

## A Comparison of Effectiveness of the Management of Conservation Areas of China and Indonesia

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**Abstract:** This study uses two methods of measuring the effectiveness of different management of protected areas, namely RAPPAM and METT. In this study compared the management of conservation areas between Merapi Volcano National Park, Indonesia and Beijing Songshan National Nature Reserve, China. The research was conducted by interviews and questionnaires with the manager and staff. The results revealed that Merapi Volcano NP and Songshan NNR have managed quite effectively. On RAPPAM methods, Merapi Volcano NP has management index of 0.63, and Songshan NNR 0.844. METT methods score for Merapi Volcano NP of 2.3, and Songshan NNR of 2.47. Those values are above the midpoint of the maximum value possible. RAPPAM and METT methods can be used simultaneously to capture the effectiveness of protected area management, as well as to determine the priority activities that need to be streamlined.

**Keywords:** Protected areas, RAPPAM, METT, Songshan National Nature Reserve, Merapi Volcano National Park, Effectiveness

### I. INTRODUCTION

Currently there are more than 100.000 units of Protected Areas (PA) in the database world conservation area with an area reached 18.9 million km<sup>2</sup> or 12.7% of the total surface area of the earth (Guhridge - Gould, 2010). Many conservation areas have been designated on the ground but managed little effective. This condition is referred to as a paper park.

Paper park is the term to refer to a conservation area that is not well managed or less (Bonham et al, 2008). Many existing protected areas, especially in developing countries have not managed effectively (Bonham et al, 2008). Paper park conditions influenced by the quality and capacity management, availability of funding and the willingness of the parties to support the management of conservation areas.

China is a country transformed from developing countries to the developed countries. Reform in China changed many things included in the conservation area. Conservation area management in China itself has not referring to the concepts of international conservation management.

In contrast with Indonesia, although it is still a developing country, modern management of conservation areas in Indonesia has a long history

(Jepson & Whittaker, 2002 ). The influence of the Dutch colonial period and international conservation organizations such as the FAO and WWF colored the development of conservation areas in Indonesia (Dunggio & Gunawan, 2009).

Protected areas in China and Indonesia, which has similarities are the Nature Reserves in China and National Park in Indonesia. Both forms of protected area managed equally by the state and have the criteria as a protected area. The criteria is to have a clear management and area management zone (core zone, buffer/wilderness zone, and experimental zone).

PA effectiveness correlates with basic management activities such as enforcement, boundary demarcation, and direct compensation to local communities (Bruner et al, 2001). Although management of the PA is considered the most well compared with other conservation area management, however, PA management effectiveness has not been evaluated. PA managers do not know whether the management of many areas that they manage work effectively or not. Evaluation of the effectiveness of PA management is a study to determine how well a managed conservation area, particularly with regard to the protection of resources and the achievement of management objectives.



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Understanding the effectiveness of PA management includes three topics, namely the design of conservation issues, both individually and as a system, eligibility issues and process management systems, as well as the service of conservation areas (Hocking et al, 2006). Evaluate the effectiveness of PA management will be beneficial not only to know the status of the current management, but also have an impact on the improvement of management in the form of a more effective allocation of resources, promote accountability and transparency, and to encourage the involvement of various stakeholders in the management process (Hocking et al, 2006).

### **Overview of Protected Areas in China**

China's approach to protected areas is not necessarily consistent with international or western protected area management approaches and it needs to be understood within China's specific historical, cultural, social, economic and political context. Most protected areas in China are managed in a strictly top-down approach by government agencies at different levels, from national to county (Weihua, 2012). Environmental protection in China dates back at least to the Qin Dynasty (221–207 BCE) when mountain areas were preserved as imperial hunting reserves and temple grounds were protected (Edmonds, 1994 in Xu & Melick, 2007).

The modern concept of public protected areas was introduced relatively recently. In 1956 the State Forestry Department implemented The Roles of the Natural Forest Logging Ban Area (Nature Reserve), and, consequently, the Dinghu Shan Nature Reserve was established in Guangdong Province, the first official protected area in China (Jim & Xu, 2004 in Xu & Melick, 2007). Following this, the development of protected areas was kept in a 'stagnation and devastation' stage (Fu, et al, 2004 in Yang, 2011).

