Governability of marine protected areas: The effect of trade-offs, hybrid patterns, and policy implications in Cenderawasih Bay National Park, Indonesia

R Bawole¹, F Yulianda², D G Bengen³, A Fahrudin², Mudjirahayu⁴

¹Marine Science Department, Papua University, Manokwari, Indonesia.
²Aquatic Resource Management Department, Bogor Agricultural University, Indonesia.
³Marine Science and Technology Department, Bogor Agricultural University, Indonesia.
⁴Aquatic Resource Management Department, Papua University, Manokwari, Indonesia.

E-mail: r.bawole@unipa.ac.id

Abstract. This paper describes how to integrate and harmonize governability that is built on the dimensions of the governance system, system to be governed, and interactive governance. This form of integration often causes trade-offs between governability (interdimensional), resulting in one of the systems more likely to have a more prominent role than other systems. This condition is often overlooked in the current management activities. Harmonization between dimensions of governability is done to synergize the roles of each dimension’s attributes to achieve good governability in reaching the objectives of the management. In a hybrid pattern (an integration between governance system and systems to be governed), the interactive governance process could be achieved through an adaptive and responsive management, and monitoring and evaluation, as well as regulatory aspects and involvement of the stakeholders as prime movers of the processes in all phases of management. This is especially important for areas without explicit customary marine management traditions where the emergent nonformal institutional set-up needs to fill a particularly large void in the nonformal adaptive core within the formal MPA framework governance. In this context, even effective rules which achieve undesirable outcomes need to be examined for underlying rationales and incentives.

Keywords: cendrawasih, governability, current management

1. Introduction

Governance is defined as a process of interactions between the public and private sectors in solving social issues, and, at the same time, creating social opportunities for the people to improve their welfare [1]. Governance is also defined as a process of interactions between the governance system, the system to be governed, and interactive governance in achieving sustainable development [2, 3], and that the framework that drives coastal management activities could achieve the governance aims [4].

Good governance is not a given standard that fits for all situations [5]. Basically, they argue that the governance is good when it meets the people needs with minimum objections. Thus, good governance is a result, not the sum, of clean governance, democratic governance, and effective governance and its indicators might be different from place to place [5]. Consequently, governance approaches in protected
forest area [6] or mangrove forests [7] are not the same with those of the other protected areas, such as Marine Protected Area (MPA). Description of the substantial governance is related to the coastal and marine issues [8]. Various governance publications which are related to coastal and marine resources had been studied: analyses of governance system in MPAs [9], actors and power in mangrove management [10], environmental risk governance as an approach to stakeholder involvement [11], scientific and governance implications in the fishery system and their correlations [12], small-scale fishery governance in the coastal co-management system [13], interactions between ecological knowledge in marine governance [14]; and MPA governance in improving the quality of coral reefs [15]. These studies have provided invaluable basic information for the perusal and analysis of coastal governance and the institutional aspect. These studies have also demonstrated that the application of good governance in managing coastal resources could bring social and economic benefits, even though the long-term contribution of resource management and sustainable development is still a major source of controversy.

The practice of approach on ecosystem basis, actually acknowledges the role of social dimension very much in establishing the process of function and dynamics of ecosystem [16]. Social dimension reflects the feature of complex adaptive system, such as institution character and interaction between actors at local scale, and these phenomena affect the selective process of the community very much in establishing the social structure and dynamics [17]. At present, various concepts emerge in combining the system of human and environment, such as eco-social and socio-ecological systems which describe how important the interconnectivity between social system and ecological system [18-20]. In the past, the term socio-ecological system was used in emphasizing the concept of integration between human being and nature [21].

The importance of viewing governance is from the governance system (GS), system to be governed (SG) and interactive governance (IG) [22]. In this system, GS is viewed as the governance subject upon which the management instruments are produced, SG as the governance object that the socio-ecological system must be governed in the management purposes, and IG is the interaction process between GS and SG.

Cenderawasih Bay National Park (CBNP) as the case in this study was initially viewed in the context of ecological function protection alone. The change in real resource utilization orientation occurred when Teluk Wondama Regency was made into a new regency in 2002. Developmental growth in the CBNP area accelerated by the Teluk Wondama Regency Government and CBNP management had an impact on the varied interests in the utilization of the resources by various individuals, community groups, and other users. On the other hand, population growth, settlement growth, developments in fishery activities, and the increased marine transport activities had caused the CBNP area to be under ecological pressure which resulted in continuous resource exploitation. This could reduce the environmental quality and cause conflicts of interest in resource utilization [23, 24]. Moreover, environmental issues in the CBNP have received significant attention from local governments and international non-government organizations (NGOs). This interest has been driven by the high diversity of the region and growing concerns over the impacts of rapid escalation in development. Scientists, governments and NGOs have conducted biological, social, economic, and governance studies to support policy, conservation and sustainable development efforts in the region. This review is the first to synthesize and summarize available data, reports and scientific publications on governance [23, 25], reef fish and marine habitats [26-28] and whale shark as endangered species in the CBNP. It identifies the existing uses, and emerging and increasing threats to the region, and summarizes the governance and policies underpinning natural resource management and conservation efforts in the region.

