LA); Total Compliance Levels of all regions (TCL)

VC = PC x VT x NC x 100

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Note:

Compliance Value (VC); Compliance Percentage (PC); Total Weight Value (VT); Classification Number (NC).

Suitable value for Beloi & Com

Simulation of the adjusted formulae for 3 CB-MS in Aidabaleten (Bobonaro), Vatuvou (Liquiça), and Uma Kaduak (Manatuto), resulted in:

- Aidabaleten: RA (41)
- Vatuvou: MRA candidate (35)
- Uma Kaduak: RA (50)

Beloi-Atauro:
PC = NA/NTC x 100%
= 49/145 x 100%
= 0.3379 x 100%
= 0.3379

Com-Lautem:
PC = NA/NTC x 100%
= 48/145 x 100%
= 0.3310 x 100%
= 0.3310

Beloi-Atauro:
VC = PC x VT x NC x 3
= 0.3379 x 47 x 3
= 47.64
= 48

Com-Lautem:
VC = PC x VT x NC x 3
= 0.3310 x 47 x 3
= 46.67
= 47

The processing of the data from the results of this study is done through Excel data sheets in the form of table summaries.

Formula of MPAS typology (20 criteria)

Criteria of suitable value for MPAs typology:
Scores: 40 – 46 = MRA (Marine Resources Recovery Areas)
       47 – 53 = AR (Aquatic Reserves)
       54 – 60 = NMP (National Marine Parks)

When the METT (level of effectiveness):
Scores: < 50% (33%) = Low effectiveness (*urgent management reform*)
       50 – 75% (33%-66%) = Moderate effectiveness (*targeted improvement needed*)
       > 75% (< 66%) = High effectiveness (*maintain & refine practices*)

Table 4. Adjusted matrix of METT for Beloi-Atauro

Score Summary of METT Beloi-Atauro			
Your score	Maximum possible score	Adjusted maximum score	Final score is the percentage of your score above the adjusted maximum score
Final Score for Context	24	9	37.5%
Final score for Planning	14	4	28.8%
Final Score for Inputs	12	2	16.6%
Final Score for Process	25	5	20%
Final Score for Outputs	15	7	21.9%
Final Score for Outcomes	27	14	51.8%
TOTAL Scores	117	41	35.1%

Criteria of Total METT score (effective score) for CB-MS Beloi-Atauro was indicated **35.1%** (moderate effective – *target improvement needed*)

Formula:
Total of effectiveness score = realization score/target score x 100
= 41/117 x 100
= **35.1%**

Effectiveness criteria:

- < 33%   = not effective
- 33% - 66%   = less effective
- > 66%   = effective

Table 5. Adjusted matrix of METT for Com-Lautem

Score Summary of METT Com-Lautem			
Your score	Maximum possible score	Adjusted maximum score	Final score is the percentage of your score above the adjusted maximum score
Final Score for Context	24	5	20.8%
Final score for Planning	14	3	21.4%
Final Score for Inputs	12	0	0%
Final Score for Process	25	6	24%
Final Score for Outputs	15	4	12.5%
Final Score for Outcomes	27	7	25.9%
TOTAL Scores	117	25	21.4%

Criteria of Total METT score f(effective score) for CB-MS Com-Lautem was indicated **21.4%** (low effectiveness – *urgent management reform*)

Formula:

Total of effectiveness score = realization score/target score x 100

$$= 25/117 \text{ x } 100$$

$$= \textbf{21.4\%}$$

Effectiveness criteria:

- < 33%   = not effective
- 33% - 66%   = less effective
- > 66%   = effective

3. DATA ANALYSES AND DISCUSSION

3.1. Analyses of Results

The analyses of data in the following discussion were consisting of MPAs typologies, METT scores, and combination of MPAs typologies and METT scores:

3.1.1. MPAs Typologies

The typology of MPA with a tailored formulae were expected to allow the 20 criteria to be tested in other CB-MS. Based on the findings, the CB-MS Beloi and Com can be classified as Aquatic Reserve with a total typology value ranging from 47-53. One important element was the variation in values, where the highest value were 3 points and the lowest was 1 point. For both status trends, both Beloi and Com for each was good for ecological criteria (12 criteria).

3.1.2. METT Scores

The results of the METT analysis showed that the final score for CB-MS Beloi was 35.1% (Fig. 5), while for Com (Fig. 6) it is only 21.4%, where the determining components were the INPUTS and OUTCOMES components. The success of the monitoring was sufficiently represented by these two components.

METT Scores for Beloi-Atauro 2025			
Element	Your Element Score	Maximum Element Score	Your Element %
Context	9	24	37.5%
Planning	4	14	28.6%
Inputs	2	12	16.7%
Process	5	25	20.0%
Outputs	7	15	46.7%
Outcomes	14	27	51.9%
Total	41	117	35.04%
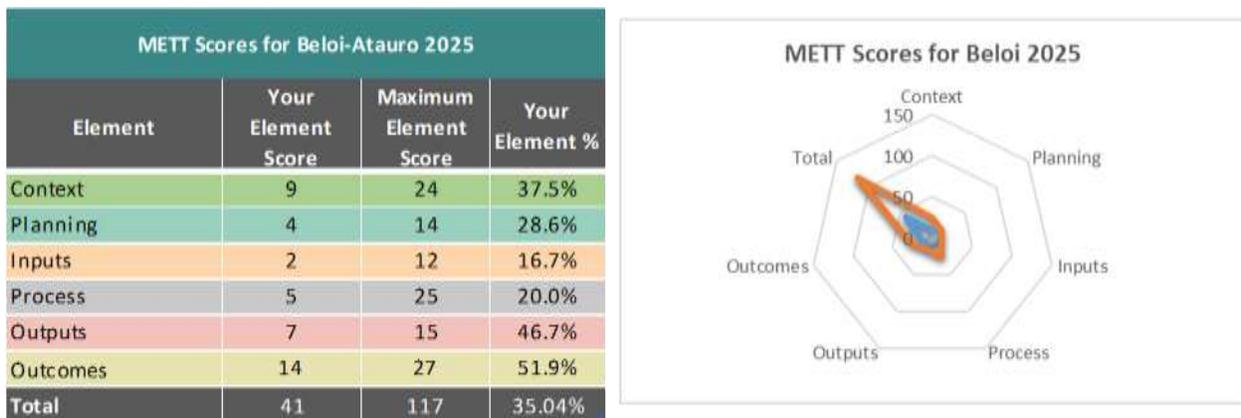
Figure 5. METT scores for Beloi-Atauro

METT Scores for Com-Lautem 2025			
Element	Your Element Score	Maximum Element Score	Your Element %
Context	5	24	20.8%
Planning	3	14	21.4%
Inputs	0	12	0.0%
Process	6	25	24.0%
Outputs	4	15	26.7%
Outcomes	7	27	25.9%
Total	25	117	21.37%

Figure 6. METT scores for Com-Lautem

3.1.3. Combination of MPAs Typologies and METT Scores

The combination results of MPAs typologies and METT scores (Fig. 7) indicated that one of the reasons might be the correlation of results between the three criteria, both from the MPAs typologies and METT scores. For example, when there was not enough time in the field to test the typology formula, then a researcher can simply to choose one of those tools. In this case, if there is no typology score, then using the METT data are sufficient to draw a preliminary conclusion about the trend status of a CB-MS that is being evaluated.
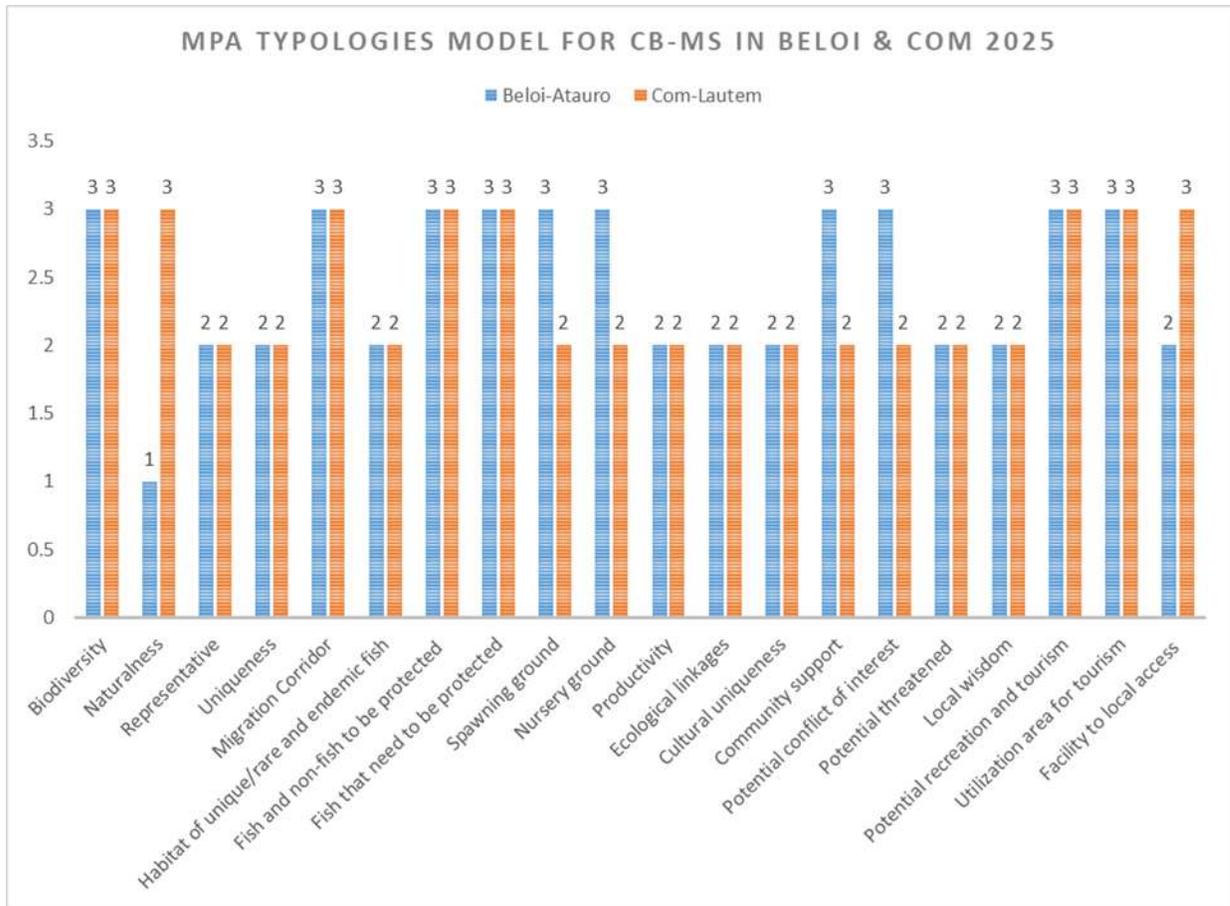
Figure 7. MPA typology model for CB-MS in Beloi-Atauro and Com-Lautem