Instead of establishing protected areas, extensive environmental degradation occurred, from the creation of enormous water control to industrial and agricultural projects under the influence of political movements associated with the Great Leap Forward (1958) and the Cultural Revolution (1965-1975) (Xu & Melick, 2007). By 1978, only 34 protected areas had been created under a centralised administrative approach. However, protected areas began to boom after China initiated economic reform and open-door policies in 1978.

The number of PA increased from 34 in 1978 to 2541 in 2009, with a total area of 147,747,000 ha now accounting for 14.72% of China's territory (Yang,

2011). This is higher than the global average. This trend will continue, as China has set an ambitious goal that 18% (172.8 million ha) of her land area will be covered by nature reserved by 2050 (Yang, 2011).

According to Jim and Xu (2004) the regulation and designation of protected areas in China went through three periods of change (in Xu & Melick, 2007). Prior to 1979, protected areas were designated and managed directly by central government, which aimed at reducing logging and hunting in high-value natural areas. Jim and Xu (2004 in Xu & Melick, 2007) considered this a top-down approach that did not foster the participation of local government and communities and it also failed to cultivate a sense of ownership at local level.

Following this initial period, there was a period of deregulation and decentralisation, from 1979 to 1991. As Jim and Xu (2004 in Xu & Melick, 2007) noted, when the numbers of protected area increased, central government was unwilling and unable to manage and finance all protected areas. Many protected areas were poorly managed or existed only on paper.

According to Jim and Xu (2004 in Xu & Melick, 2007), the last period, from 1991 to the present time, is where the central government has adopted statutory procedures to encourage and guide local governments to establish and manage newly protected areas. The administrative status is tied to the degree of disturbance and ecological value of an area: A site with high disturbance and no flagship species will be designated and managed at county level, whilst an undisturbed site of national importance will be designated and managed at national level.

The majority of Chinese protected areas are nature reserves that are managed in accordance with the Regulations on Nature Reserves (Xu & Melick, 2007). Nevertheless, protected areas also include approximately 500 scenic interest areas (often referred to as national parks), which are managed by the Ministry of Construction, and over 1400 forest parks, which are the responsibility of the SFA (State Forestry of Administration). In principle the State Environmental Protection Administration (SEPA) is responsible for the overall integrated management of conservation zones (Xu & Melick, 2007).

Nevertheless, each ministerial sector such as forestry, agriculture, land and resources, water resources, oceans, and construction are responsible for protected areas within their territories (Xu & Melick, 2007). Moreover, there is no comprehensive law that applies to all types of protected areas, and although protected

areas are supposed to comply with the World Conservation Union (IUCN) categories I–IV, there is great variation in the actual on-the-ground protection (Li & Han 2001; PATF 2004 in Xu & Melick, 2007). Now 10 different ministries or administrations manage protected areas, and during the turbulence of recent times the roles and responsibilities of government departments have been constantly redefined. In the last decade, forestry—a crucial element of conservation in China—has undergone a transformation from resource acquisition to environmental protection, overlapping with newly developing environmental protection and reserve management agencies (Xu & Melick, 2007).

According to Burgess (2012) China does not have a well-established national park system; national parks are only a recent development. In the literature found on biodiversity conservation and protected areas in China, much of the literature use different names and definitions for national parks. China has an older nature reserves system, hence all of the regulation on protected areas in China refers to nature reserves, forest parks and scenic landscapes. Not all PA in China have done measuring the effectiveness of management using RAPPAM or METT method. We traced the literature there is little research using these methods in China. RAPPAM methods used by Luan et al (2009) in Northeast China and Quan et al (2010) using the METT method of measuring 535 nature reserves (from a total of 2541 nature reserves) in China.

#### **Overview of Protected Areas in Indonesia**

Conservation strategies in Indonesia can not be separated from the history of conservation since the Dutch colonial era. Policies directed to the protection of species is indicated by the presence of conservation areas and nature reserves or wildlife reserves with a relatively small area, such as nature reserves to protect *Rafflesia arnoldi* in Bengkulu and nature reserve in Central Java to protect the teak tree endemic (Santosa et al, 2008). In a further development of nature reserves are large enough, namely Leuser Mountain in Sumatra ( 400,000 ha) established in 1934.