Based on the condition and issues above, an MPA governance needs to be created that is integrated with the government’s policies and programs. In this study, CBNP as an MPA was studied from the governance perspective which is focused on GS, SG, and GI. The CBNP governance is expected to become an instrument in an ecosystem-based management to see the overlaps and gaps due to governance fragmentation. In many cases, governance activities trigger governance hybrid patterns and
trade-offs between ecological and community welfare interests (SG aspect) and institutional capacity (GS). This approach enables a study pertaining to how to realize a win-win solution in improving the management performance quality to be conducted. Therefore, this study was aimed to provide information about the changes in MPA governance approaches. The hybrid pattern and trade-offs are invaluable in improving and developing the governability of MPAs.

2. Materials and Methods

2.1. Site and data collection
The appointment of Cenderawasih Bay National Park (CBNP) as a conservation area underwent a long process. In 1990, CBNP was appointed as a Marine Nature Preserve (Minister of Forestry Decision Number 58/Kpts-II/1990). In 1990, it was declared as a National Marine Park (Minister of Forestry Declaration Number 448/Menhut VI/1990). In 1993, it was appointed as National Marine Park (Minister of Forestry Decision Number 472/Menhut-II/1993). In 2002, it was appointed as a National Marine Park covering an area of 1,453,500 Ha (Minister of Forestry Declaration Number 8009/Menhut-II/2002). This area consists of land and coast (0.9%), islands (3.8%), coral reef (5.5%), and marine waters (89.8 %) (BBTNCT 2009).

Administratively, CBNP is located in two regencies, Teluk Wondama and Nabire Regencies. The size of the area included in Teluk Wondama Regency is approximately 80% of the CBNP area which is governed using the zonation system, namely the core zone, the marine protection zone, the tourism zone, the traditional zone, and the special and general zones (figure 1).

![Figure 1. The study location of the Cenderawasih Bay National Park area.](image)

2.2. The method and indicator selection
The method and indicator selection for sustainable governance was adopted from the results of the previous study [24], which demonstrated a combination of indicators from the three governance systems (Governance System (GS), System to be Governed (SG), and Interactive Governance (IG)). From this point on, the aggregation of the stakeholders’ opinion in determining the governance performance is adopted from the results of the other study [23] that demonstrated the role of key stakeholders in Marine Protected Area governance.
2.3. Data analysis

Data was analysed using the simple multi-attribute rating technique (SMART) analysis technique. The influence between government dimensions selected from the four scenarios was analysed using the trade-off analysis. This analysis is defined as a process that considers the overall benefit of the governance strategy and explicitly determines the best governance priority [29]. Trade-off analysis (TOA) is presented by creating a graph for each for each utilization based on the decision score of the best governance’s sustainability. This analysis demonstrates a certain resource governance to be consistent or not (trade-offs) between governance dimensions.

The TOA method is a multi-criteria decision making (MCDM) analysis which was directed towards the relevance of governance sustainable decisions which were more suitable, applicable, and representative as the priority scale for the MPA governance. The priority deciding analysis of using MCDM was a weighing of alternatives and dimensions/attributes made which are arranged based on an attribute weighing matrix in determining the MPA governance priorities.

The SMART technique was used to view the influence of governance system indicators. The SMART technique was an overall process of alternative ranking and weighing of assessment indicators. This process consisted of two phases: (i) ranking the change interest levels in the attributes from the worst indicator (the lowest rank) to the best indicator (the highest rank) and (ii) making an estimation of the ratio of relative interests and the ranking of each attribute in relation to the indicator with the lowest level of interest.

