



MANAGEMENT EFFECTIVENESS EVALUATION OF MARINE PROTECTED AREAS IN VIETNAM

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Abstract

By 2020, Vietnam have established 11 Marine Protected Areas (MPAs) although planned to have 16 MPAs by 2020 according to Prime Minister Decision No.472 dated May 26th 2010. This paper attempts to provide an overview of the current progress of Marine Protected Areas (MPAs) in Vietnam using a combined quantitative and qualitative evaluation methodology. A cross analysis and evaluation of 8 MPAs was performed using a score - card survey where MPAs were scored by 44 indicators in a framework recommended by the IUCN - WCPA. The research was carried out at the national and local levels of coastal governance and employed various data collection methodologies including in - depth interviews, field observations, electronic survey and secondary data mining. To further confirm the evaluation results, a study of project stakeholders' perceptions on the factors affecting the management effectiveness and sustainability of MPAs was conducted. Strong correlations between the results from the theory - based evaluations and the perception study were discovered. The most significant factors identified to improve MPA effectiveness include political will, sustainable financing, coordination mechanism, socio - economic contribution and obvious outcome.

Keywords: Marine protected area; Management effectiveness; The theory - based evaluation.

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1. Introduction

There were 118 MPAs in the world initially in 1970 increasing steadily to 430 MPAs by 1985 (Kelleher & Kenchington, 1992) [6]. By 2006, the number multiplied tenfold to 4,435 MPAs either statutorily or non - statutorily declared at both, national and local levels. However, this represented only 0.65 % of the world's oceans and

1.6 % of the total marine area within exclusive economic zones (Wood et al., 2008) [17]. In October 2010, a target of 10 per cent of coastal and marine areas to be conserved by 2020 was established in the 10th meeting of the Conference of the Parties for the Convention on Biological Diversity (COP 10) in Nagoya, Japan. The 4th International Marine Protected Areas Congress (IMPAC 4) in 2017 has

reviewed that at present, there are more than 15,000 marine protected areas (MPAs) around the world cover roughly 7 % of the world's marine environment (Lubchenco and Grorud - Colvert, 2015; UNEP-WCMC IUCN, 2017) [9, 15].

Driven by the common commitment to global marine conservation targets, the application of MPAs was introduced to Vietnam since 1999 (Thong, 2010) [12]. In June 2010, the Government of Vietnam finally approve the Master Plan for MPAs to 2015 and vision to 2020, with a total of 16 MPAs by 2020. Although there are still many challenges and obstacles to MPAs, according to Vietnam IUCN and DOFI (2019), Vietnam's MPA system has been strengthened and showed significant and obvious results that urge the government to further support and invest in the system. However, there has been very few documented comprehensive evaluation of MPA implementation in Vietnam to assess and identify the success and failure factors as well as the effectiveness of implementing an MPA network in Vietnam. This paper aims to analyze and assess the performance of MPA in Vietnam; identify the success and failure factors attributing to the effectiveness of MPA in Vietnam and formulate recommendations that enhance MPAs effectiveness.

2. Methodology

2.1. MPA Evaluation Method

A number of methodologies and indicators have been developed at different levels to assess the management effectiveness of protected areas (Corrales, 2004; Hockings et al., 2006; Leverington et al., 2008; Pomeroy et al., 2004; Staub & Hatziolos, 2004) [2, 3, 7, 10, 11]. The first published material on protected area

management evaluation was in Venezuela (Blanco & Gabaldon, 1992) [1].

The Framework and guidelines for assessing the management of protected areas was first published by IUCN - WCPA in 2000 (Hockings et al. 2000) [4] and then revised in 2006 (Hockings et al. 2006) [3]. The central idea of the Framework is that protected area management follows a cyclical process with six distinct stages, or elements (Fig. 1). Thus, an evaluation that individually assessed each of the elements and collectively evaluated the links between them will provide a comprehensive measurement of the management effectiveness. One of the most important advantages of the Framework is that it enables the use of a similar evaluation approach with a proven common set of criteria to evaluate and compare different projects or programs (Leverington et al., 2010) [8].