By the end of the 1970s coincided with the growth of forest concessions in Indonesia conducted a review of several forest conservation and subsequently introduced ecosystem-based approach to the management and conservation of flagship species (Santosa et al, 2008). The era is the starting point for Indonesia start expanding designation, establishment and management of protected areas.

In 1973, Indonesia registered as a state to the 48 participants of the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES ) (MoF, 2011). In the 1980s, came the concept of a national park. First established five national parks, namely Leuser Mountain, Gede Pangrango Mountain, Ujung Kulon, Baluran, and Komodo.

The starting point of modern conservation in Indonesia started in the 3rd world congress of national parks and protected areas in October 1982 in Bali, Indonesia (Mackinnon et al, 1993 in Dunggio & Gunawan, 2009). Along with the Congress, the Indonesian government declared 11 national parks. This era marked a beginning of the introduction of a national park in Indonesia, but still adopt the management of the Yellowstone national park.

In 2003, after the congress national park in Durban, the Indonesian government began improving on the management of national parks with over the interests of the community through a collaborative management (Dunggio & Gunawan, 2009). The seriousness of the government to implement the collaborative national park management pattern shown by the Forestry Minister Regulation No. P.19/Menhut-II/2004 on Collaborative Management of Natural Reserve Area and Conservation Areas. In 1990, was born the Law No. 5 on the Conservation of Natural Resources and Ecosystems , which requires 11 government regulations for its implementation. There currently are 50 national parks (43 terrestrials and 7 maritimes) with an area of 16.38 million hectares or about 65% of the total area of protected areas in Indonesia (MoF, 2011).

International obligations for the existence of the conservation area is also secured legislation Indonesia, among others: Act No. 5 of 1990, Act No. 41 of 1999, Government Regulation No. 68 of 1998 and Decree of the Minister (of Agriculture, Forestry and Agriculture, Forestry). Its existence is legitimate and legally robust. Conservation management of natural resources in Indonesia in Act No. 5 of 1990 is strongly influenced by the IUCN World Conservation Strategy. Protected Areas IUCN categorization is then adopted in the Act No. 5 of 1990, although not completely (Samedi, 2008 in Santosa et al, 2008). Unfortunately only in establishing the concept of IUCN Protected Area to adopt more advanced that the situation in the country is not entirely suitable for developing countries like Indonesia.

In Indonesia, the national park is one of the most protected areas are relatively well developed and

forms management system than the Forest Parks, Nature Parks, Nature Reserves and Wildlife Sanctuaries (Santosa et al, 2008). National parks even more serious attention in its development than the development of protected areas or developing the idea of biosphere reserves. The Forestry Ministry also has to assess the effectiveness of the management of national parks using RAPPAM and METT methods in 2004 and 2010 (WWF Indonesia, 2010).

### **Conservation Area Management Effectiveness Evaluation**

Conservation area is an area of terrestrial or marine which is designated as the protection of biodiversity, and natural and cultural resources associated with it, which officially or effectively managed (IUCN, 1994 in Dudley, 2008). The success of the conservation area as an instrument of conservation based on the assumption that the area is managed to protect the values and resources in it. Management of the conservation area would be effective if fitted to the needs of the conservation area, in accordance with the socio-economic and ecological characteristics, as well as pressure and utilization. Effective management requires not only the adoption of the system of governance and proper management objectives, adequate resources, but also the implementation of strategies and appropriate management processes

Conservation area management effectiveness evaluation is defined as a study to determine how well a managed conservation area, particularly with regard to the protection of resources and the achievement of management objectives. Understanding the effectiveness of management by Hocking et al (2006) includes 3 (three) topics, namely the design of conservation issues, eligibility issues and process management systems, as well as the services of the conservation area. The draft conservation area covers the size and shape of the area, a buffer zone and corridor management areas, ecological representation, as well as the feasibility region in carrying out its functions.