For the next results, the researcher shall focus on the following activities and data issues:

- Guidelines and establishment of MPAs;
- Evaluation of the effectiveness of the Community approach MPA;
- Comprehensive assessment report on the ecological and socio-economic impact of MPAs;
- Define the potential typology of marine protected areas (Marine National Parks, Aquatic Reserves and Marine Resources Recovery Areas) in Beloi-Atauro & Com-Lautem; and
- Recommendations to adjust governance in MPAs and adaptive management strategies.

Those above expectations, then be analyzed systematically and structured with following considerations:

- Classification of Marine Protected Areas into appropriate categories: Marine National Park, Aquatic Reserve and Marine Resources Recovery Area;
- Zoning proposals and regulatory frameworks for each type of marine protected area to ensure the conservation & sustainable use of resources;

- Greater recognition, nationally & globally, of Timor-Leste's dedication to sustainable development and marine conservation;
- Improving policy frameworks that promote community-based methods of managing marine resources.

3.2. Discussion of Results

The results of this study can specifically be stated that there is a significant relationship between MPA typology and METT scoring outcomes in the 2 CB-MS locations, namely Beloi-Atauro and Com-Lautem. Several findings that can be summarized are as follows:

1) It is important to understand that with the analyses of data derived from ecological, socio-cultural, and economic components as 20 criteria according to the current conditions of Timor-Leste, the formulae established in this study can be further discussed for any adjustments. These formulae have also been tried out in 3 CB-MSs, namely in Uma Kaduak (Manatuto), Vatuvou (Liquiça), and Aidabaleten (Bobonaro), where their respective CB-MS status are as follows: Uma Kaduak is categorized as Aquatic Reserves (AR), Vatuvou in the category of prospective MRA, and Aidabaleten is included in AR.

2) There is a relationship between MPAs typologies and METT scores, where if the compliance value of CB-MS in group I with a score of 54-60 (National Marine Park-NMP) is found, then the METT score is > 66% or high effectiveness. Group II with a score of 47-53 (Aquatic Reserve-AR) has a METT score of 33% - 66% or moderate effectiveness, and Group III with a score of 40-46 (Marine Resources for Recovery Area-MRA) has a METT score categorized as < 33% or low effectiveness. Furthermore, if in Group IV with the lowest MPA typology score of less than 40, then its status is decided as a prospective MRA.

3) In its development, the status of Marine Protected Areas (MPAs) can be categorized into 4 stages, respectively the field of formation (proposed/committed; designated; implemented; actively managed) and in the field of conservation (minimally protected; lightly protected; highly protected; fully protected). In the process of its establishment, MPA management can come from 4 options (local communities; private sector/NGOs/research institutions/universities, government agencies; the consortium of these three governance entities).

4) The status of CB-MS, MPA/co-management, LMMA, and OECM in one marine area can be combined into a single management unit, for example, with the concept of "one island one management" introduced by CTC at Atauro Island. The existence of each conservation status can apply the MPA classification formula and zoning system. The trial results of the MPA index formula for CB-MS Biqueli, Beloi, and Vila-Maumeta, which the conservation status falls into category II or III, indicate that if managing these three CB-MS units, their status should be established at MPA index levels 1 to 3 (fully protected).

5) Based on the results of the survey and several literature reviews, it is concluded that the concepts of CB-MS, MPA/co-management, LMMA, and OECM need to be adjusted to the context of Timor-Leste along with its socio-cultural perspectives. For example, LMMA should not be applied in Timor-Leste; however, the early history of CB-MS in 2005, which is identical to co-management in coastal and marine areas can be combined with OECM, in other words, if the goal is purely ecological/conservation and not for economically.

Source: IUCN WCPA, 2018)

Figure 8. Level of defining MPA & level of implementation under IUCN criteria

Figure 9. Level of defining & level of protection under IUCN criteria

Finally, although MPAs have been the cornerstone of marine conservation efforts, it is clear that MPAs are likely insufficient for conserving coastal habitats and ecosystem services and ensuring the long-term resilience of coastal communities, particularly given the daunting threats posed by climate change.

3.2.1. Regulation-Based Classification System for MPAs

Source: Horta e Costa et al. 2016 [*http://dx.doi.org/10.1016/j.marpol.2016.06.021*]

Figure 10. Regulation-based classification system for MPA

Example by applying the MPA index in Atauro as an example of the existing concept of "One Island One Management." In this especial case will be combining 3 units of CB-MS, such as in Biqueli, Beloi, and Vila-Maumeta with a total zone will be covered 50 ha for multiple use of MPAs. Meanwhile, Biqueli has 2 ha (zone class 5), Beloi has 5 ha (zone class 7) and Vila-Maumeta has 10 (zone class 8). Then the calculation will be as follows:

= (5 x 2/50) + 7 x 5/50) + 8 x 10/50)

= 0.2 + 0.7 + 1.6

= 2.5 (fully protected)

FULLY PROTECTED

However, if there is an intention to integrate the MPAs Index then apply decision tree with a Regulation-Based Classification System for MPAs :

1) Recreational fishing gear with gear score of 5 (hooks, pole, and line)

2) Aquaculture or bottom exploitation index 1, but not mining (sand extraction)

3) Recreational access index 2 (boating and/or anchoring allowed but partially regulated or unregulated

For further perspective point of view please follow this below illustration of a decision tree mechanism Fig. 11 and Fig. 12.

Figure 11. RBCS of MPAs for highest fishing gear score

Figure 12. RBCS of MPA for highest fishing gear score-1

3.2.2. Correlation of MPA with Blue Economy Development

Based on (Hatcher, 2009) synthesize that most common MPAs in the globe are illustrated into for impacts: 1) partnerships and citizen participation; 2) science-based approach; 3) long-term goals; and 4) comprehensive perspective. Besides that, during his team research revealed that the MPAs benefits have 4 main categories, such as:

- Protect ecosystem structure, function, and integrity;
- Improve fishery yields;
- Expand knowledge and understanding of marine systems; and
- Enhance non-consumptive opportunities.

Meaning that these results showed a correlation of MPA with the Blue Economy development in Timor-Leste in which it has been socialized by LMBO that essential out of 16 pillars, the most relevant to this research are BE strategic and action plan (2025-2035) are as follows:

Pillar 1: Marine scientific research

Pillar 2: Education, training, and strategic communication

Pillar 3: Maritime & coastal management and protection

Pillar 4: Marine biodiversity conservation

Pillar 5: Combating marine pollution & waste management

Pillar 6: Carbon sequestration

Pillar 7: Blue Tourism

Pillar 8: Living resources exploitation

In another words, these results finding also further considered to linkage the correlation of MPAs with natural capital that in line with ocean accounts. Hoping that the Government of Timor-Leste (GoTL) focuses on marine ecosystem restoration as part of Blue Economy policy and strategic plan (2025-2035). For example, the lessons were had been implementing by the Government of Indonesia and Costa Rica through harnessing ocean accounts. In that regard, Indonesia has committed to using their natural capital in terms of ocean accounts to measure the biophysical and monetary value of marine assets. The ocean accounts expanded to mapping marine degradation and assessing the potential costs of rehabilitating key biodiversity areas, providing a structured approach to managing and restoring those critical ecosystems. More lessons were showed that a key approach in Indonesia's restoration program has evidence-based adaptive management, that emphasizing on consistent monitoring of ecological, social, and economic value (Lockerbie, 2025). Again, insist that the current ninth government constitutional will be also taking the momentum of its Blue Economy development as Timor-Leste's strong foundation as being reflected into the total of 16 pillars but mainly prioritizing in upcoming short terms as 3 up to 5 years action plan, including extending to reach 10 years or a decade planning and actions that subject to sequential term from pillar number#1 (marine scientific research), and gradually proceeded to the next level up to pillar number#8 (living resources exploitation).