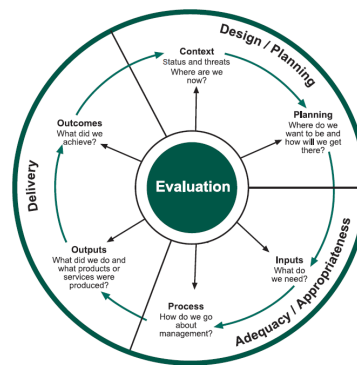


Figure 1: The framework for assessing management effectiveness of protected areas [3]

Since the first publication of a draft of this Framework in 1997, it has been used to develop specific management effectiveness evaluation methodologies, which are being applied extensively around the world. Leverington et al. (2010) [8] conducted a review of cross-analysis of data from various evaluation methodologies using a set of indicators.

One of their conclusions is that the most useful evaluation approach is to organise indicators according to the framework elements (cyclical process). Accordingly, they designed a “bottom - up” compilation of “headline indicators”, which was derived from reviewing over 2000 questions and indicators from more than 40 different protected area management effectiveness evaluation methodologies. Each of the “headline indicators” was then scored and added up. The total score reflects the overall effectiveness of the protected area. Similarly, Staub & Hatzios (2004) [11] adopted a scorecard approach to evaluate the effectiveness of marine protected areas. The scorecard

adopts different questions for MPA managers to score each of the “headline indicators” throughout the cyclical process of management.

For the purpose of this research, a score - card framework for theory - based evaluation of MPA effectiveness combining both proposed approaches by Leverington et al. (2010) and Staub and Hatzios (2004) [8, 11] was applied to evaluate the effectiveness of MPAs in Vietnam. Proposed indicators were synthesized and the most appropriate to the local context of Vietnam ones were chosen. Each indicator was scored using a scorecard with questions relevant to it. The selected criteria are listed in Table 1.

Table 1. Indicators for MPA effectiveness

Criteria of effectiveness (C)		Effectiveness Indicators (EI)
Context		
Criteria 1: Legal status	1	Park gazette
	2	MPA regulations and mechanism for controlling inappropriate activities
	3	Support by political and civil environment
Criteria 2: Integration	4	Integration of the MPA in a larger coastal management plan
Planning		
Criteria 3: Management planning	5	Marine protected area objectives agreed
	6	Management plan exist
	7	The planning process involves stakeholder
	8	The socioeconomic impacts of decisions are considered in the planning process
	9	Periodic review and updating of the management plan
	10	Management plan is tied to the development and enforcement of regulations
Input		
Criteria 4: Management resources	11	Adequacy of staff numbers
	12	Adequacy of staff on marine conservation
	13	Adequacy of infrastructure, equipment and facilities
	14	Adequacy of funding
	15	External funding from NGO contributions, taxes, fees, etc
	16	Additional support from volunteer programs, local communities, etc
Criteria 5: Information base	17	Adequacy of relevant, available information for management
	18	Adequate program of research
Process		

Criteria of effectiveness (C)	Effectiveness Indicators (EI)	
Criteria 6: Capacity Building	19	Staff/ other management partners skill/knowledge level up
	20	Adequacy of staff training
	21	Awareness raising for local government authority
Criteria 7: Stakeholder involvement	22	Communication platform between stakeholders and managers
	23	Education and awareness program
	24	Stakeholders involve actively in MPA activities
	25	Stakeholder awareness and concern about marine resource conditions and threats
Criteria 8: Benefit sharing	26	Clear financial contributions agreements between MPA and local community
Criteria 9: Co - ordination	27	Productive working relationship through clear coordinating mechanism
	28	Maintains information sharing platform
Criteria 10: Law enforcement	29	Adequacy of law enforcement capacity
Criteria 11: Monitoring and Evaluation (M&E) is effective	30	Clear and adequate M&E framework
	31	M&E is used effectively throughout implementation
Output		
Criteria 12: Achievement of work program	32	Achievement of management plan
	33	Results and outputs have been produced obviously
Outcome		
Criteria 13: Conservation outcome	34	Proportion of conservation objectives achieved
	35	Have threats been reduced
	36	Resource conditions improved
	37	Resource use conflicts have been reduced
	38	Compliance
Criteria 14: Community outcome	39	Stakeholder satisfaction with the process and outputs of the MPA
	40	Community welfare improved
	41	Community environmental awareness improved
Criteria 15: Governance	42	Political support increase
	43	Local government utilize sufficient local budget for MPA
	44	Fee mechanism for tourism formulated