The feasibility of the system and management process includes how management is run and respond to the challenges that exist, both in terms of planning, training and capacity building, public relations and management implementation. While the services of the conservation area is the achievement of the goals set for the biological and social aspects. The evaluation results can provide a status of protected areas management effectiveness at the time

of running. The evaluation results can be satisfactory (well), or less. Conservation area manager can continue business parameters that are considered good, and improve the management of the parameters that are considered are lacking. Ideally this process continues periodically so that managers can determine the position of conservation management at this time, and to determine the allocation of resources to improve the management and achievement of those objectives.

### **Beijing Songshan Nature Reserve, China and Merapi Volcano National Park, Indonesia**

Based on the above, China has a Nature Reserve which is more advanced than other protected areas, while Indonesia has a national park. This makes the discussion interesting to study about the management of the Nature Reserve in China and the National Park in Indonesia. Therefore, in this study tries to compare the management of the Nature Reserve in China and the National Park in Indonesia.

Established in 1985, Songshan is the first and only national level nature reserve in the Beijing municipality, exactly located in Yanqing County, 90 km from central Beijing. With an area of 4660 Ha, Songshan is located in the Yanshan mountain range, lying just south of Dahaituo Mountain (2198 m), the second highest peak in Beijing (Beijing Songshan, 2012). Along with its rich variety of wildlife, its close proximity to the urban center of Beijing also add value to its important ecological functions and services such as water retention, dust storm prevention, and air cleansing. The Songshan National Nature Reserve Administration is responsible for management of Songshan Nature Reserve. It is under authority of the Beijing Municipal Bureau of Landscape and Forestry, SFA of China (Beijing Songshan, 2012).

Merapi Volcano region is a protected state forest since 1931 (Merapi Volcano NP, 2011). This area is an important and strategic value because it serves as a water catchment area for the benefit of the province of Yogyakarta and Central Java, especially Sleman, Yogyakarta, Klaten, Boyolali, and Magelang Regency. Merapi forest areas of tropical forest type conditions were very active volcano.

Forest area was previously an area that serves as a protected forest entirely, except an area of 198.5 ha located in Sleman district has designated a Nature Reserve Plawangan-Turgo; and an area of 131 ha as the Forest Eco-Tourism. This area is regulated by the Decree of the Minister of Agriculture



No.155/Kpts/Um/8/1975 (Merapi Volcano NP, 2011).

Appointment of Forest Merapi Volcano as Merapi Volcano National Park accordance with the Decree of the Minister of Forestry Number. 134/Menhut-II/2004 about change Function Protected Forest Areas on May 4, 2004. Nature Reserves and Forest Ecotourism in the Forest of Merapi Volcano National Forest Group of ± 6410 ha, located in the District of Magelang, Boyolali and Klaten of Central Java province and the district of Sleman, DIY province. The Merapi Volcano National Park Administration is under authority of Direktorat General of Forest Protection and Nature Conservation, Ministry of Forestry (MoF).

Songshan National Nature Reserve (NNR) has Level 1 nationally protected animal species including the Golden leopard (*Panthera pardus Linnaeus*), Golden eagle (*Aquila chrysaetos kamtschatica Severtzov*), Imperial eagle (*Aquila heliaca heliaca Savigny*), and Black stork (*Ciconianigra*) (Beijing Songshan, 2012). Merapi Volcano National Park (NP) has too nationally protected animal species, such as Javan leopard (*Panthera pardus melas*), Leopard cat (*Felis bengalensis*), Javan langur (*Trachypithecus auratus*), Javan deer (*Muntiacus muntjak*), Javan Eagle (*Nisaetus bartelsi*), Black eagle (*Ictinaetus malayensis*), and Crested Serpent Eagle (*Spilornis cheela*) (Merapi Volcano NP, 2011).

## STUDY AREA AND METHODOLOGY

Research sites located in the Songshan NNR, Beijing-China and Merapi Volcano NP, Yogyakarta-Indonesia. The research was conducted by interviews and questionnaires from June until July 2013. Respondents in this study are managers and staff of the Songshan NNR and Merapi Volcano NP.

Data were collected from respondents in the form of focus group discussions (FGD) is guided by the researcher. FGD results were analyzed and the results presented to the leadership of the Songshan NNR and Merapi VNP and his staff to request clarification and refinement of the data is less.