Another example is coming from Costa Rica for stablishing their first comprehensive ocean accounts by 2030 with the primary goal for assessing the condition of its marine ecosystem and the flows of ecosystem service derived from marine environment assets. From these two lessons learned, the GoTL must go straight forward to implement its Blue Economy policy framework and action plan (2025-2035) with more confidence in collaborating the concept of coastal and marine areas management tools, such as Marine Protected Area (MPA), Integrated Coastal Management (ICM), and Terrestrial and Marine Spatial Planning (TMSP) while asking any technical assistance with Global Ocean Account Partnership (GOAP) secretariat at campus of UNSW-Australia (*https://www.oceanaccounts.org*).

3.2.3. Adoption readiness for the MPAs typologies guidelines in Timor-Leste

There are four policies indicators of readiness adoption for the MPAs typologies in Timor-Leste consist of technical, social/stakeholders, political/institutional, and operational/management as follows:

A. Technical:

- This guideline can be used as an alternative to determine the MPA typology if there are already METT score results for a particular DPL-BM;

- When trying to determine the MPA typology of a certain area, it is necessary to assess first for ecological and economic criteria, then socio-cultural criteria by following each applicable formula;

- The determination of this guideline has been trialed at targeted locations in two CB-MS case study areas, namely Beloi-Atauro and Com-Lautem, with a typology formula trial in three MPAs, namely CB-MS of Sanirin-Aidabaleten (Bobonaro), Vatuvou (Liquiça), and Uma Kaduak (Manatuto);

- This guideline can be carried out in CB-MS areas that already have the secondary data for at least one ecological criterion, such as biodiversity, and subsequently to complement data for other ecological, economic, and socio-cultural criteria, primary data can be obtained from questionnaire analysis that is being included in the appendix of this report.

B. Social/Stakeholders:

- Codify MPA typology guideline into fisheries and conservation policy frameworks.
- Institutionalize multi-stakeholder platforms for the MPA typology guideline adoption.
- Integrate social protection and equity indicators into MPA monitoring.
- Pilot adaptive governance models in Atauro Island and expand nationally.
- Develop communication tools (policy briefs, MPA typology maps, and the SOP of MPAs typologies) for workshops and trainings.

C. Political/Institutional:

- Codify guidelines into fisheries and conservation law and regulation to ensure legal enforceability.
- Clarify institutional mandates by creating an inter-ministerial coordination mechanism.
- Invest in institutional capacity (training, staffing, monitoring systems).

- Align MPA typology adoption with national climate change adaptation and mitigation, including marine biodiversity strategies (e.g., Blue Economy Policy and Strategy Plan 2025-2035) for political attraction.
- Formalize decentralization pathways so that Suco Councils could co-manage their CB-MS/MPA and Tara-Bandu under national oversight.

D. Operational/Management:
- Standardize operational guidelines for all MPAs under the typology framework (e.g., SOP for MPAs Typologies).
- Institutionalize METT and monitoring systems with clear reporting lines to Ministry of Agriculture, Livestock, Fisheries and Forestry (MALFF).
- Invest in human resources (training, ranger programs, coastal community monitors).
- Secure sustainable financing through national budget lines and innovative mechanisms (e.g., blue carbon credits, blue bonds, and tourism levies).
- Embed adaptive management cycles into operational plans, ensuring feedback from communities and science (integrating scientific ecological knowledge with traditional ecological knowledge), and development partners (International NGOS, Local NGOs, and Community Based Organizations).

Table 6. Comparative adoption readiness matrix: MPAs typologies guideline in Timor-Leste

Policy indicator	Current strength	Key gaps	Readiness level
Social/stakeholders (community legitimacy)	Strong legitimacy through Tara-Bandu and CB-MS; active NGO & community engagement	Fragmented coordination; uneven gender/youth inclusion; weak link to social protection	Moderate–High
Political/institutional (institutional authority)	International commitments (CTI, PEMSEA, ATSEA, AIS Forum); Inter-ministerial engaged	Guidelines not codified; overlapping mandates; limited institutional clarity	Moderate
Operational/management (operational capacity)	Pilots in Atauro; emerging METT use; strong local monitors (local community empowerment)	Lack of standardized plans; donor dependence; weak national staffing & financing	Low–Moderate

Illustration of future MPAs in Timor-Leste for the next 20 years (2025-2045). This research provides the future scenarios of MPAs visioned that in the past marine ecosystems were abundant and diverse of species and habitats. However, over time, it has expanded and intensified human activities depleted and disrupted on the marine ecosystems and reduced ecosystem services. MPAs, in conjunction with climate mitigation strategies and more sustainable uses of the marine can conserve and restore biodiversity, and the resilient ecosystems needed for human well-being. Different levels of protection will result in different outcomes, if enabling conditions are satisfied as being described below.
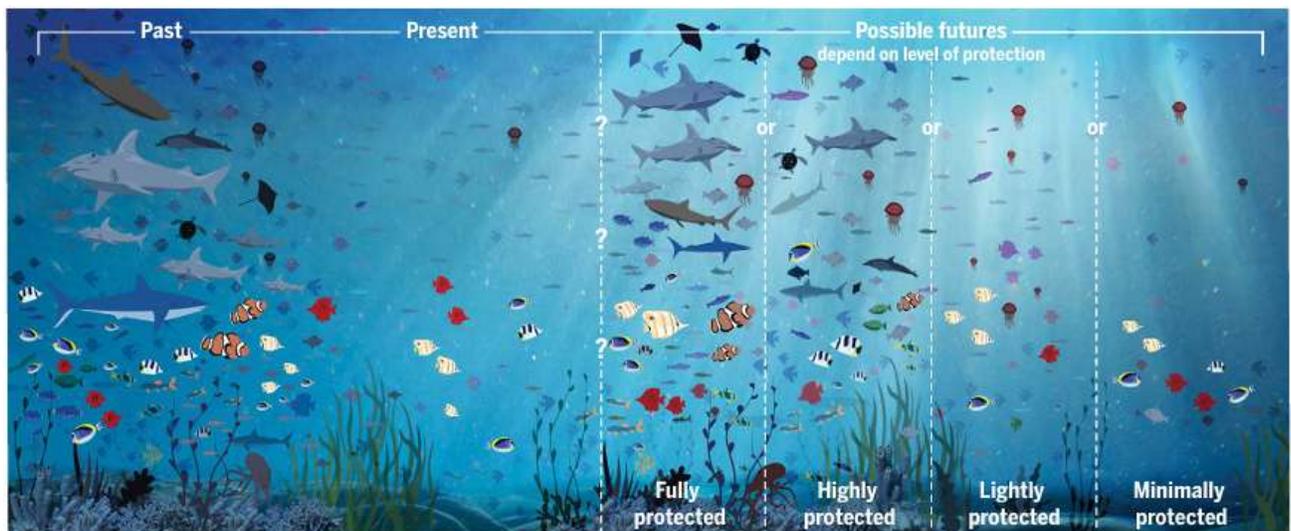
Source: Grorud-Colvert et al., Science 373, eabf0861 (2021)

Figure 13. Level of protection and the effectiveness of MPAs

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusions

Based on the results of this study, there are several important points that are the main findings before drawing a comprehensive conclusion in answering three research questions. Among these points, it was found that the case studies in two selected sites in this study, each for the METT score and MPA typology: METT score in Beloi-Atauro was 35.1% *(moderate effective, meaning improvement is needed)*, while METT score in Com-Lautam was 21.4% *(low effectiveness, meaning urgent management is needed)*. Nevertheless, when viewed from the MPA typology at each research site, both Beloi-Atauro (48 points) and Com-Lautem (47 points) fall into the category of Aquatic Reserves. The briefly conclusions that meet the objectives and the research questions could be described as follows:

- There is a significant correlation in between MPA typologies & METT scores;
- CB-MS & METT score for Beloi-Atauro was categorized as Aquatic Reserve & Moderate Effectiveness; and
- CB-MS & METT score for Com-Lautem was categorized as Aquatic Reserve & low Effectiveness.