Each MPA was scored using the evaluation sheets comprising of all criteria and corresponding effectiveness indicators (EFs). Scores were based on a 0, 0.5 and 1 rating system that reflected an MPA's application of the indicator and its performance of that indicator (desired/undesired). Where an indicator was not applicable to an MPA, no score was given. The scoring system is as follows:

- “0”: No application of the indicator; poor/undesired impacts of actions overall
- “0.5”: Application of the indicator was average overall; desired and undesired impacts were balanced overall
- “1”: Strong application of the indicator; positive overall performance with impacts in the desired direction

As the mean scores are based on indicators rated between zero and one, they

reflect a continuum from “no management at all” to “high management standards”. As shown in Figure 2, the lowest third of this continuum (below 0.33) means that overall MPA management is clearly inadequate. Scores between 0.33 and 0.67 indicate that while basic management is in place, considerable improvement is still needed. As most scores fall in this category, this is further split into those

between 0.33 and 0.5 (basic but with major deficiencies) and those between 0.5 and 0.67. Generally, a “sound” level of management would begin at a score of around two - thirds (0.67). Scores above this mean that the area is being managed relatively well.

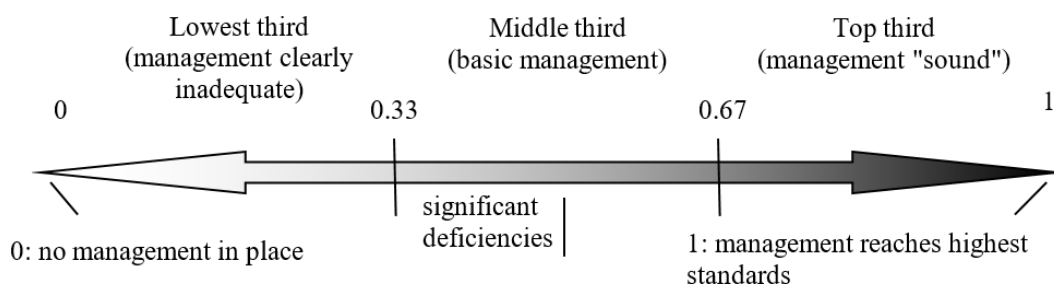


Figure 2: Rating system for MPA management (adapted from Leverington et al., 2010 [8])

2.2. Study areas

Of the 11 MPAs established, the Bach Long Vi, Ly Son and Co To sites were established recently and had insufficient data to be assessed. The remaining 8 MPAs will be evaluated using an electronic score - card survey to provide an extensive overview. The details of 8 sites are summarized in Table 2.

Table 2. Summary of MPAs selected for evaluation

Name of MPA	Year of establishment	Support of establishment	Implementation by	Total area (ha)**	Sea area (ha) **
Cat Ba * (MPA1)	1986	MARD	DARD	16,196	9,800
Con Dao* (MPA2)	1993	MARD	Provincial People's Committee	19,998	14,000
Hon Mun (MPA3)	2001	DANIDA/IUCN	Provincial People's Committee	16,000	12,000
Nui Chua* (MPA4)	2003	DANIDA/IUCN	Provincial People's Committee	29,865	7,352
Cu Lao Cham (MPA5)	2005	DANIDA/IUCN	City People's Committee	5,175	1,544
Phu Quoc (MPA6)	2007	DANIDA/IUCN	DARD	26,863	18,700
Con Co (MPA7)	2009	DANIDA/IUCN	DARD	5,532	2,140
Hon Cau (MPA8)	2011	DANIDA/IUCN	DARD	12,500	12,390

* National Park having marine component;