The ranking was conducted by determining the dimension and indicators of the analysed data. The SMART technique analysis was applied to the measurement of governance sustainability dimensions (GS, SG, and IG). The attributes used in this analysis were the most sensitive indicators as governance sustainability leverages, and were taken from the leverage analysis results [24]. Each dimension could be developed into an attribute as an indication to view alternative governance scenarios (table 1). Alternative governability scenarios were based on the factual condition (existing), the present condition (governance improvement in done on the criteria), the ideal condition (governance components running well in reaching governance purposes), and the poor condition (governance components not running effectively in line with the governance purposes). These scenarios were designed as policy alternatives that could be taken in real conditions in the field (table 1).

| Table 1. The criteria weighing matrix for determining the MPA sustainability governance priorities. |
|---------------------------------------------------------------|
| Dimension/attribute                | Factual condition | Low governance | Moderate governance | Good governance |
| Governance System (GS)              |                   |                |                    |                 |
| Conflict between stakeholders       | 3                  | 3              | 2                   | 1               |
| Regulation enforcement & compliance | 1                  | 1              | 2                   | 3               |
| System to be Governed (SG)          |                   |                |                    |                 |
| Reef fishery                        | 2                  | 3              | 2                   | 1               |
| Economic performance indicator      | 2                  | 1              | 2                   | 3               |
| Ecosystem performance indicator     | 2                  | 1              | 2                   | 3               |
| Market development                  | 1                  | 1              | 2                   | 3               |
| Critical resource utilization       | 3                  | 3              | 2                   | 1               |
| Catch surveillance                  | 1                  | 1              | 2                   | 3               |
| Interactive Governance (IG)         |                   |                |                    |                 |
| Data and information access         | 2                  | 1              | 2                   | 3               |
| Adaptiveness and responsiveness to decisions | 2  | 1              | 2                   | 3               |
| Monitoring and evaluation process and feedback | 1 | 1              | 2                   | 3               |

\[\text{Source: Governance levels adopted from [30, 31].} \ 1 = \text{low; } 2 = \text{moderate; } 3 = \text{high.}\]
3. Results and Discussion

The results of the governance priority analysis in MPA governance were that the best governance scenario was selected and prioritized (figure 2). Enforcement and compliance to the SG dimension gave a huge contribution to governance because this attribute held a high rank among the 11 attributes used (figure 3). Next was money (monitoring and evaluation) and feedback; management that is adaptive and responsive to governance dynamics and access to data/information from the IG dimension were the governance attributes in the next rank. Another important attribute was surveillance of catch from the SG dimension. The attributes aside from the attributes mentioned previously were not considered influential in governance activities.

![Figure 2. The best alternatives for MPA sustainability governance](image)

Figure 3. Attribute contribution to the selected scenario in MPA governability (regulation compliance; adaptive and responsive management; fish and catch regulation; other; monitoring and feedback; data and information; critical resources).

3.1. The influence of trade-offs and the governance hybrid pattern.

The trade-off analysis on the MPA governance system interaction demonstrated that there was an imbalance in the governance activities (table 2 and figure 4). Nevertheless, this analysis enabled the consideration of the overall benefits of the selected governance strategy and explicitly determined the best governance priority for all parties [24, 29]. The SG and GS were seen to have more trade-off influence compared to the other systems because of their heavier relative weight. The inter-system relationship tended to be more of complement interaction; the governance systems operated alone in achieving the governance purposes. Therefore, interactive governance (IG) could be used to facilitate
the system so that the governance could suggest a win-win solution between GS and SG. Each governance dimension had attributes that were very difficult to fulfill in order to achieve the good management purposes (the effect of trade-offs). The effect of trade-offs could be an important factor in determining the success of the governance activity. This means that the interaction between various attributes proved that governance should not be approached from the SG aspect alone but also requires an understanding of the GS system (figure 5).

**Table 2.** The trade-offs influence in the governance system with the good governance scenario.

| Trade-offs reference        | Trade off influence (relative weight) |
|----------------------------|--------------------------------------|
|                            | Governance system | System to be governed | Interactive governance |
| Governance system          | -                     | -                      | -                      |
| System to be governed      | 300                   | 50                     | -                      |
| Interactive governance     | 150                   | 50                     | -                      |

Note: High relative weight percentages signify a strong trade-off effect

**Figure 4.** The trade-off effect of governance.

A hybrid pattern governance is achieved through regulations and stakeholder involvement as the locomotive in all management phases. IG could be achieved through collaborative governance and could be applied as a solution for creating a good socio-ecological system. The hybrid governance could be developed through joint control between stakeholders and could be initiated through negotiations and the development of agreements between key stakeholders [23]. In the context of hybrid governance, we stated that sometimes change in ecosystems and society is gradual or incremental. During periods of steady progress, things move forward in roughly continuous and predictable ways. At other times, change is abrupt, disorganizing, or turbulent. During such periods, experience tends to be incomplete for understanding, consequences of actions are ambiguous, and the future of system dynamics is often unclear and uncertain. Evidence points to a situation where periods of abrupt change are expected to increase in frequency, duration, and magnitude. At the same time, the capacity of ecosystems to remain within desired states in the face of abrupt change seems to have been reduced as a consequence of human actions. Vulnerable coral reef ecosystems may easily shift into undesired states in the sense of providing ecosystem services to society. The existence of such alternate regimes poses new fundamental challenges to environment and resource management.
3.2. Policy implication