4.2. Recommendations

For further consideration the very important take a way messages:

- Needs to consider the Regulation-Based Classification System for MPAs in Timor-Leste (e.g. when applying to "one island one management" concept in Atauro MPA);
- Needs to incorporate of these results finding with blue economy policy and action plan for Timor-Leste (2025-2035);
- Needs to integrate the SOP of MPAs typologies (Figure 14) and METT scores (Table 4 and Table 5) as the reference to evaluate a certain MPA performance;
- Needs to consider the 4 stages of new MPA establishment (proposed/committed, designated, implemented, and actively managed) and 4 levels of MPA protection (minimally protected, lightly protected, highly protected, and fully protected), including 4 types of PA governance

(governance by government, shared governance, private governance, and governance by indigenous people & local communities) under the IUCN guideline;

- It is proposed to consider a resolute step when committed, designated, implemented, and actively managed of a certain MPA that become minimally protected, lightly protected, highly protected, and fully protected criteria;

- It is highly recommended to apply the protected area governance type of the existing MPAs in Timor-Leste for a shared governance type (e.g. CB-MS of Beloi in Atauro and CB-MS of Com in Lautem);

- It is recommended to use the term of CB-MS or community based MPA as a single designated site in only one village level and mentioned the MPA when it has been covered for at least 3 CB-MS as one cluster or MPA linkages;

- It is recommended to use the existing best practices of establishing community based MPA and/or LMMA from development partners (e.g., Blue Ventures, Coral Triangle Center, Conservation International) while waiting for the new updated of government law or regulation;

- It is recommended not to expand the existing MPA and/or community based MPA for establishing a new CB-MS, including OECM before evaluating carefully the outcome of its management effectiveness towards the ecology, economy, and socio-cultural achievements, particularly with the economically benefit of the MPA establishment.
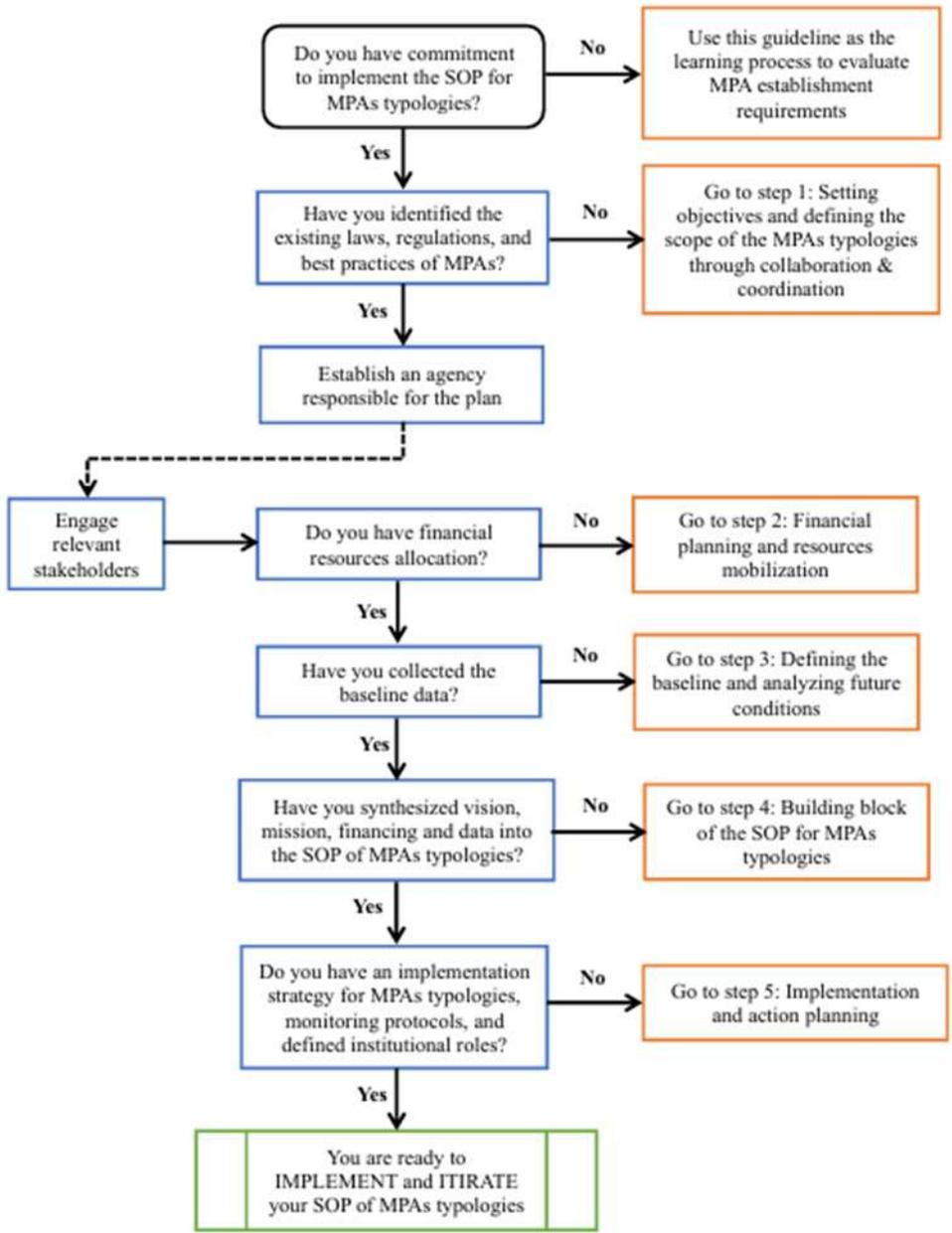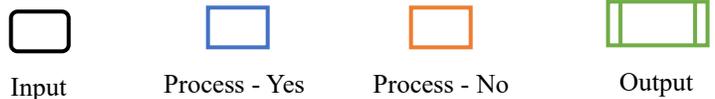
Figure 14. The SOP of MPAs typologies

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ANNEXES

Estabelecimento das Diretrizes para as Áreas Protegidas Marinhas
em Timor-Leste 2025: *O Estudo de Caso para um Santuário Marinho
Comunitário nas Sucos de Beloi-Ataúro e Com-Lautem*

Annex 1. Kestionariu ba peskiza INCT

Naran respondente (bele ou anonim): ....
Enderesu (aldeia & suco): ....
Naran pesquizadór (enumeradór): ....
Data intervista (loron no oras): ....

SESAUN I – EKOLOJIA

1. Tu'ir ita-bo'ot, espésie ikan no la'os ikan (hanesan: baleia, golfinu, dugong no lenuk tasi) ne'ebé mak uniku iha área ne'e, iha ka lae?
   a) barak (liuhosi 3)
   b) uitoan (1 ka 2 deit)
   c) la iha
2. Iha espésie ikan no la'os ikan ne'ebé halo migrasaun?
   a) barak (liuhosi 3)
   b) uitoan (1 ka 2 deit)
   c) la iha
3. Iha espésie ikan ne'ebé proteje (bazeia ba lista ikan protezidu hosi governu agora ne'e?
   a) barak (liuhosi
   b) uitoan (1 ka 2 deit)
   c) la iha
4. Iha ka lae tipu ikan ruma ne'ebé presiza hetan protesaun (agora daudaun laiha lista ikan ne'ebé governu proteje)? Se iha, favór ida hatete naran no tipu!

5. Iha ikan ruma no la'os ikan ne'ebé úniku/raru/endemiku iha área ida ne'e? Se iha, favór ida hatete naran no tipu!

6. Iha tipu ekosistema tasi-ibun no tasi nian ruma iha área ida-ne'e? Se iha, favór ida temi naran no tipu! Porezemplu, ai-parapa, du'ut-tasi no Resife Korál/Ahu-ruin.

SESAUN II – SÓSIO-KULTURÁL NO EKONÓMIA

1. Iha fatin atrasaun kulturál ruma iha área ida-ne'e atu atrai turista sira ne'ebé vizita. Se nune'e bele temi dansa tradisional nia naran. Porezemplu, fulan ida dala hira.

2. Turista sira mai husi ne'ebé atu vizita área ne'e?
   a) Iha rai-li'ur/internasional
   b) Nasionál
   c) Lokál

3. Komunidade fó apoiu ba esforsu konservasaun rekursu, porezemplu, MPA iha área ne'e? Presiza uza métodu levantamentu persesaun (eskala Likert)

4. Iha konflitu interese potensiál iha área ida-ne'e kona-ba planu zonasaun APM nian? Presiza iha mekanizmu FGD ida ho métodu aprosimasaun análize ba parte interesada sira.

5. Karik iha rendimentu komunidade nian hanesan benefísiu ida hosi implementasaun "Tarabandu" nian? Se nune'e, rendimentu hira mak hetan no oinsá ho ninia mekanizmu.

Annex 2. Ética do Investigador e Ética da Investigação

1. Explique como vai requerer a autorização para a realização de entrevistas ou inquéritos a instituições, empresas e sucos/aldeias.

   Na realização de entrevistas ou inquéritos em instituições, empresas e aldeias (sumo), será solicitada autorização formal através de:
   - Cartas oficiais às autoridades competentes descrevendo o objetivo e a metodologia da investigação
   - Reunir com os líderes locais para obter o seu apoio e cooperação
   - Conformidade com as diretrizes éticas e obtenção de consentimento informado dos participantes
   - Colaboração com as instituições locais para facilitar o envolvimento e a participação da comunidade

2. Explique como vai tratar o consentimento dos participantes da pesquisa (instituições, caso aplicável) na sua pesquisa.

   Para garantir práticas de investigação éticas, os participantes receberão as seguintes informações antes da participação:
   - Objectivo do estudo e sua importância
   - Estime o tempo necessário para a participação
   - O direito de recusar a participação ou de se retirar a qualquer momento
   - Garantir a confidencialidade e o anonimato
   - Dados de contacto para outras dúvidas ou preocupações
     A aprovação institucional será solicitada sempre que necessário, garantindo o cumprimento das normas de proteção de dados e dos padrões éticos. Todos os participantes deverão fornecer o seu consentimento informado antes de iniciar qualquer entrevista ou inquérito.

