LESSON LEARNED FROM PULAU TIOMAN MARINE PARK (PTMP)

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Abstract: The performance of a Marine Protected Areas (MPAs) can be assessed from three main dimensions, namely (1) biophysical, (2) governance, and (3) economic and social cultural. This particular study has investigated the performance of Pulau Tioman Marine Park (PTMP) from these comprehensive dimensions in aiming to gain knowledge on lessons learned from this 24 years old marine park. The PTMP is also chosen due to its progressive development and worldwide popularity as a tourist destination, which has a significant economic as well as social impact to the local community of the island. The study integrates qualitative and quantitative approaches in achieving its objectives and to enhance the rigorousness of the study. The respondents include the communities in Kg Juara, Kg Tekek, Kg Air Batang, Kg Salang, Kg Mukut, and Kg Genting/Paya. The findings of the study reveal the lessons learned from the three dimensions of performance. First, in terms of biophysical dimension, there is an urgent need for developing a focal species database, hiring qualified research officers at the island, and strictly enforcing the marine park plan, particularly on the development areas, water and sewage system. Second, from the perspective of the governance, three lessons learned has been identified. Good cooperation in monitoring and surveillance by both the JTLM and the local community, effective information dissemination, particularly on the rules and regulations, and adequacy of available resources to manage the island are considered as the key requirements. Finally, in terms of economic and social cultural dimension, the study identifies another three lessons learned. For continuous improvement efforts, the establishment of one-stop centre for development of the island, development of historical/ attraction sites, and integration of local values, beliefs, and opinion into the management plan are deemed to be beneficial to the island in the long-run. These lessons learned are hoped can be a lesson to other marine parks in managing the marine life and not to forget the people life as well for achieving sustainability development.

Keywords: Lesson Learned, Best Practices, Pulau Tioman Marine Park

INTRODUCTION

Marine Protected Area (MPA) is an area of intertidal or subtidal terrain (include overlying waters and associated flora, fauna, historical and cultural features) which has been reserved by law to protect part or all of the enclosed environment. MPA is critical for the world sustainable development efforts. The ocean is the source of food for human beings, and hence should be conserved in the long run. This effort, however, is a continually challenging goal due to various reasons. It could be due to financial, political as well as social factors. Despite these challenges, MPA needs to be effectively managed with scientific information over time. MPA should be the place for protecting marine species and habitats, conserving marine biodiversity, and restoring fisheries stocks. It is also an area for improving the economy of the local communities through the eco-tourism activities in the surrounding areas. Hence, in order to achieve these goals of MPA establishment, managing an MPA will require continuous, iterative adaptive and participatory processes from all angles to ensure it remains relevant to the community as well as other stakeholders. The management process will usually include planning, design, implementation, monitoring, evaluation, communication and adaptation.

Pulau Tioman Marine Park (PTMP) is home to tropical rainforests, habitats and coral reefs which house a variety of critically endangered species. This ecosystem has to be sustained for future generations and its success story needs to be shared to other MPAs. Furthermore, PTMP had achieved category Level 4 for Regional Flagship Sites in ratings Coral Triangle Marine Protected Areas (CTMPAS) in 2016. This category represents the highest level of evaluation leading to regional interest involved three components namely ecological, social and governance criteria in addition to the highest level for effective management. This paper discussed the insight of three (3) dimensions from The International Union for Conservation of Nature (IUCN) published guidebook of natural and social indicators for assessing the effectiveness of management of MPA entitled “How your MPA is doing”. The guidebook, as a matter of fact, has highlighted three main dimensions that need to be seriously taken into consideration by the MPA manager. Those three dimensions include the biophysical indicators, the social-economic indicators, and the governance indicators. The biophysical indicators measure the biophysical conditions of the ocean and costs, which include the biotic, abiotic and aerial dimensions. The socio-economic indicators, on the other hand, concern with the social, cultural, economic and political factors. Meanwhile, the governance indicators are related to the management of the park. They measure how effective the available resources (input) used by the park managers. Resource governance would involve local, state, national and international stakeholders. These indicators measure how the MPAs affect and affected by the people or stakeholders of the marine park.