** According to Prime Minister Decision No. 472 dated May 26th 2010.

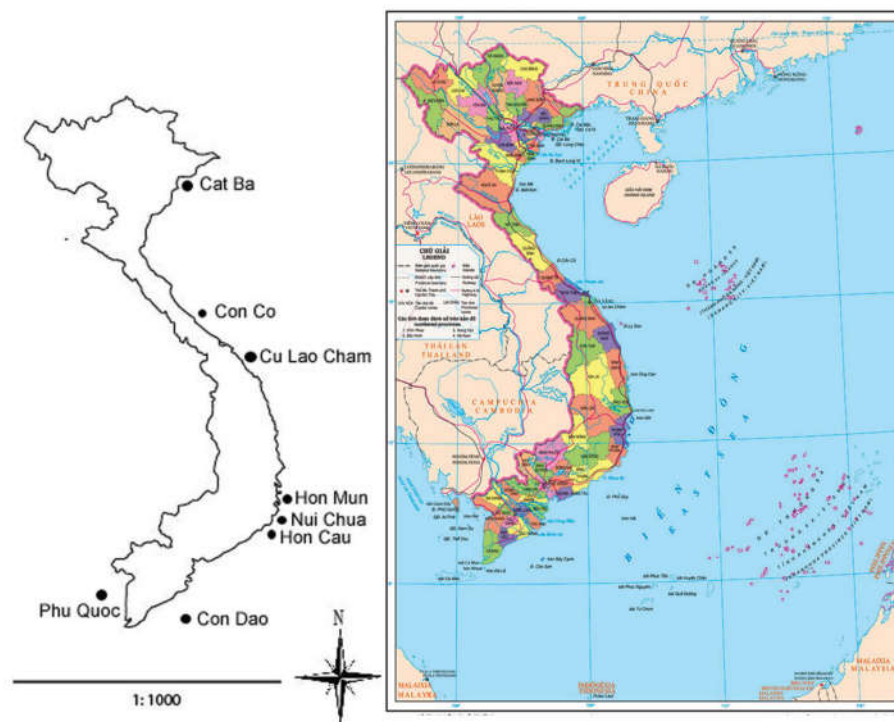


Figure 3: Map of selected MPAs

2.3. Methodology of local perception study

Together with the MPA scorecard, questionnaires on incentives for MPA effectiveness were also sent to all established MPAs in Vietnam. IUCN officer and MPA experts from DOFI and University of Natural Sciences were also interviewed and contributed their opinions. The respondents

were asked to rank different factors of 5 incentives contributing to the effectiveness of MPAs in Vietnam (Tab. 3). These are economic incentives, interpretative incentives, knowledge incentives, legal incentives and participative incentives (Jones and De Santo, 2011) [5]. The score ranges from 1 to 10 (1: least important; 10: most important).

Table 3. List of incentives to be ranked

Incentives	Effectiveness Factor
Economic incentives	1. Socio - economic contribution
	2. Sustainable financing
Interpretative incentives	3. Education and awareness raising activities
	4. Obvious outcome to demonstrate effective investment
Knowledge incentives	5. Capacity building for staff
	6. Strong research
Legal incentives	7. Strong co - ordination mechanism/integrated management
	8. Political will
Participative incentives	9. Stakeholder involvement
	10. Benefit sharing

3. Results and discussions

3.1. Effectiveness of MPA reflected by score - card evaluation

3.1.1. How effective is MPA management?

On balance, MPA management in Vietnam achieved the basic standard of management, with no score lower than the 0.33 mark. The arithmetic mean score is 0.54, out of a maximum of one. Scores for individual protected areas measured vary from 0.37 to 0.76. The top three strong performing MPAs are Cu Lao Cham, Cat Ba and Con Dao with two of them being National Parks with marine components. The fact that all of the MPAs are scored above the “inadequate” zone is a positive indication of the effectiveness of Vietnam’s MPA system. The least effective MPA is Hon Cau. This is the

newest MPA among the 8 selected for analysis and it is comprehensible that its degree of achievements is comparatively lower than that of the others.

It is important to note that MPA1 (Cat Ba) and MPA2 (Con Dao) are located in the provinces where Integrated Coastal Management (ICM) performed relatively fair as analysed by Tran and Chou (2019) [14]. The other 5 less effective MPAs are located in areas where there is either no ICM initiative or the ICM initiative is managed by the government, which was analysed to perform relatively poor (Tran and Chou, 2019) [14]. However, there is one exceptional case of MPA5 Cu Lao Cham. It is located in Quang Nam where ICM performance was evaluated to be very low, yet its MPA has a very high performance score (0.71).