Direction of the discussion in the FGD using Rapid Assessment Questionnaires (RAQ) either in the form of data entry sheet (data sheet), and matrix. The whole answer is unanimous agreement among the FGD participants. If there is misunderstanding the intent of the question, the researchers became affirming the intent of RAQ. The structure and content of each is as follows RAQ.

This study uses two methods of measuring the effectiveness of different management of conservation areas, namely RAPPAM (Ervin J/WWF, 2003) and METT (WWF, 2007) Although all have a different emphasis, but in the process of data collection and analysis processes have a common relative.

### RAPPAM (Rapid Assessment Prioritization for Protected Areas Management)

RAQ to RAPPAM consists of questions related to (1) basic information, (2) pressure and threats, (3) the value of biological importance, (4) the value of socio-economic importance, (5) susceptibility, (6) management objectives, (7) law basis, (8) the design area, (9) staffing, (10), communication and information (11) infrastructure (12) financial, (13) management plan, (14) decision making, (15) research, monitoring and evaluation, and (16) output.

Data analysis was performed with the method RAPPAM displays the values obtained in the form of a histogram graph showing the assessment indicator score of each component or cumulative and simple multivariate analysis that connects the two components to refine the analysis. Assessment scores for the questions in the following datasheets RAPPAM.

Multivariate analysis was performed to relate the elements of the contextual stage (degree of threats and challenges, the importance of socio-economic, ecological significance, etc)

### METT (Management Effectiveness Tracking Tools)

RAQ to METT consists of two parts, ie the data sheets and assessment form. Data sheets consists of two pieces, the first sheet to record basic information about the location of the site, such as name, size, location, and legality. While the second sheet contains a list of threats facing the region, following its influence on regional rankings. Assessment form contained 30 questions relating to relating to the context, planning, inputs, process management, output and outcome.

Analysis of data on METT method done by displaying the values obtained in the form of a histogram chart shows the indicator score assessment.

## RESULT

Performance Management Merapi VNP and Beijing Songshan NNR is a current snapshot of performance management that shows how effective the area is managed. Performance Management Merapi VNP and Songshan NNR photographed using 3 different methods.

**Merapi Volcano NP and Songshan NNR Management Performance using RAPPAM**

In the management of performance measurement using RAPPAM there are 120 questions to be answered by the manager of protected areas.

Table 1. RAPPAM of Merapi Volcano NP and Songshan NNR

	Merapi	Songshan
CONTEXT		
Biological Importance	0.7	0.875
Sosio-Economic Importance	0.65	0.825
Vulnerability	0.6	0.475
PLANNING		
Objectives	0.75	1
Legal Security	0.45	1
Site Design and Planning	0.55	0.85
INPUT		
Staffing	0.55	1
Communication & Information	0.55	0.85

Infrastructure	0.45	0.9
Finance	0.65	0.95
PROCESS		
Management Planning	0.55	0.95
Management Decision Making	0.75	0.95
Research, Evaluation, Monitoring	0.75	0.95
OUPUTS		
Outputs	0.6	0.74
PA System-Level Design	0.75	0.6

Performance measurement with RAPPAM method for assessing the management of Merapi VNP and Songshan NNR into 7 groups of questions, of which 6 of them are the stages of the cycle of conservation management. 6th stage of the cycle is the conservation area (1) context, (2) planning, (3) inputs, (4) processes, and (5) outputs and (6) outcome. The data in the table above can be simplified in the form of a histogram graph easier to interpret the existing output.