The system to be governed (SG) is basically the object of the MPA governance which is a socio-ecological system [9, 25]. The overall interaction between governance systems becomes very complex and dynamic. The complexity is related to the MPA system components that are interdependent and are related to the socio-ecological system variables [25]. The MPA is the recipient and producer of various services or it could be said that the users of this area are dynamic in the time scale because it is related to the resource characteristics (varied, dynamic, and vulnerable). Then, as a natural ( ecological) system, the MPA provides various habitats and the marine organisms interact and form a food web with various coastal ecosystems in supporting the environmental capacity. Socially, the MPA consists of multifunctional activities, heterogeneous stakeholder groups with a variety of appropriate interests, values, ethics, and resolution strategies for conflicts between the area users [23]. However, the complexity and dynamics of the conditions occur at critical levels, the involvement of the stakeholders in overcoming the governance issues is a wise option as a solution to overcome many problems [30-34].

The good governance system could use synergistic interactions to eliminate the trade-off effect. Therefore, all the systems contribute with each other in producing a synergistic effect on the governance activities. This means that without the widespread public support and government participation, the management of the area could not receive policy (political) support needed to execute practical activities in the field or it could mean weak public commitment in supporting the MPA governance activities. Efforts that could be made are improving the stakeholders’ access capacity in the decision-making process so that each governance system (GS, SG, and IG) encourages the stakeholders to unite the purpose in governance activity achievements. In this case, the stakeholders could also improve their understanding of coastal ecosystem in the MPA. On the other hand, the fishery resources in the MPA could be extracted to generate as much benefit as possible for human welfare. From the governance dimension, the benefit aspect is related to economic, social, institutional, and ecological activities, causing the resource condition to become complex and management purposes difficult to achieve.

The governance system in the hybrid form has a chance to attract opportunities from the dynamics of the socio-ecological system (SG) which occur at individual, group, and institutional level (GS). Local and traditional knowledge becomes paramount and will assist in managing the unpredictable changes in the ecosystem and social level. The interaction between the GS and SG system enables the achievement of collaborative governance aims and a better, more effective governance performance.
The hybrid relationship context enables the systems to interact with one another in providing or receiving benefits in creating better conditions in the socio-ecological system. The local governance capacity building (GS) to increase the community's proactive effect could be done synergistically with both the micro and macro scale development in reducing the impact of development on the coral reef ecosystem [35].

Ignoring the socio-ecological system (SG) could also become a source of conflict among stakeholders (GS) because of the simultaneous interests of the users in utilizing the resource (fishery activities) and because it could potentially lead to social and ecological problems. The results of the analysis demonstrate that the GI dimension needs to be the main concern and must be well governed so that the operations to achieve MPA governance purposes could be fully effective.

GI could be maximized through its function in abridging the processes that occur in GS and SG. GI could be conducted through monitoring and evaluation activities and through adaptive and responsive management. In this case, the involvement of stakeholders who hold positions as key players [23] is a must to ensure the accountability of the monitoring and evaluation process. The same could be conducted if governance activities face obstacles in the field so that adjustments could be made in response to the uncertainties in program execution. Adaptive and responsive management can be seen when the CBNP Management (CBNPM), Fishery and Marine Affairs of Teluk Wondama Regency (FMATW), and NGOs could intervene with management actions against various obstacles and challenges. Conflict resolution [23] and a collaborative management mechanism [36] could be used as a reference in overcoming conflicts so that hidden (latent) conflicts do not evolve into open conflicts. The shifts in the stakeholder interest and influence map could be anticipated in order to reduce conflicts that might arise. The management’s responsiveness as a form of managerial intervention could be conducted especially on fisher groups and local wholesalers, and also on fishers from outside of the area.

It is the most decisive key stakeholder group in determining the success of the management of MPA governance (Fishery and Marine Affairs of Teluk Wondama Regency (FMATW), CBNP Management (CBNPM), park rangers, and regency office of tourism). CBNPM as the governing body has authority in the preservation and protection of biodiversity areas including issuing licenses. FMATW has the authority to issue fishery business license and fishery catching license to the public. This group of stakeholders has direct community economic empowerment programs, so its position is crucial to successful management.

In the socio-economic point of view, the coastal communities in Teluk Wondama Regency are communities that have historically been dependent on the natural resources around them (both on land and in the sea). This condition indicates that most of the communities are oriented towards an extractive economy that is subsistent [25, 26]. This situation demonstrates that the communities depend mainly on the coastal area in supporting their household economy because it is accessible and rich in resource potentials.