3. Explique como vai tratar da confidencialidade dos dados dos participantes (instituições, caso aplicável).

   Para proteger a confidencialidade institucional e dos participantes, serão implementadas as seguintes medidas:
   - Anonimização: Todos os identificadores pessoais serão removidos dos dados de investigação para impedir a rastreabilidade até aos participantes ou instituições individuais
   - Armazenamento seguro de dados: os dados de pesquisa serão armazenados em segurança em ficheiros digitais protegidos por palavra-passe e unidades de armazenamento físico bloqueadas

- Controlo de acesso: apenas o pessoal de investigação autorizado terá acesso a dados confidenciais
- Consentimento Informado: Os participantes serão informados sobre a confidencialidade dos dados no início do inquérito/entrevista e será fornecido consentimento explícito
- Proteção de Dados Institucionais: Quaisquer informações institucionais recolhidas serão recolhidas e reportadas de forma a impedir a identificação de organizações específicas
- Conformidade ética: O estudo obedecerá às diretrizes nacionais e internacionais de ética na investigação para garantir a privacidade e a confidencialidade dos dados

4. Refira como poderá evitar causar situações de ansiedade ou de stress para os participantes, dependendo do estudo em questão (se aplicável).

Atos de proteção e segurança para os Participantes de estudos que envolvam participantes vulneráveis, incluindo menores ou indivíduos que sofram de trauma, serão tomadas as seguintes precauções:
- Abordagem sensível ao trauma: as entrevistas serão conduzidas de forma solidária e não intrusiva
- Consentimento informado: os participantes serão totalmente informados sobre os seus direitos e poderão desistir a qualquer momento
- Apoio psicológico: o acesso a serviços de aconselhamento será prestado se necessário.

5. Refira como poderá realizar inquéritos ou entrevistas a menores de 18 anos, dependendo do estudo em questão (se aplicável).

Não aplicável

6. Tendo em consideração os pontos anteriores de consentimento, confidencialidade e proteção e Segurança dos participantes, explique como vai abordar o participante e o que vai explicar ao participante na fase inicial e na fase final do inquérito/entrevista.

Garantir o consentimento e a segurança da confidencialidade do participante requer o compromisso entre o investigador e o participante. Os participantes têm o direito de ser informados de forma clara e completa sobre os aspetos da investigação (por exemplo, os objetivos da investigação e o envolvimento pessoal na investigação) em que a sua participação está envolvida, de serem livremente retirados do processo de entrevista a qualquer momento durante a investigação e sem quaisquer consequências, pressão ou dano ao participante devido a este facto.

7. Indique de que forma pode evitar a fabricação de dados, a falsificação de dados e as formas de plágio voluntário ou involuntário na investigação.

Para evitar a falsificação de dados, a equipa aplicará os métodos de Abordagem Participativa com Discussão em Grupo Focal (DFG) e Consentimento Livre e Informado (CLPI) para garantir a confidencialidade.

8. O seu estudo envolve o uso/experiência de animais em pesquisa? Se sim, explicar detalhadamente que aspetos éticos o estudo terá em consideração para com os animais e o meio ambiente. Explicar o mesmo em relação a estudos sobre a flora. Se não envolver animais, escreva na resposta "não."

Não

Annex 3. METT assessment for Beloi-Atauro (INCT 2025)

Strengthened MPAs functioning effectively in priority coastal and marine biodiversity areas,
demonstrating improved management effectiveness, sustainability, and benefits (METT Assessment)

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
A. Context: Where are we now? Assessment of important threats and the policy environment				
1. Legal status – Does the protected area have legal status?	The protected area is not gazette	0		Based on the current reality that there is no formal of government regulation for MPA in Beloi-Atauro
	The government has agreed that the Marine Protected Area (MPA) should be gazette but the process has not yet begun	1		
	The protected area is in the process of being gazette but the process is still incomplete	2		
	The Marine Protected Area has been legally gazette (or in the case of private reserves is owned by a trust of similar)	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Context	**Additional point:** a. The MPA has received national and/or international recognition for its importance *(in the comments column, describe the recognition in detail)*	+1		
2. MPA regulations – **Are unsustainable human activities (e.g. poaching) controlled?**	There are no mechanisms for controlling unsustainable human activities in the MPA	0		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Context	Mechanism for controlling unsustainable human activities in the MPA exist but there is major problem in implementing them effectively	1		
	Mechanisms for controlling unsustainable human activities in the MPA but there are some problems in ineffectively implementing them	2		There has been undertaking the controlling mechanisms in place but not effective yet
	Mechanisms for controlling unsustainable human activities in the MPA exist and are being effectively implemented	3		
3. Law enforcement – Can staff sufficiently enforce MPA rules?	The staff have no effective capacity/resources to enforce MPA legislation and regulations	0		
	There are major deficiencies in staff capacity/resources to enforce MPA legislation and regulations (e.g. lack of skills no patrol budget)	1		At least minimum capacity of staff for law enforcement related to CB-MS in Beloi-Atauro

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Context	The staff have acceptable capacity/resources to enforce MPA legislation and regulations but some deficiencies remain	2		
	The staff have excellent capacity/resources to enforce MPA legislation and regulations	3		
	Additional point: a. There are additional sources of control (e.g. volunteers, national services, local communities)	+1		
	b. Infraction is regularly prosecuted and fines levied	+1		
4. MPA boundary demarcations – are the boundaries known and demarcated?	The boundaries of MPA are not known by the management authority or others stakeholders	0		
	The boundary of MPA is known by authority but is not known by others stakeholders	1		
	The boundary of MPA is known by both the management authority and others but is not appropriately demarcated	2		In the initial there is a fixed boundary but it has been disappearing or cut off
Context	The boundary of MPA is known by the management authority and stakeholders and is appropriately demarcated	3		
5. Integration of the MPA in a larger coastal management plan – is	There is no discussion about the integration of the MPA in a larger coastal management plan	0		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
the MPA part of larger coastal management plan? *Context*	There are some discussions about the integration of the MPA in a larger coastal management plan	1		People have intention to strengthen the CB-MS in a large scaling up
	The MPA is on the process of being integrated into a larger coastal management plan but the process is still incomplete	2		
	The MPA is part of a larger coastal management plan	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
6. Resource inventory – is there enough information to manage the area?	There is little or no information available on the biophysical, socio-cultural and economic conditions associated with the MPA	0		There is not enough of data availability for further CB-MS development
	Information on the biophysical, socio-cultural and economic conditions associated with the MPA is not sufficient to support planning and decision making	1		
Context	Information on the biophysical, socio-cultural and economic conditions associated with the MPA is sufficient for key areas of planning/decision making but the necessary survey work is not being mentioned	2		
	Information on the biophysical, socio-cultural and economic conditions associated with the MPA is sufficient for planning and decision making	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
7. Stakeholder awareness and concern – Are stakeholders aware and concerned about marine resource conditions? *Context*	Less than 25% of stakeholders are aware or concerned about the marine resource conditions and threats and management efforts	0		The indicator is based on the list of participants during the public consultation (survey)
	Approximately 25% - 50% of stakeholders are aware or concerned about the marine resource conditions and threats	1		
	Approximately 50% - 75% of stakeholders are aware or concerned about the marine resource conditions and threats	2		
	Over 75% of stakeholders are aware or concerned about the marine resource conditions and threats	3		
TOTAL for Context (9)				
B. Planning – Where do we want to be? Assessment of MPA design and planning				

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
8. MPA objectives – Have objectives been agreed?	No firm objectives have been agreed for the MPA	0		
	The MPA has agreed objectives	1		
	The MPA has agreed objectives but there are only partially implemented	2	■	People have the CB-MS plan but not effective
Planning	The MPA has agreed objectives and is managed to meet the objectives	3		
9. Management plan – Is there a management plan and is it being implemented?	There is no management plan for the MPA	0		
	A management plan is being prepared or has been prepared but is not being implemented	1		
	An approved management plan exists but it is only being partially implemented	2	■	Partially implementation of the CB-MS management plan
	An approved management plan exists and is being implemented	3		
	Additional points for planning:			
	a. There is also a long-term master plan (at least 5 years)	+1		
	b. The planning process allows adequate opportunity for key stakeholders to influence the management plan	+1		
	c. Stakeholder participation includes representation from the various ethnic, religious and user groups as well as representation from both genders	+1		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
	d. The socioeconomic impacts of decisions be considered in the planning process	+1		
	e. The local culture, including traditional practices, social systems, cultural features, historic sites and monuments, is considered in the planning process	+1		
	f. There is an established schedule and process for periodic review and updating of the management plan	+1		
	g. The results of monitoring, research and evaluation are routinely incorporated into planning	+1		
Planning	h. Management plan is tied to the development and enforcement of regulations	+1		
TOTAL for Planning (4)				
C. Inputs – What do we need? Assessment for resources needed to carry out management				
10. Research – Is there a program of management-orientated survey?	There is no survey or research work taking place in the MPA	0	█	No data for survey and although there is existing research data but never comminated to the people in Beloi Village
	There is some ad hoc survey and research work	1		
	There is considerable survey and research work but it is not directed towards the needs of the MPA management	2		