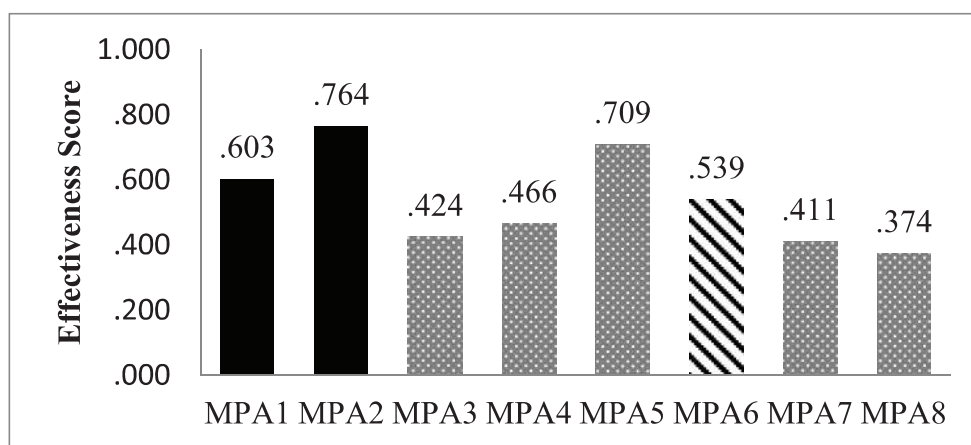


Figure 4: Overall effectiveness of MPAs in Vietnam

(Mean 0.54; St. Dev 0.14; Min 0.37; Median 0.50; Max 0.76)

(Colours are used to indicate associated ICM: black is “Bilateral ICM”, dotted is “Government Initiatives ICM” and striped is “No ICM”)

3.1.2. How did the criteria of management perform?

The strength and weakness of each criterion of effectiveness across the MPA sites are illustrated in Figure 5.

The scores of each criterion for effectiveness (C1 - C14) ranged from 0 (C2: Integration) to 0.75 (C1: Legal status). The top 5 and bottom 5 criteria are summarized in Table 4.

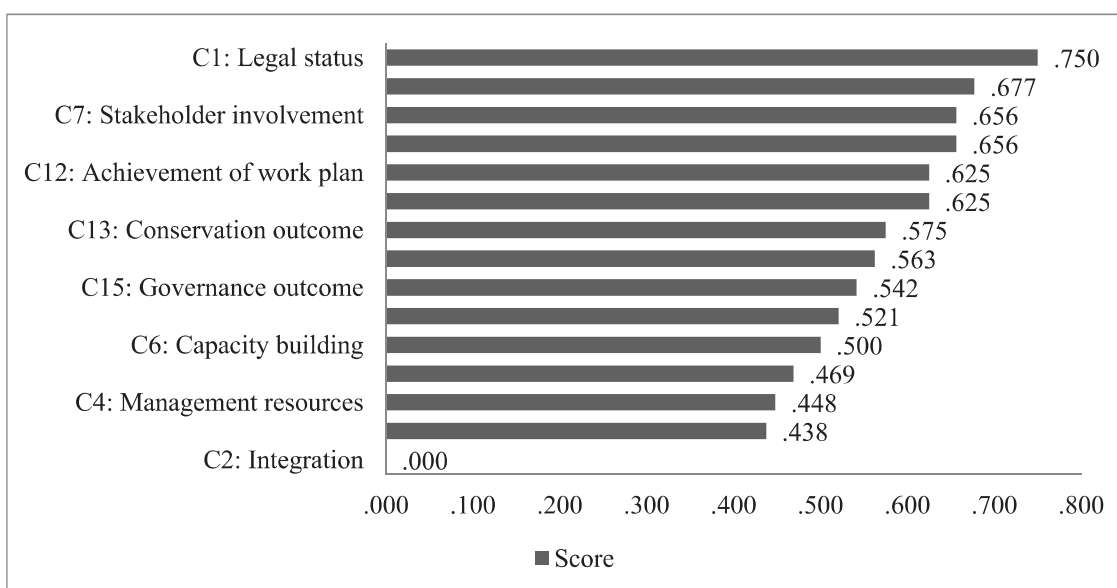


Figure 5: Average scores of criteria of effectiveness across all MPA sites

Table 4. Five highest and five lowest scored criteria of effectiveness

Top 5 (in descending order)	Bottom 5 (in descending order)
C1: Legal status	C6: Capacity building
C3: Management planning	C11: M&E
C5: Information base	C4: Management resources
C7: Stakeholder involvement	C8: Benefit sharing
C10: Law enforcement	C2: Integration