Economically, MPA governance is very strategic in ensuring the sustainability of the resources. The strategic interest could be seen at least from two main points, the household economic activities that generate cash based on natural resources (natural resources based activity), and at the same time have a high market value (market-based activity). This condition would cause a short time preference where each of the resource users would reap as many benefits as possible in a short period of time. As a result, a decline in both quantity and quality of the resources would be inevitable if there are no laws to regulate it. For example, if the government institution is lacking strength in both regulations and sanctions, other users could utilize resources with high economic value uncontrollably. On the other hand, if the community institution is weak, other parties (such as the government through investors) would try to utilize the resources by granting permits for fish catching and fishery businesses. This phenomenon has been observed repeatedly in Teluk Wondama Regency, especially the utilization of fishery resources in
MPA. In several cases, the fish-catching activities could be done with just permission from the owner of the traditional rights or the head of the sub-village.

The surveillance network and information system are adequate, but the socio-economic approach is weak, for example, the ecosystem value assessment and the use of benefit analysis to elaborate the planning scenario. Legislative and institutional considerations are also lacking because each sectoral administration uses its own tools and procedures. These would make it difficult for the local stakeholders (the local people/fishers) to grasp a good understanding of the MPA governance. Economic incentives are quite well-developed in a number of sectors (such as in recruitment of conservation cadres at sub-village level and sub-district level, grants in the form of detachable boat motors and fishing equipment). These activities are integrated into the planning and action plan for surveillance, monitoring, and evaluation activities.

Feedback for monitoring and evaluation activities are usually lacking. There is a common belief that the community does not need to be involved in the initial phases of planning an activity, and should only be involved later on in the final phases of the planning or even in the activity implementation. The weakness of the indicators used in quantifying the purposes in a time/place scale with the implementation of the activity was identified as the reason for the low participation rate of stakeholders in MPA governance. For instance, some environmental improvement indicators were defined as an end result which is expected to be achieved in 5 or 10 years in the National Park Governance Plan. However, there are no result benchmarks that are more concrete on how to assess the activity such as changes in behavior, institutional mechanisms, and income rate. The evaluation is also often not seen as an internal approach in the area governance performance improvement process, but it is seen merely as a control procedure.

The funding mechanism is scattered in a number of government institutions (regency/province governments), CBNPM and NGOs, and is not allocated optimally in community economic activities. This could be seen in the activities in CBNPM, NGOs and FMATW. These institutions should have different areas in the governance activity so that the performance of the governance activity could be seen as a whole, and would result in an increase in fish biomass and improved environmental conditions, and improved coastal community welfare [26]. Coordination between stakeholders in the overall action plan of the whole area would improve their effectiveness in supporting the MPA governance activities.

Adaptive management in the natural resource governance process is a learning by doing process [24, 26, 37], the process of self-organizing that emerges in an adaptive collaborative management system [38]. Adaptive management as a process where the management institutions and knowledge of ecology are tested and revised in a dynamic and continuous process in a dynamic self-organization [39]. Adaptive management combines the dynamic learning characteristic of adaptive governance and the characteristic of the relationship between cooperative management and collaborative management. Joint management pertains to the problem-solving process involved in authority division in management at organization level [40]. Adaptive management depends on a varied collaboration between stakeholders, working at different levels, often through networks of local users for regional and national organizations, and even international entities [39].

Even though many activities are executed, there is still a strong controversy about the CBNP zonation boundaries and the issue of weak coordination between user sectors. Cultivation activities are still being conducted at demonstration plot scale, so they cannot yet uphold the fisher household economy and cannot yet become an alternative productive livelihood. There are still differences in perception between planning instruments pertaining to fishing permits, especially between CBNPM and FMATW.

Problem solving is still very partial because facts demonstrate that at various phases, especially the initial phases, synchronization between action plans, institutional restructuration, and funding does not yet exist. The most common occurrence is the changes in behavior that are not evenly distributed throughout the area. In general, the community received benefits from extension activities explaining
the importance of the MPA, and the awareness to protect the coast from practices that are not environmentally friendly has grown. The use of various governance instruments (environmental education, outreaching) has opened new horizons for the local decision maker in adapting the management when they are given an opportunity to look back and compare with the achievements they have reached so far.

The bureaucrats who are accustomed to long-term planning through the top-down instrument cannot yet tolerate some changes in the purposes at the beginning of the activity implementation. Meanwhile, most of the activities in the planning phase caused an inevitable program reorientation. This was closely related to the diversity of the planning instruments (administration procedures and funding mechanisms). The lack of vision in stakeholders would delay the achievement of the MPA governance goals. As a result, more time is needed to integrate the framework in formulating a different, more collaborative planning mechanism between stakeholders. Sustainability is often the main issue as the result of the formation of a gap between stakeholders and the difference in governance instruments offered.