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Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Inputs	There is a comprehensive, integrated programme of survey and research work, which is relevant to management needs	3		
	Additional point: a. Carrying capacity studies have been conducted to determine sustainable use levels	+1		
11. Staff numbers –Are there enough people employed to manage the protected area? *Inputs*	There are no staff	0		
	Staff numbers are inadequate for critical management activities	1		
	Staff numbers are below optimum level for critical management activities	2	🟩	There is no permanent of management staff
	Staff numbers are adequate for the management needs of the site	3		
12. Current budget – Is the current budget sufficient?	There is no budget for management of the MPA	0	🟩	There is no budget mechanism
	The available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage	1		
	The available budget is acceptable but could be further improved to fully achieve effective management	2		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Inputs	The available budget is sufficient and meets the full management needs of the protected area	3		
	Additional points: a. There is a secure budget for the MPA and its management needs on a multi – year basis	+1		
	b. The budget is not entirely dependent on government funding; instead, funding also comes from NGO contributions, taxes, fees, etc.	+1		
TOTAL for inputs (2)				
D. Process – How do we go about management? Assessment of the way in which management is conducted				
13. Education and awareness program – Is there a planned education program?	There is no education and awareness program	0	 	No indication for strengthen the capacity on education and any programs
Process	There is a limited and ad hoc education and awareness program, but no overall planning for this component	1		
	There is a planned education and awareness program but there are still serious gaps	2		
	There is a planned and effective education and awareness program fully linked to the objectives and needs of the protected area	3		

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Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
14. Communication between stakeholders and managers – Is there communication between stakeholders and managers?	There is little or no communication between managers and stakeholders involved in the MPA	0	[green]	There is no management measure (SOP) for the CB-MC structure
	There is communication between managers and stakeholders but this is not a planned or schedule program	1		
	There is a planned communication program that is being used to build support for the MPA amongst relevant stakeholders but implementation is limited yet	2		
	There is a planned communication program that is being implemented to build support for the MPA amongst relevant stakeholders	3		
Process	**Additional point:** There is some communication with other MPA managers (and for example exchanges of good practices)	+1		
15. Stakeholder involvement and participation – Do stakeholders have meaningful input to management decision?	Stakeholders have no input into decisions relating to the management of the protected area	0		
	Stakeholders have some input into decisions relating to the management but no direct involvement in the resulting decisions	1	[green]	There is coordination mechanism among not effective staff and link to other stakeholders but not effective yet

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Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
	Stakeholders directly contribute to some decisions relating to management	2		
	Stakeholders directly participate in making decisions relating to management	3		
Process	**Addition point:** a. There are clear financial contributions/agreements between MPA and tourism operators to recover MPA resources rents for local benefits	+1		
16. Indigenous people – Do indigenous and traditional people resident or regularly using the MPA have input to management decisions?	Indigenous and traditional people have no input into decisions relating to the management of the protected area	0		
	Indigenous and traditional people have some input into decisions relating to the management but no direct involvement in the resulting decisions	1		
	Indigenous and traditional people directly contribute to some decisions relating to management	2		
Process	Indigenous and traditional people directly participate in making decisions relating to management	3	■	People are all follow the existing customary law or "tara-bandu"
17. Staff training – Is there enough training for staff?	Staff are untrained	0		
	Staff training and skills are low relative to the needs of the MPA	1	■	No enough skill getting

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
	Staff training and skills are adequate, but could be further improved to fully achieve the objectives of management	2		
	Staff training and skills are in tune with the management needs of the MPA and with anticipated future needs	3		
Process				
18. Equipment – Is the site adequately quipped?	Is there little or no equipment and facilities	0		No facility to support the management of CB-MS for running
	There are some equipment and facilities but these are wholly inadequate	1		
	Most of equipment and facilities are adequate and maintained	2		
Process	There are adequate equipment and facilities and it is well maintained	3		
19. Monitoring and evaluation – Are biophysical, socioeconomics and governance indicators monitored and evaluated?	There are no monitoring and evaluation the biophysical, socioeconomics and governance context of the MPA	0		No monitoring conducted based on the information got from the people who involved
	There is some and ad hoc monitoring and evaluation, but no overall strategy and/or no regular collection of results	1		
	There is an agreed and implemented monitoring and evaluation system but results are not systematically used for management	2		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
	A good monitoring and evaluation system exists, is well implemented and used in adaptive management	3		
	Additional point: a. The MPA participates as a site in national or international environmental monitoring program such CARICOMP, CPACC, GCRMN, AGGRA or similar (provided the name of program (s))	+1		
Process	b. There is an Emergency Response Capacity in place of mitigate impacts from non-threats	+1		
Total for process (5)				
E. Outputs – What where the results? Assessment and the implementation of management programs and actions; delivery of products and services				
N.B.: The outputs should be assessed based on progress since the last assessment. If this is the first time the Score Card is being used, respondents should assess outputs over the last 3 years. For newly establish MPAs, respondents may have to skip this section				
20. Context indicators – have context indicators been approved?	a. Legal status has improved *(refers to question 1. Legal status)*	+2		
	b. Regulations have improved *(refers to question 2. MPA Regulations)*	+2		
	c. Law enforcement has improved *(refers to question 3. Law enforcement)*	+2		
	d. Boundary demarcation has improved *(refers to question 4. MPA boundary demarcation)*	+2		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Outputs	e. The MPA has been integrated into ICM *(refers to question 5. Integration of MPA)*	+2		
	f. The resource inventory has improved *(refers to question 6. Resource inventory)*	+2		
	g. Stakeholder awareness and concern have improved *(refers to question 7. Stakeholder awareness and concern)*	+2		
21. Products and services	a. **Signs** – signs are now available or new one has been installed	+1		
	b. **Moorings** – moorings are now available or new one has been installed	+1		
Outputs	c. **Education materials** – education materials are available or new one has been developed	+1		
22. Mechanisms for stakeholder participation in decision-making and/or management activities (e.g. advisory council) –	There are no mechanisms for stakeholder participation in decision-making and/or management activities	0		
	There are some mechanisms for stakeholder participation in decision-making and/or management activities but no sufficient	1	■	Some mechanisms are applying for management activities

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
are mechanism available to ensure stakeholder participation? *Outputs*	There are sufficient mechanisms for stakeholder participation in decision-making and/or management activities	2		
23. Environmental education activities for stakeholders (e.g. public outings at the MPA) – have education activities been developed for stakeholder? *Outputs*	There are no education activities available for stakeholders	0		
	There are some education activities for stakeholders but they are not sufficient	1		There is no sufficient education for stakeholders
	There are sufficient education activities available for stakeholders	2		
24. Management activities – have the two critical management activities (listed in the data sheet) been improved to address threats? *Outputs*	Management activities have not been improved	0		No specific action to address the existing threat for protected species
	Some measures have been taken to improve management activities	1		
	Management activities have been sufficiently improved	2		

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Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
25. Visitor facilities – Does the MPA have sufficient visitor facilities?	There are no visitor facilities and services	0		
	Visitor facilities and services are inappropriate for current levels of visitation or are under construction	1	 	Only a few visitors' facility but no improvement
	There are some visitor facilities and services but they could be improved	2		
Outputs	Visitor facilities and services are sufficient for current levels of visitation	3		
26. Fees – If fees (entry fees – tourism, fines) are applied, do they help MPA management?	Although a fee system exists, fees are not collected	0		
	The fees are collected but they go straight to central government and are not returned to the MPA or its environs	1		
	The fees are collected but they are disbursed to the local authority rather than the MPA	2	 	Fee for "tara-bandu" is collected during December as a Christmas gift
Outputs	There are fees for visiting the MPA that help to support this and/or other MPAs	3		
27. Staff training	Staff was trained but could be further improved to fully achieve the objectives of management	2	 	Staff have been trained and to comparative study but not more often
Outputs	Staff was trained in tune with the management needs of the MPA and with anticipated future needs	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Total for outputs (7)				
F. Outcomes – What did we achieve? Assessment of the outcomes and the extent to which they achieved objectives				
28. Objectives – Have MPA objectives (listed in the data sheet page) been addressed? *Outcomes*	Management objectives have not been addressed	0		
	Management objectives have not been addressed somewhat	1		
	Management objectives have not been sufficiently addressed	2	█	No sufficient efforts to address the objective of CB-MS
	Management objectives have not been significantly addressed	3		
29. Threats – Have threats (listed in the data sheet page) been reduced? *Outcomes*	Threats have increased	0		
	Threats have stayed at approximately the same levels	1	█	Potential threats are still in the same level when entering to the boundary
	Threats have been reduced somewhat	2		
	Threats have been largely reduced	3		
30. Resource conditions – Have resources conditions improved? *Outcomes*	Resource conditions have declined	0		
	Resource conditions have stayed at approximately the same levels	1		
	Resource conditions have improved somewhat	2		
	Resource conditions have improved significantly	3	█	Marine resources are improving during the closed session for protection