Biophysical Dimension

MPAs are considered as a main tool for conserving the bio-physical conditions of our oceans and coast. Therefore, there should be an indicator to measure these conditions. IUCN has listed ten (10) biophysical indicators which include biotic, abiotic and aerial. Among the ten (10) indicators, six (6) indicators are (B1, B2, B3, B4, B6, and B8) used to measure how much 'inventory' is reserved and available, while the other four (4) indicators (B5, B7, B9, and B10) are used to examine the level of 'income' that may be affected the MPA. IUCN has defined the 10 indicators in biophysical as:

- B1: Focal species abundance
- B2: Focal species population structure
- B3: Habitat distribution and complexity
- B4: Composition and structure of the community
- B5: Recruitment success within the community
- B6: Food web integrity
- B7: Type, level and return on fishing effort
- B8: Water quality
- B9: Area showing sign of recovery
- B10: Area under no or reduced human impact

Governance Dimension

The management effectiveness refers to as the assessment of how well a protected area is being managed by the MPA manager, primarily the extent to which it is protecting values and achieving goals and objectives. IUCN has developed a framework for assessing management effectiveness, which has been widely applied around the world to develop specific assessment systems designed to meet the need to evaluate management effectiveness in different circumstances. The IUCN framework which used by this study has 16 indicators. These 16 indicators, in fact, can be grouped in those nine (9) dimensions of Management Effectiveness Assessment Tool (MEAT). Table 1 shows the integration of the two frameworks.

Socio-economic Dimension

The establishment of MPAs always put forward the conserving and protecting ecosystems and biodiversity for future generations' benefits. Beside biophysical and governance perspective in managing the MPAs, the key factors that will shape the development and management are related with the economic, politics and socio-cultural in the surrounding area. Thus, MPAs with inhabitants as PTMP will affect the people and also affected by them. IUCN through Pomeroy, Parks & Watson (2004) has listed 16 socio-economic indicators to allow MPA managers to incorporate and monitor stakeholder group concerns and interest into the management process, determine the impacts of management decisions on the stakeholders, and demonstrate the value of the MPA to the public and decision makers. This study employed socio-economic indicators that been designed as a guideline to evaluate the performance of PTMP and further identified the lesson could be learned by other MPAs particularly in Malaysia. The 16 socio-economic indicators are listed as in Table 2.

Table 1: Integration of the IUCN framework and MEAT

No	Governance Indicators (IUCN)	MEAT
G1	Level of resource conflict	NA
G2	Existence of a decision-making and management body	Management Body
G3	Existence and adoption of a management plan	Management Plan
G4	Local understanding of MPA rules and regulations	Community Participation, Legal Instrument and CEPA
G5	Existence and adequacy of enabling legislation	Legal Instrument
G6	Availability and allocation of MPA administrative resources	Financing
G7	Existence and application of scientific research and input	Monitoring & Evaluation
G8	Existence and activity level of community organization	Community Participation
G11	Level of training provided to stakeholders in participation	CEPA and Community Participation
G12	Level of stakeholders participation and satisfaction in management process and activities	Community Participation
G13	Level of stakeholder involvement in surveillance, monitoring, and enforcement	Community Participation
G14	Clearly defined enforcement procedures	Enforcement
G15	Enforcement coverage	Enforcement
G16	Degree of information dissemination to encourage stakeholder	CEPA

	compliance	

Table 2: List of Possible Socio-Economic Indicators Related to MPA Goals

SOCIO-ECONOMIC INDICATORS	
S1	Local marine resource use patterns
S2	Local values and beliefs about marine resources
S3	Level of understanding of human impacts on resources
S4	Perceptions of seafood availability
S5	Perceptions of local resource harvest
S6	Perceptions of non-market and non-use value
S7	Material style of life
S8	Quality of human health
S9	Household income distribution by source
S10	Household occupational structure
S11	Community infrastructure and business
S12	Number and nature of markets
S13	Stakeholder knowledge of natural history
S14	Distribution of formal knowledge to community
S15	Percentage of stakeholder group in leadership positions
S16	Changes in conditions of ancestral and historical sites/ features/ monuments

(Source: Pomeroy, Parks &Watson, 2004)

METHODOLOGY

Research Process

This study employed three phases (phase 1: idea generation and instrument development, phase 2: data collection, phase 3: data analysis and report writing) in completing the research process for PTMP lesson learned study starting from May 2017 until December 2017. We used hybrid approach which integrates qualitative and quantitative methods in gathering the insight information from relevant stakeholders using a well design interview questions, primary data through field survey with structured questionnaire and comparative analysis with other marine parks. The quantitative and qualitative methods, as almost all data-collection methods have some biases. Collecting data through the multi-method approach and from multiple sources lends breadth and rigor to the present study. In addition, literature review was conducted on previous studies in PTMP and other MPAs.