Accordingly, MPAs in Vietnam are assessed to have strong legal status, good management planning, adequate stakeholder involvement, sufficient database for management and generally good achievement of their work plan. However, MPAs are all not assimilated into a larger context of integrated management. Management resources including budget, facility and staff capacity are insufficient and inadequate. The benefit sharing has not been adequately formulated or materialized. Capacity building and M&E activities are not sufficient.

3.1.3. Which indicators of management are the most effective?

The top 8 best performing effectiveness indicators (EIs) are listed in Table 5. MPAs in Vietnam appear to have a strong foundation when established as

reflected by the high scores for context indicators EI5, EI1 and EI2. Each of the other elements of the WCPA framework (planning, process, input and output) contributed only 1 indicator in the top 8. All MPAs have strong management plans, regulations and mechanisms to monitor inappropriate activities. The baseline information is adequate for management. During MPA implementation, education and awareness programs are the main focus. More importantly, it seems that most of the MPAs show a positive change in resources condition which is the key objective of MPA management.

Table 5. Top eight best performing effectiveness indicators

Top 8 (in descending order)	Score	Element
EI5: Marine protected area objectives agreed	1.00	Context
EI6: Management plan exists	1.00	Planning
EI1: Park gazetted	0.88	Context
EI23: Education and awareness program presents	0.81	Process
EI2: MPA regulations and mechanism for controlling inappropriate activities	0.75	Context
EI17: Adequacy of relevant, available information for management	0.69	Input
EI33: Results and outputs have been produced obviously	0.69	Output
EI36: Resource conditions improved	0.69	Outcome

3.1.4. Which effectiveness indicators performed most poorly?

Of the nine most poorly performing indicators (Tab. 6), there are 3 from Process, 2 from Outcome, 2 from Input, 1 from Planning and 1 from Context. In implementation, MPAs in Vietnam appear to lack support from volunteer programs and the local community (EI16). It is observed that although the MPA is designed to conserve marine resources, the number of staff with marine conservation knowledge is insufficient (EI12).

During the process stage, activities to raise awareness for the local government authority (EI21) are inadequate. The lack of effective awareness raising activities may result in less political support. The

mechanism for finance distribution between beneficiaries is not clear (EI 26) and planning with low involvement of stakeholders (EI7) may lead to poor support and involvement from various stakeholders.

Although the conservation outcome is obvious, the conflict of resources is not efficiently resolved. Moreover, the local budget utilized for MPA activities, which can be assigned by the local authority is relatively modest and not sufficient to conduct MPA implementation.

All of MPAs are not under any integrated management plan (EI4). This may be one of the reasons leading to the inadequacy of resolving resource conflicts (EI37).

Table 6. Bottom nine performing effective indicators

Bottom 10 (in descending order)	Score	Element
EI7: The planning process involve stakeholder	0.44	Planning
EI26: There are clear financial distributions agreements between beneficiaries	0.44	Process
EI43: Local government utilize sufficient local budget for MPA	0.44	Outcome
EI16: There is additional support from volunteer programs, local communities	0.38	Input
EI21: Awareness raising for local government authority	0.38	Process
EI31: M&E is used effectively throughout implementation	0.38	Process
EI37: Resource use conflicts have been reduced	0.38	Outcome
EI12: Adequacy of staff on marine conservation	0.25	Input
EI4: Integration of the MPA in a larger coastal integrated management plan	0	Context

3.1.5. Which indicators are most strongly linked to effective management?

To investigate which factors of management appear to be most closely linked to the overall effectiveness, data were analysed using the Pearson's correlation coefficient. These correlations do not necessarily mean a causative link, but give an indication where the most effective MPAs are characterized by certain factors. The overall management effectiveness of MPA in Vietnam was most strongly linked to factors including

support from stakeholders, funding, adequate information for management, sufficiency of the research program, communication with stakeholders, stakeholder awareness on marine conservation, education and awareness program and last but not least, support by the local authority and community.