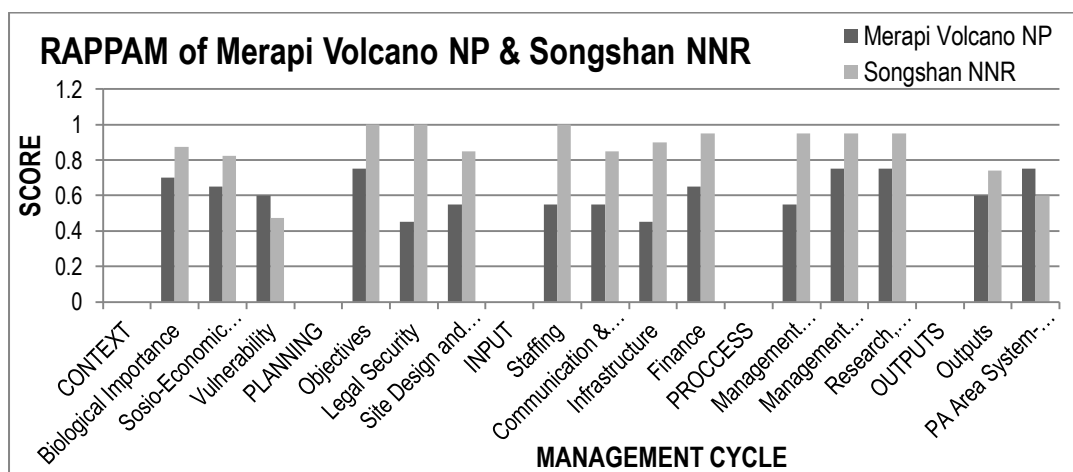


Figure 1. Histogram of RAPPAM of Merapi and Songshan

Of the histogram graph above shows that the points are relatively good in RAPPAM results for Merapi Volcano NP is a component of Objective, Management Decision Making, and Research, Evaluation, Monitoring. While Songshan NNR has

good points of Objective, Legal Security, and Staffing. Merapi Volcano NP has lack points of Legal Security and Infrastructure; while Songshan NNR of Vulnerability and PA System – Level Design.

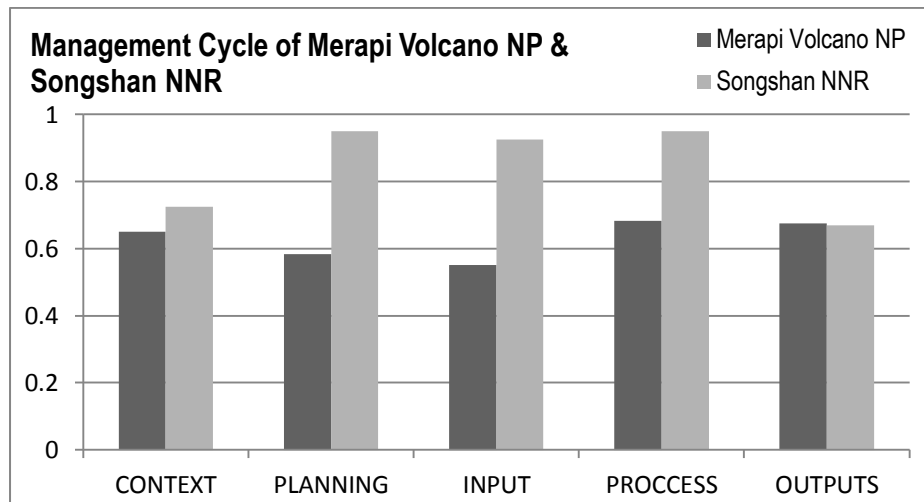


Figure 2. Graph of Management Cycle of Merapi Volcano NP & Songshan NNR

From the graph above, we see that the main weaknesses in the management cycle Merapi Volcano NP is the Input stage, while Songshan NNR is the Outputs stage. Merapi Volcano NP has pretty

good in the Process and the Results stage; and Songshan in the Planning and Process. Management effectiveness index of Merapi Volcano NP management cycle can be calculated based on the value:

$$= \left( \frac{\sum (\text{tot C})}{n_C} + \frac{\sum (\text{tot P})}{n_P} + \frac{\sum (\text{tot I})}{n_I} + \frac{\sum (\text{tot Pr})}{n_{Pr}} + \frac{\sum (\text{tot O})}{n_O} \right) : 5$$

$$= (0,65 + 0,58 + 0,55 + 0,68 + 0,67) / 5$$

$$= 0,63 \text{ (on a scale of 1)}$$

This index shows that the Merapi Volcano NP managed quite effectively.

This index shows that the Songshan NNR managed effectively.