There are four (4) instruments developed for this study, as follow:

1. A designed comparative instrument based on a set of good practices from several well-known marine parks.
2. Structured interview question for JTLM:
    i. JTLM Pulau Tioman
    ii. JTLM Putrajaya
3. Structured interview question for six group of stakeholder:
    i. Police
    ii. School
    iii. Clinic
    iv. Ketua Kampung
    v. Association Representative
    vi. Tioman Development Authority (TDA)
4. Survey questions distributed to local community at six villages:
    i. Kampung Tekek
    ii. Kampung Air Batang
    iii. Kampung Salang
    iv. Kampung Juara
    v. Kampung Mukut
    vi. Kampung Genting

The items contain for survey questionnaires are mostly related to socio-economic perspective and a few captured on the perspective of biophysical and governance. Meanwhile, structured interview questions focused mainly on biophysical and governance issues. In order to develop this instrument, three workshops have been set up from the beginning of this study. The research process for this study is illustrated in Figure 1.

Data Collection Process

An on-site data collection on PTMP was conducted during school holiday in August 2017. There are three approaches carried out in getting the insightful information; which are through:

1) Structural interview
   Within four days, this study manages to conduct few interviews as in Table 3.

2) Survey
   The second approach is a survey through a set of questionnaire that has been distributed to the local community of PTMP which scattered around six main villages. These villages are Kampung Tekek, Kampung Air Batang, Kampung Paya & Genting, Kampung Juara, Kampung Salang and Kampung Mukut. Total number of PTMP local community is 3,314 residents (TDA, 2015). There is no increasing in terms of number of the population since 2012. A total of 400 set of questionnaire were distributed to the list of the population obtained from TDA which been stratified according to six villages. Table 4 listed the survey respond according to these six villages.

3) Observations
   Observations have been done on PTMP during the visit from 25th August 2017 until 28th August 2017.