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
31. Community welfare – Has community welfare improved?	Livelihoods and standards of living in the community have declined	0		
	Livelihoods and standards of living in the community have stayed approximately the same	1		
	Livelihoods and standards of living in the community have improved somewhat	2	■	Level of living standards of people are little improved
	Livelihoods and standards of living in the community have improved significantly	3		
	Additional point: a. MPA management is compatible with the local culture, including traditional practice relationships, social systems, cultural features, historic sites, and monuments linked to marine resources and uses	+1		
	b. Resource use conflicts have been reducing	+1		
Outcomes	c. Benefits from the MPA are equitably distributed	+1		
	d. The non-monetary benefits of the marine resources to society have been maintained or enhanced	+1		
32. Environmental awareness – Has community	Environmental awareness of resource conditions, threats and management activities has declined	0		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
environmental awareness improved?	Environmental awareness has stayed approximately the same	1		
	Environmental awareness has improved somewhat	2	 	Environmental awareness is improved
Outcomes	Environmental awareness has improved significantly	3		
33. Compliances – Are users complying with MPA regulations?	Less than 25% of users are complying with regulations	0	 	Indicator is illustrated from the presence of participant during the community consultation (protesters) – number of protesters divided by total participants
Outcomes	25% - 50% of users are complying with regulations	1		
	50% - 75% of users are complying with regulations	2		
	Over 75% of users are complying with regulations	3		
34. Stakeholder satisfaction – Are the stakeholders satisfied with the process and outputs of the MPA?	Less than 25% of stakeholders are satisfied with the process and outputs of the MPA	0		
	25% - 50% of stakeholders are satisfied with the process and outputs of the MPA	1		
	50% - 75% of stakeholders are satisfied with the process and outputs of the MPA	2		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Outcomes	Over 75% of stakeholders are satisfied with the process and outputs of the MPA	3		Level of satisfaction is measured as opposite from the protesters (total number of people who agree on the establishment of CB-MS)
	Additional points: a. Stakeholders feel that they are able to effectively participate in management decision	+1		Participants feel the benefit of CB-MS in their village although some of them are not active member
	b. Stakeholders feel that they are adequately represented in the MPA decision-making processes	+1		
TOTAL for outcomes (14)				

Strengthened MPAs functioning effectively in priority coastal and marine biodiversity areas,
demonstrating improved management effectiveness, sustainability, and benefits (METT Assessment)

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
B. Context: Where are we now? Assessment of important threats and the policy environment				
	The protected area is not gazette	0		Not realized yet for any legislation for MPA

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
1. Legal status – Does the protected area have legal status?	The government has agreed that the Marine Protected Area (MPA) should be gazette but the process has not yet begun	1		
	The protected area is in the process of being gazette but the process is still incomplete	2		
	The Marine Protected Area has been legally gazette (or in the case of private reserves is owned by a trust of similar)	3		
Context	**Additional point:** b. The MPA has received national and/or international recognition for its importance *(in the comments column, describe the recognition in detail)*	+1		
2. MPA regulations – Are unsustainable human activities (e.g. poaching) controlled?	There are no mechanisms for controlling unsustainable human activities in the MPA	0		No mechanism applies to control
	Mechanism for controlling unsustainable human activities in the MPA exist but there is major problem in implementing them effectively	1		
Context	Mechanisms for controlling unsustainable human activities in the MPA but there are some problems in ineffectively implementing them	2		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
	Mechanisms for controlling unsustainable human activities in the MPA exist and are being effectively implemented	3		
3. Law enforcement – Can staff sufficiently enforce MPA rules?	The staff have no effective capacity/resources to enforce MPA legislation and regulations	0	 	No effective capacity to staff
	There are major deficiencies in staff capacity/resources to enforce MPA legislation and regulations (e.g. lack of skills no patrol budget)	1		
	The staff have acceptable capacity/resources to enforce MPA legislation and regulations but some deficiencies remain	2		
	The staff have excellent capacity/resources to enforce MPA legislation and regulations	3		
	Additional point: c. There are additional sources of control (e.g. volunteers, national services, local communities)	+1		
Context	d. Infraction is regularly prosecuted and fines levied	+1		
4. MPA boundary demarcations – are the	The boundaries of MPA are not known by the management authority or others stakeholders	0		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
boundaries known and demarcated?	The boundary of MPA is known by authority but is not known by others stakeholders	1		Delineation of boundary is clear but not informed well (disappear of buoyance)
	The boundary of MPA is known by both the management authority and others but is not appropriately demarcated	2		
Context	The boundary of MPA is known by the management authority and stakeholders and is appropriately demarcated	3		
5. Integration of the MPA in a larger coastal management plan – is the MPA part of larger coastal management plan?	There is no discussion about the integration of the MPA in a larger coastal management plan	0		
	There are some discussions about the integration of the MPA in a larger coastal management plan	1		Integration of CB-MS planning into Suco regulation and up to higher level at administrative post
Context	The MPA is on the process of being integrated into a larger coastal management plan but the process is still incomplete	2		
	The MPA is part of a larger coastal management plan	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
6. Resource inventory – is there enough information to manage the area? *Context*	There is little or no information available on the biophysical, socio-cultural and economic conditions associated with the MPA	0		
	Information on the biophysical, socio-cultural and economic conditions associated with the MPA is not sufficient to support planning and decision making	1		No sufficient of data collection before the decision taken for CB-MS establishment
	Information on the biophysical, socio-cultural and economic conditions associated with the MPA is sufficient for key areas of planning/decision making but the necessary survey work is not being mentioned	2		
	Information on the biophysical, socio-cultural and economic conditions associated with the MPA is sufficient for planning and decision making	3		
7. Stakeholder awareness and concern – Are stakeholders aware and concerned about marine resource conditions?	Less than 25% of stakeholders are aware or concerned about the marine resource conditions and threats and management efforts	0		Indicator is coming from the interview with selected key respondent and community consultation
	Approximately 25% - 50% of stakeholders are aware or concerned about the marine resource conditions and threats	1		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Context	Approximately 50% - 75% of stakeholders are aware or concerned about the marine resource conditions and threats	2		
	Over 75% of stakeholders are aware or concerned about the marine resource conditions and threats	3		
TOTAL for Context (5)				
B. Planning – Where do we want to be? Assessment of MPA design and planning				
8. MPA objectives – Have objectives been agreed?	No firm objectives have been agreed for the MPA	0		
	The MPA has agreed objectives	1		
	The MPA has agreed objectives but there are only partially implemented	2		Partial people are knowing the CB-MS objective
Planning	The MPA has agreed objectives and is managed to meet the objectives	3		
9. Management plan – Is there a management plan and is it being implemented?	There is no management plan for the MPA	0		
	A management plan is being prepared or has been prepared but is not being implemented	1		Management plan of CB-MS is prepared but implemented
	An approved management plan exists but it is only being partially implemented	2		
	An approved management plan exists and is being implemented	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
	Additional points for planning:			
	i. There is also a long-term master plan (at least 5 years)	+1		
	j. The planning process allows adequate opportunity for key stakeholders to influence the management plan	+1		
	k. Stakeholder participation includes representation from the various ethnic, religious and user groups as well as representation from both genders	+1		
	l. The socioeconomic impacts of decisions be considered in the planning process	+1		
	m. The local culture, including traditional practices, social systems, cultural features, historic sites and monuments, is considered in the planning process	+1		
	n. There is an established schedule and process for periodic review and updating of the management plan	+1		
	o. The results of monitoring, research and evaluation are routinely incorporated into planning	+1		
Planning	p. Management plan is tied to the development and enforcement of regulations	+1		
TOTAL for Planning (3)				
G. Inputs – What do we need? Assessment for resources needed to carry out management				