Management effectiveness index of Songshan NNR management cycle can be calculated based on the value:

**Merapi Volcano NP and Songshan NNR Management Performance using METT**

$$= (0,72 + 0,92 + 0,92 + 0,95 + 0,67) / 5$$

$$= 0,844 \text{ (on a scale of 1)}$$

From the results of FGD with existing staff at Merapi Volcano NP & Songshan NNR obtained METT scores as illustrated in the following figure.

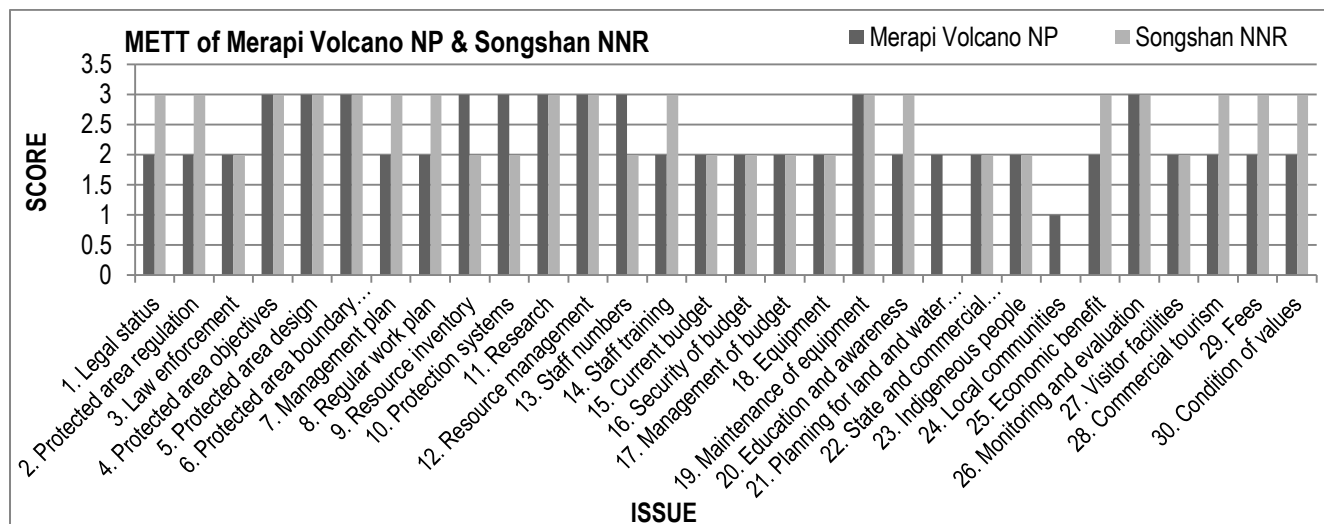


Figure 3. METT of Merapi Volcano NP & Songshan NNR

Management effectiveness index calculation with METT approach produces the following for Merapi Volcano NP:

$$\begin{aligned}
 &= \frac{\sum (\text{tot skor})}{n} \\
 &= 69 / 30 \\
 &= 2,3
 \end{aligned}$$

Then for Songshan NNR:  $74/30 = 2,47$

This value indicates the general management issues Merapi Volcano NP has been managed reasonably well. Even the management PA objectives, PA area design, PA boundary demarcation, resource inventory, protection systems, research, resource management, staff numbers, maintenance of equipment and monitoring and evaluation was good (score 3). This result is quite consistent with the results RAPPAM where management objectives, research and monitoring and evaluation are also shown good results.

As for which is still not the involvement of local communities in the management. This is shown by the low scores obtained are only worth 1 only. The local community has not been involved in the management of the Merapi Volcano NP.

For Songshan NNR has been managed well for the general management issues: legal status, PA regulation, PA objectives, PA area design, PA boundary demarcation, management plan, regular work plan, research, resource management, staff training, maintenance of equipment, education and awareness, economic benefit, monitoring and evaluation, commercial tourism, fees, and condition of values was good (score 3). This result is consistent

with the results RAPPAM where management objectives, legal security and staffing are also shown good results.

Similar with Merapi Volcano NP, Songshan NNR doesn't involve the local communities in the management, and doesn't have planning for land and water use. This is shown by the low scores obtained are only worth 0 (zero) only.