Among the top 10, there are 5 input indicators and 3 process indicators. This showed that input resources and implementation process are significant to the effectiveness of MPAs in Vietnam.

Table 7. Top ten indicators most strongly correlated with overall MPA performance

Effectiveness Indicator	Element	Pearson's coefficient	Performance Rank
EI16: Additional support from volunteer programs, local communities	Input	0.973	40
EI14: Adequacy of funding	Input	0.902	31
EI15: External funding from NGO contributions, taxes, fees, etc	Input	0.902	32
EI17: Adequacy of relevant, available information for management	Input	0.893	7
EI18: Adequate program of research	Input	0.881	11
EI3: Support by political and civil environment	Context	0.857	17
EI22: Communication platform between stakeholders and managers	Process	0.857	13
EI25: Stakeholder awareness and concern about marine resource conditions and threats	Process	0.857	14
EI33: Results and outputs have been produced obviously	Output	0.772	8
EI23: Education and awareness program	Process	0.764	5

3.1.6. Which criteria promote effective performance?

Table 8 highlights the strongest correlations between individual criterion and MPA overall effectiveness. It is observed that 2 input and 2 outcome criteria strongly correlated with sound project performance and effectiveness.

The results again indicated that the effectiveness of MPA in Vietnam

correlated well with adequacy of resources and database input for management. In this case, stakeholder involvement is critical to MPA effectiveness. Furthermore, it is very important that MPAs show significant outcomes with regards to governance and community improvement. These are the factors that lead to effective implementation of MPAs in Vietnam.

Table 8. Top five criteria most strongly correlated with overall MPA performance

Criterion	Element	Pearson's coefficient	Performance Rank
Criteria 4: Management resources	Input	0.957	13
Criteria 5: Information base	Input	0.914	3
Criteria 7: Stakeholder involvement	Process	0.908	4
Criteria 15: Governance	Outcome	0.848	9
Criteria 14: Community outcome	Outcome	0.846	10

3.2. Local perception of MPA effectiveness

This section explores the local perception of the MPA effectiveness in Vietnam. Local perceptions about MPA effectiveness were compared to those obtained from the empirical research in the previous section.

Figure 6 summarises the results of all perceived factors contributing to MPA

effectiveness by 12 respondents. The top 5 factors (scoring above 8) are:

- EF2: Sustainable financing
- EF8: Political will
- EF7: Strong co - ordination mechanism/integrated management
- EF1: Socio - economic contribution
- EF4: Obvious outcome to demonstrate effective investment