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
10. Research – Is there a program of management-orientated survey?	There is no survey or research work taking place in the MPA	0	 	No survey ever conducted based on the results of interview to selected respondent (data & information) indicators
	There is some ad hoc survey and research work	1		
	There is considerable survey and research work but it is not directed towards the needs of the MPA management	2		
	There is a comprehensive, integrated programme of survey and research work, which is relevant to management needs	3		
Inputs	**Additional point:** b. Carrying capacity studies have been conducted to determine sustainable use levels	+1		
11. Staff numbers –Are there enough people employed to manage the protected area?	There are no staff	0	 	No recruited staff to running the daily activities
	Staff numbers are inadequate for critical management activities	1		
	Staff numbers are below optimum level for critical management activities	2		
Inputs	Staff numbers are adequate for the management needs of the site	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
12. Current budget – Is the current budget sufficient?	There is no budget for management of the MPA	0		No budget (proposal for fund rising)
	The available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage	1		
	The available budget is acceptable but could be further improved to fully achieve effective management	2		
	The available budget is sufficient and meets the full management needs of the protected area	3		
	Additional points:			
	c. There is a secure budget for the MPA and its management needs on a multi – year basis	+1		
Inputs	d. The budget is not entirely dependent on government funding; instead, funding also comes from NGO contributions, taxes, fees, etc.	+1		
TOTAL for inputs (0)				
H. Process – How do we go about management? Assessment of the way in which management is conducted				
13. Education and awareness program – Is	There is no education and awareness program	0		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
there a planned education program? *Process*	There is a limited and ad hoc education and awareness program, but no overall planning for this component	1		Very limited program for awareness (only the launching ceremony but no continuation after CTSP then CI)
	There is a planned education and awareness program but there are still serious gaps	2		
	There is a planned and effective education and awareness program fully linked to the objectives and needs of the protected area	3		
14. Communication between stakeholders and managers – Is there communication between stakeholders and managers?	There is little or no communication between managers and stakeholders involved in the MPA	0		
	There is communication between managers and stakeholders but this is not a planned or schedule program	1		
	There is a planned communication program that is being used to build support for the MPA amongst relevant stakeholders but implementation is limited yet	2		
	There is a planned communication program that is being implemented to build support for the MPA amongst relevant stakeholders	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Process	**Additional point:** There is some communication with other MPA managers (and for example exchanges of good practices)	+1		
15. Stakeholder involvement and participation – Do stakeholders have meaningful input to management decision?	Stakeholders have no input into decisions relating to the management of the protected area	0	 	No involvement of stakeholder for decision making (initial stage)
	Stakeholders have some input into decisions relating to the management but no direct involvement in the resulting decisions	1		
	Stakeholders directly contribute to some decisions relating to management	2		
	Stakeholders directly participate in making decisions relating to management	3		
Process	**Addition point:** b. There are clear financial contributions/agreements between MPA and tourism operators to recover MPA resources rents for local benefits	+1		
16. Indigenous people – Do indigenous and traditional people	Indigenous and traditional people have no input into decisions relating to the management of the protected area	0		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
resident or regularly using the MPA have input to management decisions?	Indigenous and traditional people have some input into decisions relating to the management but no direct involvement in the resulting decisions	1		
	Indigenous and traditional people directly contribute to some decisions relating to management	2		
Process	Indigenous and traditional people directly participate in making decisions relating to management	3		People are involved directly for the ceremony and awareness campaigning
17. Staff training – Is there enough training for staff?	Staff are untrained	0		
	Staff training and skills are low relative to the needs of the MPA	1		
	Staff training and skills are adequate, but could be further improved to fully achieve the objectives of management	2		Staff's skill is sufficient from other government partners initiative for capacity building
Process	Staff training and skills are in tune with the management needs of the MPA and with anticipated future needs	3		
18. Equipment – Is the site adequately quipped?	Is there little or no equipment and facilities	0		No facilities
	There are some equipment and facilities but these are wholly inadequate	1		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Process	Most of equipment and facilities are adequate and maintained	2		
	There are adequate equipment and facilities and it is well maintained	3		
19. Monitoring and evaluation – Are biophysical, socioeconomics and governance indicators monitored and evaluated?	There are no monitoring and evaluation the biophysical, socioeconomics and governance context of the MPA	0	 	No monitoring to the delineation of protected area
	There is some and ad hoc monitoring and evaluation, but no overall strategy and/or no regular collection of results	1		
	There is an agreed and implemented monitoring and evaluation system but results are not systematically used for management	2		
	A good monitoring and evaluation system exists, is well implemented and used in adaptive management	3		
	Additional point: c. The MPA participates as a site in national or international environmental monitoring program such CARICOMP, CPACC, GCRMN, AGGRA or similar (provided the name of program (s))	+1		
Process	d. There is an Emergency Response Capacity in place of mitigate impacts from non-threats	+1		

Issue	Criteria	Score: Tick only one box per question	Comment/Explanation
Total for process (6)		
I. Outputs – What where the results? Assessment and the implementation of management programs and actions; delivery of products and services		
N.B.: The outputs should be assessed based on progress since the last assessment. If this is the first time the Score Card is being used, respondents should assess outputs over the last 3 years. For newly establish MPAs, respondents may have to skip this section		
20. Context indicators – have context indicators been approved? *Outputs*	h. Legal status has improved *(refers to question 1. Legal status)*	+2	
	i. Regulations have improved *(refers to question 2. MPA Regulations)*	+2	
	j. Law enforcement has improved *(refers to question 3. Law enforcement)*	+2	
	k. Boundary demarcation has improved *(refers to question 4. MPA boundary demarcation)*	+2	
	l. The MPA has been integrated into ICM *(refers to question 5. Integration of MPA)*	+2	
	m. The resource inventory has improved *(refers to question 6. Resource inventory)*	+2	
	n. Stakeholder awareness and concern have improved *(refers to question 7. Stakeholder awareness and concern)*	+2	
21. Products and services	d. **Signs** – signs are now available or new one has been installed	+1	
	e. **Moorings** – moorings are now available or new one has been installed	+1	

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Outputs	f. **Education materials** – education materials are available or new one has been developed	+1		
22. Mechanisms for stakeholder participation in decision-making and/or management activities (e.g. advisory council) – are mechanism available to ensure stakeholder participation? *Outputs*	There are no mechanisms for stakeholder participation in decision-making and/or management activities	0		
	There are some mechanisms for stakeholder participation in decision-making and/or management activities but no sufficient	1		No sufficient of stakeholders for decision-making process
	There are sufficient mechanisms for stakeholder participation in decision-making and/or management activities	2		
23. Environmental education activities for stakeholders (e.g. public outings at the MPA) – have education activities been	There are no education activities available for stakeholders	0		
	There are some education activities for stakeholders but they are not sufficient	1		Not efficient for education campaign (proof document from community for public awareness campaign)

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
developed for stakeholder? *Outputs*	There are sufficient education activities available for stakeholders	2		
24. Management activities – have the two critical management activities (listed in the data sheet) been improved to address threats? *Outputs*	Management activities have not been improved	0		No activities ever conducted in terms of addressing some critical habitats (sea grass and coral reefs ecosystems)
	Some measures have been taken to improve management activities	1		
	Management activities have been sufficiently improved	2		
25. Visitor facilities – Does the MPA have sufficient visitor facilities? *Outputs*	There are no visitor facilities and services	0		No visitors' facilities around the designated of protected area
	Visitor facilities and services are inappropriate for current levels of visitation or are under construction	1		
	There are some visitor facilities and services but they could be improved	2		
	Visitor facilities and services are sufficient for current levels of visitation	3		
26. Fees – If fees (entry fees – tourism, fines)	Although a fee system exists, fees are not collected	0		No fee collecting for CB-MS activity

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
are applied, do they help MPA management? *Outputs*	The fees are collected but they go straight to central government and are not returned to the MPA or its environs	1		
	The fees are collected but they are disbursed to the local authority rather than the MPA	2		
	There are fees for visiting the MPA that help to support this and/or other MPAs	3		
27. Staff training *Outputs*	Staff was trained but could be further improved to fully achieve the objectives of management	2	▓	There are some training and study comparative but not further link to CB-MS management
	Staff was trained in tune with the management needs of the MPA and with anticipated future needs	3		
Total for outputs (4)				
J. Outcomes – What did we achieve? Assessment of the outcomes and the extent to which they achieved objectives				
28. Objectives – Have MPA objectives (listed in the data sheet page) been addressed? *Outcomes*	Management objectives have not been addressed	0		
	Management objectives have not been addressed somewhat	1		
	Management objectives have not been sufficiently addressed	2	▓	Partially addressing the objectives of CB-MS since STSP activities
	Management objectives have not been significantly addressed	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
29. Threats – Have threats (listed in the data sheet page) been reduced? *Outcomes*	Threats have increased	0	▉	Threads are increasing because no protection anymore for the existing boundaries sites
	Threats have stayed at approximately the same levels	1		
	Threats have been reduced somewhat	2		
	Threats have been largely reduced	3		
30. Resource conditions – Have resources conditions improved? *Outcomes*	Resource conditions have declined	0	▉	Link to the increased threats that maintain exist
	Resource conditions have stayed at approximately the same levels	1		
	Resource conditions have improved somewhat	2		
	Resource conditions have improved significantly	3		
31. Community welfare – Has community welfare improved?	Livelihoods and standards of living in the community have declined	0		
	Livelihoods and standards of living in the community have stayed approximately the same	1	▉	Communities' standard of living are no change compare to the initial launching of community based marine protected area since 2012
	Livelihoods and standards of living in the community have improved somewhat	2		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
Outcomes	Livelihoods and standards of living in the community have improved significantly	3		
	Additional point: e. MPA management is compatible with the local culture, including traditional practice relationships, social systems, cultural features, historic sites, and monuments linked to marine resources and uses	+1		
	f. Resource use conflicts have been reducing	+1		
	g. Benefits from the MPA are equitably distributed	+1		
	h. The non-monetary benefits of the marine resources to society have been maintained or enhanced	+1		
32. Environmental awareness – Has community environmental awareness improved? *Outcomes*	Environmental awareness of resource conditions, threats and management activities has declined	0		
	Environmental awareness has stayed approximately the same	1	🟧	The status quo is still existed
	Environmental awareness has improved somewhat	2		
	Environmental awareness has improved significantly	3		

Issue	Criteria	Score: Tick only one box per question		Comment/Explanation
33. Compliances – Are users complying with MPA regulations? *Outcomes*	Less than 25% of users are complying with regulations	0		
	25% - 50% of users are complying with regulations	1		Number of people who disagree with previous CB-MS initiative and cross-conservation measures with number of people who agree
	50% - 75% of users are complying with regulations	2		
	Over 75% of users are complying with regulations	3		
34. Stakeholder satisfaction – Are the stakeholders satisfied with the process and outputs of the MPA?	Less than 25% of stakeholders are satisfied with the process and outputs of the MPA	0		
	25% - 50% of stakeholders are satisfied with the process and outputs of the MPA	1		
	50% - 75% of stakeholders are satisfied with the process and outputs of the MPA	2		Commonly the people are satisfied (number of people who agree divided by total participant during the community consultation) – data gathering during the survey of INCT research 2025
	Over 75% of stakeholders are satisfied with the process and outputs of the MPA	3		

Issue	Criteria	Score: Tick only one box per question	Comment/Explanation
Outcomes	**Additional points:** c. Stakeholders feel that they are able to effectively participate in management decision	+1	
	d. Stakeholders feel that they are adequately represented in the MPA decision-making processes	+1	
TOTAL for outcomes (7)			