3.3. Authority Integration of key stakeholders

The marine area of Teluk Wandama Regency which is within CBNP and in terms of tourism is under the responsibility of Regency office of tourism. Government of Teluk Wondama Regency as an administrator, in accordance with Law No. 26/2002 (on the establishment Teluk Wondama) and Law No. 21/2001 (on special autonomy) and Law No. 23/2014 which was (local government), has the authority to run government and to manage natural resources in order to improve local community welfare.

The roles of local government authority in the activities of exploration, exploitation, conservation and utilization of marine resources, coastal and small islands are also mandated by Law No. 27/2007 (the management of coastal areas and small islands) and Law No. 31/2004 (fishery). The laws give authority to the provinces/regency/town in managing public administration, spatial planning and fishery resource management. On the other hand, the CBNP has been established under Minister of Forestry Decision No. 8009/2002 with reference to the Law No. 5/1990 (the conservation of natural resources and ecosystems). So, the CBNP region is under the authority of the central government (Ministry of Forestry) which is operationally managed by MBBBNP as a technical and operational unit in the field.

The CBNP zone mapping has been initiated since 1988 and has taken about 21 years for it to be formally adopted. CBNP zoning was assigned by the Director General of Forest Protection and Nature Conservation with Decree 121/2009 [41]. It is expected that the CBNP zoning can be an alternative direction in the area management of the CBNP as well as solution for the conflict of resource utilization among users. Further, the CBNP zoning in overall Teluk Wondama Regency has brought the Spatial Plan of Teluk Wondama into consideration as stipulated in the Local Regulation 11/2008. Although the overall zoning CBNP been equipped with the Strategic Plan up to 2029, but the strategic plan of the management; a detailed space plan, a management plan, and action plan for each zone has not been established.

Differences in perceptions and values in translating various regulations have been put CBNP management activities into difficult and complex circumstances and have caused conflict. Overlapped regulations and gap in translating the content and context of the regulations have resulted in fragmentation of CBNP management overall. In addition, conflicts of authority mainly related to the spatial arrangement of coastal and marine resource utilization (local fishing areas and the fish target commodity) have brought about poor governance of CBNP [23, 24]. The results of data analysis showed that only 36% of governance performance in which indicated that a poor governance in the management CBNP. Although at the regency level there are regulations governing resource management, including conservation (Papua special autonomy, fishery, and management of coastal areas and small islands), but CBNP institution still faces obstacles in coordination related to the use of zoning.
The weak institutions also related to the existing legislation. Under Law No. 5/1990, conservation areas including marine national park was established by the Minister of Forestry, while under Law No. 31/2004, the marine conservation areas, including national marine park are established by the Minister of Marine and Fisheries. In fact, most of the CBNP region is covered by sea waters, but the determination of the CBNP is decided by the Minister of Forestry. Implications of such determination is that the management responsibilities are given to the Ministry of Forestry Unit, namely CBNPM. On the other hand, responsibilities for the management of marine, coastal and small islands, in respect to marine and fisheries resources management are given by the Teluk Wondama Government to Marine affairs and fishery and in respect to marine tourism development (coastal, small islands, and diving) are given to Office of Tourism Affairs of Teluk Wondama. This has led to conflict in the implementation level (in the field) related to the management of the CBNP.

The results of stakeholder analysis [23] shown that the greatest threat to the integrity and preservation of protected areas is actually associated to institutions at all levels of related governmental organization (national, provincial and district). Differences in sectoral interests and different viewpoint of each institution have caused conflict in its implementation in the field. Spatial and natural resources utilization conflicts in turn become a threat to the integrity and sustainability of the conservation area.

To overcome the obstacles associated with the sectoral authority and the emergence of conflicts as a result of differences in assessing the content and context of the legislation, the integration of authority in the CBNP-Teluk Wondama Goverments can be done in the following ways:

1. Synchronization and harmonization of legislation in the form of local law or regulation. They are expected to form the basis for each user in the region. Establishment of the law should involve all components (government, communities and businessmen) and should start by conducting an academic study as the basis for consideration in drafting the regulations and in ensuring accountability of the regulation or law.

2. Optimizing the CBNP functional zones to achieve environmental benefits, social and economic balance, and sustainability.

3. Established zoning should be equipped with other follow-up management documents, such as strategic plan, detailed spatial plan, management plans and action plans for each allotment area. The existence of these documents is in line with the mandate of Law No. 26/2007 (spatial plan) and Law No. 27/2007 (the management of coastal areas and small islands) in ensuring the implementation activities in the future.