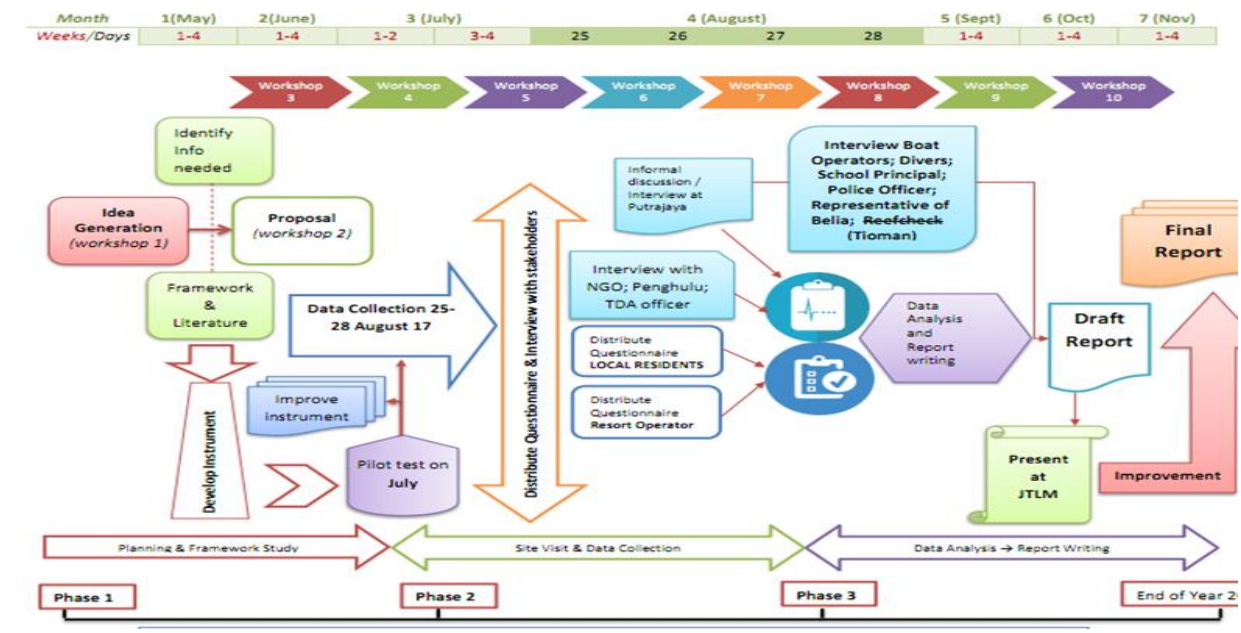

Figure 1: Research Process

FINDINGS

Below are finding for lesson learned according to three dimensions:

Lesson Learned from Biophysical Dimensions

i. The development of focal species database in PTMP

A database that keeps all the information regarding the focal species in PTMP is much needed for fulfilling the purpose of PTMP. Seven different focal species types that have been identified in Section 2.1 can be used as a guideline for producing a list of potential focal species in PTMP. By having a list of focal species many efforts can be done in order to fully utilized PTMP especially in serving as part of food security function for local and surrounding communities. Any corrective measures and restoration efforts also can be made by having this database of focal species. These measures and efforts have been addressed in Introduction under indicators B1 to B6.

ii. Qualified research officers stationed in PTMP

Qualified research officers are believed to be important for monitoring and controlling researches by the private parties and any other agencies that will be conduct in PTMP. The officers also functioning for analyzing findings from the researches and reporting them to management of PTMP for further actions. At the same time, these officers are responsible for focal species database mentioned above.

iii. Plan for development areas, water and sewage system

PTMP has significant areas of permanent forest that are still no or reduced human impact. A proper plan for development should have in place for maintaining the flora and fauna in PTMP. It is also important for areas that have damaged due to human or natural effects to recovery. In term of water and sewage system, much more work needed to be done in order to protect organisms in the sea since all the sewage systems are connected to the rivers.

Table 3: List of Conducted Interview

Day	Stakeholders	Topic/Issue	Place
1 - morning	JTLM staff 1) En Anuar		Tanjung Gemuk Jetty
2 - morning	JTLM Staff 1) 2) 3) 4)	1) Biophysical 2) Governance	Tioman Island Marine Park Office
2 - morning	1) Nazri 2) Boat Operator -Fatin 3) Hafaz – PIBG , PPK		Air Batang Village
2 - morning	1) Tok Wan – pengurus 2) Diver 3) nelayan		Tekek Village
2 - evening	1) TDA officer 2) Salang ex-village head		Tioman Development Authority Office
3 - morning until evening	Juara Village representative 1) Ketua Kg 2)Tok Imam		Juara Village
	Salang Village representative 1) bekas ketua kampung 2)Imam surau 3) Pakcik Maulana – old citizen		Salang Village
	Genting Village representative 1) Hj Azman - KK 2) Imam Masjid		Genting Village
	Mukut Village representative 1) SU JKKK 2) Imam		Mukut Village
4 - morning until evening	Government agencies 1) Police - Sarjan 2) Clinic - MO 3) School - Cikgu		Tekek Village
	Community representative 1) Ketua Belia Kg Mukut Selatan		Tekek Village
	1) Pengusaha Scuba		Air Batang Village
	1) Penghulu assistance (jawatan sambilan) 2) TDA officer	Secondary data gathering	1) Penghulu Office 2) TDA Office

Table 4: Survey Responds According to Tioman Six Main Villages

Area (name of village)	Total House	Total residents	Disproportionate Stratified Sampling	Sample size respond
Kampung Tekek	421	1866	100	69
Kampung Air Batang	34	226	100	39
Kampung Salang	40	279	50	17
Kampung Paya & Genting	86	435	50	15
Kampung Mukut	46	225	50	43
Kampung Juara	70	283	50	30
TOTAL	705	3314	400	213

Lesson Learned from Governance Dimensions

iv. Good monitoring and surveillance by JTLM and community

From the perspective of the JTLM, the stakeholders are encouraged to participate in managing the PTMP. In general, user participation in surveillance, monitoring and enforcement of coastal areas is improved in PTMP. For example, the involvement of local community are considerably high in observing and investigating activities such as commercial fishing, recreational fishing, traditional fishing methods, tourism, boating and any other activities in zoning areas.