## DISCUSSION

The Chinese government has often been more concerned with the numbers and total area of reserves than with their effectiveness (Xu & Melick, 2007). As a result, many problems have emerged such as obscure laws and regulations, lack of funding for management, inadequate participation of local communities, and inadequacy of planning and monitoring. According to Quan et al (2010), all of these shortages are reflected in their assessment results, which basically represent the current status of the management effectiveness of nature reserves in China. The inadequate level of management effectiveness represents a warning and a challenge for governments and nature-reserve managers to improve their effectiveness.

Overall, nature reserve development in China is facing policy challenges that could undermine the achievements so far made for biodiversity conservation in the country, and the existing policy framework requires reform (Xu et al, 2012). However, China is planning to amend the Forest Law and enact the Law of Nature Reserves, and experiences of policy reforms were taken into



account in drafting the new Law. The promotion and implementation of policies based on the active participation of stakeholders and integration and coordination with them, and a strategic approach to ensure that nature reserves have the appropriate long-term capacity to meet their conservation objectives, could have a positive effect on the future of nature reserves in China (Xu et al, 2012).

Same with PA management in China, main issues facing of PA management in Indonesia are the lack of support from local stakeholders and other sectors (leading to: land encroachment and conflict of interest with local stakeholders and other sectors), lack of sustainable financing, lack of technical capacity (staffs, Infrastructures, etc.), and low political commitment by the national government (MoF, 2011). Nevertheless, the Ministry of Forestry initiated steps to the Park Model and resort-based management of national parks (MoF, 2011).

National Parks Model is defined as a national park that is managed in accordance with specific conditions, including changes that occur in an effective, efficient, transparent, and accountable to the achievement of an independent national park. While Santosa et al (2008) recommended the development of a typical Indonesian conservation, namely: changing the paradigm of conservation, policy reforms and legislation, establish dialogue and collaboration process (to build mutual trust, mutual understanding and cooperation to build), build conflict resolution mechanisms , developed an innovative methodology and participatory conservation (among others by exploring and utilizing local knowledge), and build the capacity of the parties.

In general, institutional management of Songshan NNR is better than Merapi Volcano NP. This can be caused by differences in age of conservation areas , which Merapi Volcano NP younger than 19 years. Merapi Volcano NP designation as a national park in 2004 , and began operations in 2006. While Songshan NNR started up since 1985.

Based on the specification of use, scoring and question classification, RAPPAM methods more suitable for measuring the performance of the implementation stages of the management cycle, while METT more appropriate to capture the conditions at a particular time 't' (Hermawan, 2010). RAPPAM and METT methods can be used simultaneously to capture the effectiveness of protected area management, as well as to determine the priority activities that need to be streamlined. In

the future we need to do measurements with these methods periodically to see and compare the performance of management and institutional development over time. This measurement activities in addition to capturing institutional management performance, also has additional benefits in the form of improved internal communication among staff both horizontally and vertically.

## CONCLUSION

A comparison management institutional between Songshan National Nature Reserve, China and Merapi Volcano National Park, Indonesia can be concluded that that Merapi Volcano NP and Songshan NNR have managed quite effectively. Merapi Volcano NP has the results of a calculation using RAPPAM (management index 0.63) and METT (score 2.3). Those values are slightly above the midpoint of the maximum value possible. Songshan NNR has the results from RAPPAM (management index 0.844) and METT (score 2.47). Those values are above the midpoint of the maximum value possible.

Although both the protected area management works quite effectively, but still needs some improvement. On RAPPAM methods, Merapi Volcano NP has lack points of Legal Security and Infrastructure; and Songshan NNR of Vulnerability and PA System – Level Design. METT analysis results Merapi Volcano NP is not widely involve local communities in its management. Likewise, Songshan NNR also doesn't involve the local communities in the management, and doesn't have planning for land and water use.

In general, institutional management of Songshan NNR is better than Merapi Volcano NP. This can be caused by differences in age of conservation areas , which Merapi Volcano NP younger than 19 years. RAPPAM and METT methods can be used simultaneously to capture the effectiveness of protected area management, as well as to determine the priority activities that need to be streamlined.

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