4. Teluk Wondama Regency can be formed as a regional government with the basis of integrated conservation since nearly 82% of its territory categorized as conservation area and its marine waters are within the CBNP region.

4. Conclusion

Hybrid pattern and trade-off are more affected by key stakeholders and compliance rules constructed locally. They are implemented and locally sanctioned can contribute to the quality of formal MPA governance. Non-formal emergent rules therefore need to be identified and examined. This is especially important for areas without explicit customary marine management traditions where the emergent non-formal institutional set-up needs to fill a particularly large void in the non-formal adaptive core within the formal MPA framework governance. In this context, even effective rules which are achieving undesirable outcomes need to be examined for underlying rationales and incentives. A thorough understanding of emerging local institutional patterns and an incorporation of the rationales which underlie them into the design of formal coastal management and conservation may go a long way to improve the quality of the large expansion of MPA area planned for CBNP and for other parts of Indonesia in future.
Acknowledgements

This research was funded by The Ministry of Education and Culture. We acknowledge the collaboration of the Network of Management Board of Cenderawasih Bay National Park and WWF, site project of Cenderawasih Bay National Park, Indonesia. Further thanks go to Ridwan Sala for his collaboration, as well as for the English editing. We also thank to local people and fishers who assisted in field data collection.

References

[1] Kooiman J, Bavinck M, Jentoft S and Pullin R 2005 *Fish for Life: Interactive Governance for Fisheries* (Amsterdam: Amsterdam University Press)
[2] Jentoft T S, Van Son J and Bjørkan M 2007 Marine protected areas: a governance system analysis. *Human Ecology* 35 611–622
[3] Chuenpagdee R and Jentoft S 2009 Governability assessment for fisheries and coastal systems: A reality check *Human Ecology* 37 109–120
[4] Chua T E 2006 The dynamics of integrated coastal management: practical application in the sustainable coastal development in East Asia. *Philippines: global environment facility, PEMSEA* 468
[5] Nurrochmat D R, Darusman D R and Ekayani M 2016 Kebijakan Pembangunan Kehutanan dan Lingkungan: Teori dan Implementasi (Bogor: IPB Press)
[6] Ekawati S, Kartodiharjo H, Hardjanto, Dwiprabowo H and Nurrochmat D R 2011 Proses pembuatan kebijakan pembagian kewenangan antar tingkat pemerintahan dalam pengelolaan hutan lindung dan implementasinya di tingkat Kabupaten. *J. Analisis Kebijakan Kehutanan* 8 2 132-151
[7] Kustanti A, Nugroho B, Darusman D, Nurrochmat D, Krott M and Schusser C 2014 Actor, interest and conflict in sustainable mangrove forest management - a case from Indonesia. *Int. J. of Marine Science* 4 16 150-159
[8] Cicin-Sain B and Belfiore S 2005 Linking Marine Protected Areas to Integrated Coastal and Ocean Management: A Review of Theory and Practice *Ocean and Coastal Management* 48 847–868
[9] Jentoft S 2007 Limits of governability: Institutional implications for fisheries and coastal governance *J. Marine Policy* 33 1-11
[10] Kustanti A, Nugroho B, Nurrochmat D R and Okimoto Y 2014 Evolusi hak kepemilikan dalam pengelolaan ekosistem hutan mangrove di Lampung Mangrove Center. *J. Risalah Kebijakan Pertanian dan Lingkusang* 1 45-56
[11] Benn S, Dunphy D and Martin A 2009 Governance of environmental risk: New approaches to managing stakeholder involvement. *J. of Environmental Management* 90 1567–1575
[12] Garcia S M and Charles A T 2008 Fishery systems and linkages: Implications for science and governance *J. Ocean & Coastal Management* 51 505–527
[13] Marı´n A and Berkes F 2010 Network approach for understanding small-scale fisheries governance: The case of the Chilean coastal co-management system *J. Marine Policy* 5 851-858
[14] Evans L S 2010 Ecological knowledge interactions in marine governance in Kenya *J. Ocean and Coastal Management* 16 1-22
[15] Christie P P and White A T 2007 Best practices for improved governance of coral reef marine protected areas *J. Coral Reefs* 26 1047–1056
[16] Dale D H, Brown S, Haeuber R A, Hobbs N T and Hnulty N 2000 Ecological principles and guidelines for managing the use of land *J. Ecological Applications* 107 639–670
[17] Lansing J S 2003 Complex adaptive systems *J. Annual Review of Anthropology* 32 183–204
[18] Waltner-Toews D, Kay J J, Neudoerffer C and Gitau T 2003 Perspective changes everything: managing ecosystems from the inside out *J. Frontiers in Ecology and the Environment* 1 23–30
[19] Gallopin G C, Funtowicz S, O’Connor M M, and Ravetz J 2001 Science for the twenty first century: from social contract to the scientific core *Int. J. Soc. Sci.* 168 219–29
[20] Holmes C M 2001 Navigating the socioecological landscape J. Conservation Biology 15 1466–1470