v. Excellent in information dissemination on rules and regulations

The best action of management plan in term of laws and regulations can bring together all level of shareholders or authorities needs to be implemented. In PTMP, there are various available authorities to govern the island such as Tioman Development Authority (TDA), Jabatan Alam Sekitar (JAS), Jabatan Perairan dan Saliran (JPS_ and etc. From the perspective of local community, they are satisfied in terms of information dissemination on the rules and regulations of the marine park by the authority specifically by TDA. Moreover, the existence of rules and regulations of PTMP are generally adequate and well in place scattered around the Tioman Island.

vi. Inadequate resources in term of staff, financial and equipment

Human and financial resources are obligatory and required to carry out the management plan effectively particularly in terms of its enforcement in PTMP. Enforcement also requires a significant fund such as fuel and other maintenance costs of the ships and equipment. Consequently, increasing enforcement activities needs extra allocation for overtime payment while additional staff at the island will incur higher cost in terms of compensation. Thus, in order for realizing the effectiveness of management plan, it's important to JTLM to enhance and optimize their resources specifically staff and equipment.

Lesson Learned from Socio-Economic Dimensions

vii. The establishment of centered development authority specifically for PTMP.

Pulau Tioman as a marine park is managed by JTLM. However, the management in terms of physical development in the island and socio-economic growth of the local community is administered and govern by Tioman Development Auhority (TDA). TDA plays a main role in implementing local government functional. Therefore, PTMP is under a proper and systematic planning. The existence of TDA is an opportunity for MPA management to be more focused in their main task in conserving the biodiversity. However, to increase the local community understanding on how the natural ecosystem works, and take action to protect the MPA, a synergy approach between JTLM and TDA is indeed important to boost the growth and development in Tioman Island.

viii. The sustainable heritage development of historical / attractions site

It is seems that PTMP attraction is not only dependent on its oceanic inventories but the island itself. The historical site in PTMP is in a decent attention by the villagers and responsible authorities. For instance, the five (5) kilometers Dragon Horn Trail, a trail for hikers to Gunung Semukut at Kampung Semukut had been preserved and in a good condition had attracted many local and foreign tourists to visit PTMP. Not only physical trail is in good maintenance but along the side walk the natural beauty of flora and fauna is preserved. Besides this many other walking trails either the old trail or newly made that connecting many villages will also becoming new attraction to PTMP. The local community gains benefit by serving as tourist guides and incidentally from a variety of tourism activities.

ix. Local values, beliefs and opinion are integrated in the action management plan.

The best action management plans if it can bring together all level of stakeholders needs to be developed and implemented. To the local community, consideration of their cultural values, beliefs and their opinion are an important part of PTMP management plan. The actions took by the authorities reflecting their voices are heard. Majority of the local community are Malay and Muslim. For example, the old folk are worried that the young generations are openly expose to the consumption of liquor and cannot prevent themselves for its addiction after PTMP imposed liquor duty free. However, school education is very vital in supporting any conflicting issues including conservation of ecosystems and biodiversity. At the moment, Sekolah Kebangsaan Tekek is the best platform in educating young generations to be responsible to their homeland. It can be seen when they inform their own parents to protect the coral and marine species of PTMP. Thus, this is an opportunity to MPA management specifically JTLM to work with teachers and students by doing a series of well-designed programs regularly in educating them to become a knowledgeable and responsible community.

CONCLUSIONS

This study review lesson learned from PTMP which are related to National Policy on Biological Diversity 2016-2025 (NPBD 2016-2025). The lessons learned of PTMP in terms of biophysical perspective, governance and socio-economic are found to be aligned with the goals and targets of the NPBD 2016-2025. In other words, in the case of PTMP, the JTLM has successfully taken necessary initiatives to achieve the national biodiversity goals. Lesson learned (vi), however, has been perceived to negatively relate to the national biodiversity goal. In fact, increasing the fund for conservation effort is a challenging goal to be achieved due to availability of limited

resources in the JTLM. The goal to increase the protected areas depends heavily on the financial as well as human resources. Hence, further actions should be strengthened to search for alternative sources of funds for conservation effort in the long run.

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