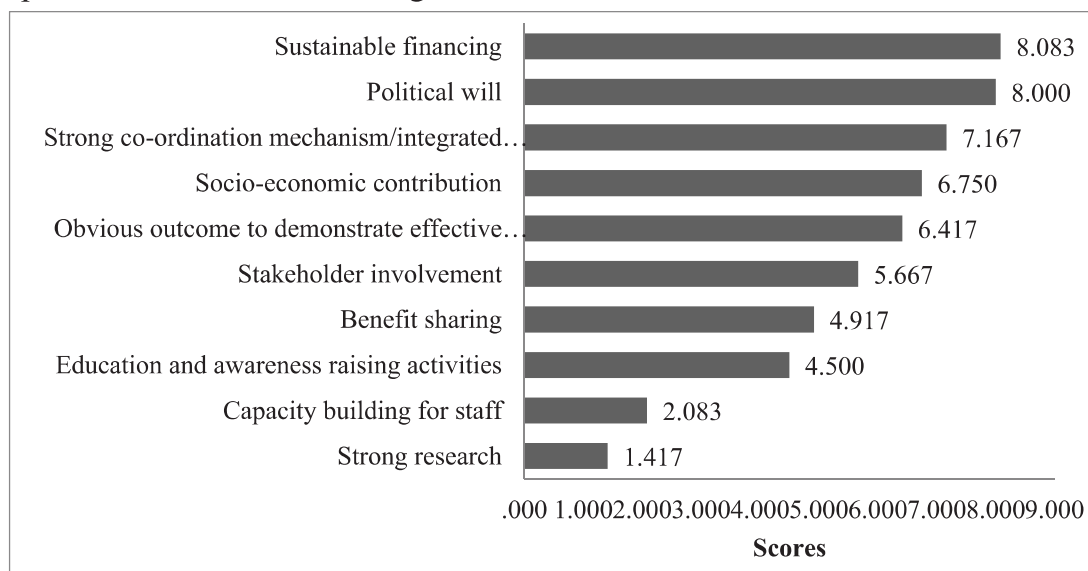


Figure 6: Ranking of effectiveness factors according to all respondents

3.3. Discussions

The statistical analysis presents a clear picture of how the MPA system has been doing in Vietnam. It shows that MPAs in Vietnam are fairly effective with the overall score of 0.54. The two National Parks with marine components performed above the average. Cu Lao Cham can be considered as a good case of MPA with the highest performance score of 0.71.

The analysis also showed that most of Vietnam's MPAs have strong legal status, adequate management plan, regulation and mechanism to monitor inappropriate activities. The baseline information is adequate for management. During MPA implementation, education and awareness programs are the main focus of many MPAs. More importantly, it seems that most of the MPAs showed a positive

change in resources condition, which is the key objective of MPAs.

However, MPAs are all not incorporated into a larger context of integrated management. Management resources (budget, facility, staff capacity) are insufficient. The benefit sharing has not been adequately formulated. Capacity building, awareness raising activity for local authorities and M & E activities are insufficient. Even though the MPA's main purpose is marine resources conservation, the number of staff with marine conservation knowledge is insufficient. MPAs in Vietnam seemed to lack support from volunteer programs and the local community. One key factor that may lead to the ineffectiveness of Vietnam MPA is insufficient financial resources from the local government and other sources to conduct MPA activities.

The statistical analysis draws out the factors which accelerate MPA effectiveness in Vietnam, including financial resources, support from local authority and community, stakeholder involvement and awareness raising activities for all types of stakeholders. More importantly, the MPA should show obvious outcome as a demonstration of effective investment of budget and effort.

Perceptions of MPA effectiveness from all respondents reflected the empirical results discussed in Section 3.1. The key factors affecting effectiveness of MPAs in Vietnam are mainly economic incentives, legal incentives and interpretative incentive. MPAs will perform better if they also address the socio - economic contribution to the local community. If MPAs show noticeable results, it will gain stronger support from the local authorities and community, which in turn, result in higher participation and co -

ordination. Respondents also recognized the importance of placing MPAs in the context of integrated management as mentioned by Cu Lao Cham MPA representative "Even (though) Cu Lao Cham shows positive effectiveness, we are facing considerable problems from the transboundary issue(s) such as freshwater discharge from river mouth, (and) water pollution from Hoi An town. It's very critical for us to be considered in an integrated coastal management mechanism".

4. Conclusions and recommendations

Overall, the MPA system in Vietnam has achieved a basic standard of management with an effectiveness score of 0.54. Out of all 8 MPAs, there are 3 sites with high scores (above 0.7). In particular, two of these have been placed in the context of broader integrated management.

Since the start, MPAs in Vietnam were established with a strong foundation of legal support, baseline study, marine regulations, stakeholder involvement and adequate management planning. Awareness raising activities for stakeholders were conducted at all MPA sites. MPA implementation showed evident results which in turn, effectively attracted support from the local authorities and community.

However, the MPA system still faces a lack of adequate financial support. A clear benefit-sharing mechanism among beneficiaries is not presented. Resource use conflict is still not being addressed. Except for some cases, MPAs have not been managed within a broader integrated context. Monitoring and evaluation are relatively weak across all MPAs. It is

also revealed that although the MPA is established for a marine conservation purpose, the MPA staff often have inadequate knowledge about marine conservation

The most critical factors contributing to MPA effectiveness are economic, legal and interpretative incentives. Among them, political will and sustainable financing are perceived to be key to MPA success. MPAs should contribute to the welfare of the community in order to be kept sustained. The clarity of MPA achievements is an encouraging factor that may lead to more support from local authorities and the community.

MPA implementation in Vietnam still faced the limitations of transboundary issues and resource usage conflicts. MPAs managed in isolation from the surroundings and without wide collaboration from a broad range of stakeholders will not achieve complete and sustainable success. Therefore, MPA implementation in Vietnam can be further improved by following an integrated management approach and incorporating into a bigger picture of spatial marine planning strategy for Vietnam.

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