[21] Berkes F and Folke C 1998 Linking Social and Ecological Systems; Management Practices and Social Mechanisms for Building Resilience (New York: Cambridge University Press)

[22] Kooiman J, Bavinck M, Chuenpagdee R, Mahon R and Pullin R 2008 Interactive Governance and Governability: An Introduction. The Journal of Transdisciplinary Environmental Studies 7 1-8

[23] Sembiring S, Basuni S and Soekmadi R 2010 Resolusi konflik pengelolaan Taman Nasional Teluk Cenderawasih di Kabupaten Teluk Wondama J. Manajemen Hutan Tropika 2 84-91

[24] Bawole R 2012 Analysis and mapping of stakeholders in traditional use zone within marine protected area J. Manajemen Hutan Tropika 18 110-117

[25] Bawole R, Yulianda F, Bengen D G and Fahrudin A 2011 Keberlanjutan penatakelolaan zona pemanfaatan tradisional dalam kawasan konservasi laut Taman Nasional Teluk Cenderawasih Papua Barat. J. Manajemen Hutan Tropika, 2 71–78

[26] Bawole R, Yulianda F, Bengen D G, Fahrudin A and Mudjirahayu 2015 Socio-Ecological System within Governance of Marine Protected Area: Case from Cenderawasih Bay National Park, Indonesia. J. Manajemen Hutan Tropika 1 19-24

[27] Bawole R, Rumere V, Mudjirahayu and Pattiasina T F 2013 Performance of coral reef management: Integrating ecological, socioeconomic, technological, and institutional dimensions J. Manajemen Hutan Tropika 19 63-73

[28] Bawole R, Pattiasina T F and Kawulur E I J J 2014 Coral-fish association and its spatial distribution in Cenderawasih Bay National Park Papua, Indonesia AACL Bioflux 7 248-254

[29] Brown K K, Tompkins E and Adger W N 2001 Trade-off Analysis for Participatory Coastal Zone Decision-Making (Norwich: Overseas Development Group University of East Anglia)

[30] Grafton R Q, Kompas T, McLoughlin R and Rayns N 2007 Benchmarking for fisheries governance J. Marine Policy 31 470–479

[31] Chuenpagdee R, Kooiman J and Pullin R S V 2008 Assessing governability in capture fisheries, aquaculture and coastal zones. The Journal of Transdisciplinary Environmental Studies 7 1 – 2

[32] Fletcher S 2007 Influences on stakeholder representation in participatory coastal management programmes Ocean & Coastal Management 50 314–328

[33] Fletcher S 2007 Representing stakeholder interests in partnership approaches to coastal management: Experiences from the United Kingdom J. Ocean & Coastal Management 50 606–622

[34] Wiley P C, Armor J, Ehler R, Feurt C and Hart Z 2001 Connecting stakeholders to local coastal management. Proceedings of Coastal Zone 07. Portland, July 22 to 26, Oregon

[35] Cruz-Trinidad A, Geronimo R C and Alin P M 2009 Development trajectories and impacts on coral reef use in Lingayen Gulf, Philippines J. Ocean & Coastal Management 52 173–180

[36] Bawole R, Yulianda F, Bengen D G and Fahrudin A 2012 Manajemen kolaboratif zona pemanfaatan tradisional Taman Nasional Teluk Cenderawasih J. pesisir dan pulau pulau kecil 1 73–86

[37] Allen C R, Fontaine J J, Pope K L 2010 Gar mestani A S Adaptive management for a turbulent future Journal of Environmental Management 1 – 7

[38] Olsen S Band Hahn T 2004 Social-ecological transformation for ecosystem management: the development of adaptive co-management of a wetland landscape in southern Sweden. Ecology and Society 9 2 – 10

[39] Folke C, Hahn T, Olsson P and Norberg J 2005 Adaptive governance of social-ecological systems Annual Review of Environment and Resources 30 441–473

[40] Carlsson L and Berkes F 2005 Co-management: concepts and methodological implications. Journal of environmental management 75 65–76

[41] BBTNTC (Balai Besar Taman Nasional Teluk Cenderawasih) 2009 Rencana Pengelolaan Taman Nasional Teluk Cenderawasih. Manokwari: Balai Besar TNTC