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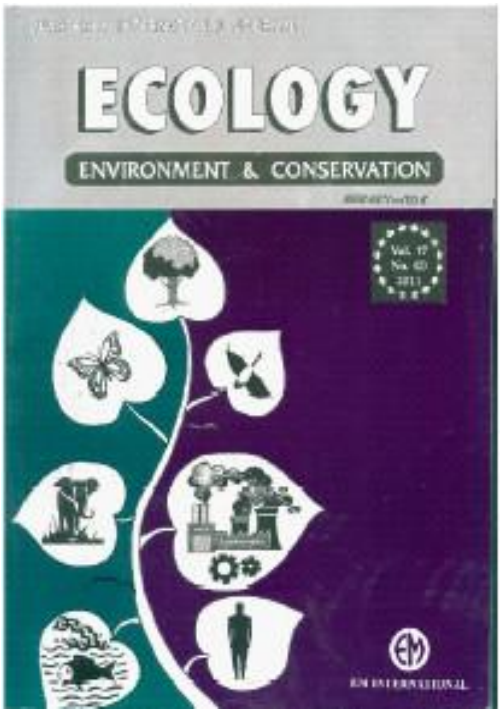

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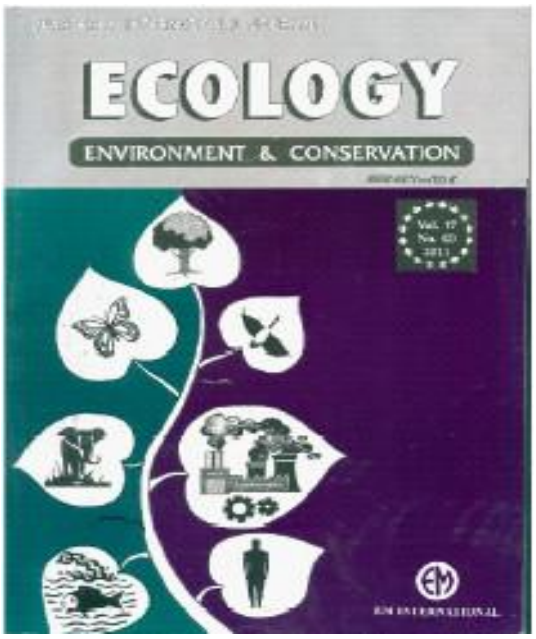
ECOLOGY
ENVIRONMENT & CONSERVATION

ECOLOGY, ENVIRONMENT AND CONSERVATION
VOL. 23 (4) : 2017
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Eco. Env. & Cons. 23 (4) : 2017; pp. (1826-1836)
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ISSN 0971–765X

A study of strategic plan for conservation and society in the Seho small Island

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(Received 4 March, 2017; accepted 30 May, 2017)

ABSTRACT

A strategic plan is one of the most important tasks that managers in organizations are to accomplish. The aim of the paper is to develop an appropriate strategy for the Nature Preserve of Seho Small Island. The determination of nature preserve area is based mostly on the western distribution of Matoa (*Pometia pinnata*) and it is necessary to protect. To reach this goal, this study applies SWOT analysis along with QSPM and spatial analysis from Geographical Information System to determine area zoning of Seho Small Island and the priority of the strategic management. The results showed that position of the management was located in Quadrant I. It means that the management face various Threats, but it still has the strengths from the internal aspects. The strategy necessary to develop was to use the strengths to utilize the opportunity, so that they can be used to solve weaknesses. Beside that, based on spatial analysis result it can be determined core zone, buffer zone and rehabilitation zone including watershed area.

Key words : *Management strategic, SWOT analysis, QSPM, Zoning areas, Spatial analysis, Pometia pinnata, Conservation*

Introduction

Most of the conservation areas for the benefit of its inhabitants had been built especially in countries like America and Europe. They are obsessed with the beauty of the rich natural heritage. In fact, the concept of the development of the conservation area has been conducted in the southern region of the world, especially the tropics, including Indonesia (TII, 2016). Indonesia has natural forest resources and their ecosystems with high level of diversity, uniqueness, originality and beauty that are very potential natural resources. Therefore, it is necessary to develop and utilize for the greater welfare of people through the protection, conservation, and utilization of wild life areas and the natural conservation areas, which are the representation of ecosystem with diversity in flora and fauna, the sources of germplasm in land and water, main function as life buffer and others. Forest conservation is very important mainly for nature preservation. Nature preserve is an area of land that is protected and managed in order to preserve type of habitat and its flora and fauna which are often rare or endangered (CED, 2012). In general, efforts to manage a nature preserve well in the fields is not easy and often make conflict among local communities or conflict between human and animal or other conflict of interest to manage a nature preserve.

In many countries, there were some conflicts appear in nature preserve management in the fields. There was threats in Van Long Nature Reserve Vietnam i.e. forest fire, unsustainable land use in the core zone of the reserve, rapidly growing tourism and the Cement Factory which is located next to the reserve (Nguyen, 2008); there was severe conflicts

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reserve managers and local communities in Nangun river nature reserve, Yunnan, China (Kui, 2000) or the problems in protecting Khao Yai National Park, Thailand, i.e. rapid growth in poulation, exploitation of timber, land and energy, tourism and residential development (Panusittikorn and Prato, 2001); the conflict was found in conserving tiger and elephant habitat in India. As such, human beings and wild animals are forced to share common resources, which can result in human-wildlife conflict (Bargali, 2016); human-tiger conflict in Kerinci Seblat National Park, Sumatra, Indonesia (Nugraha and Sugardjito, 2009). Human-wildlife conflict is a serious obstacle to conservation world-wide and will become increasingly prevalent as human populations increase, development expands, the global climate changes, and human and environmental factors put people and wildlife in greater direct competition for a shrinking resource base (Madden, 2009). Moreover, human-wildlife conflict is often less a conflict between humans and wildlife and more a conflict between humans about wildlife. Natural resource conflicts have been exacerbated by the slow response National Park (NP) management for political and social dynamics are quickly exceeded the limits of NP, including: (a) A lack of clarity regarding the extent to which the public is involved in the management of NP; (b) The district proliferation / partition for decentralization that leads to the jurisdiction of some districts' now overlaps (sometimes entirely) with a conservation area, which leads to conflicts of authority between the district and the management of NP and (C) The failure of management of NP to demonstrate the contribution of real economic preserving nature to support community livelihoods and increase the gross domestic product of local government (TII, 2016).

In fact, many conflicts in nature preserve management from time to time in every country can not be resolved totally. In general, it can be resolved only partially and there is not an holistic conflict resolution. This situation can be illustrated as a Zeno's paradox. In this paradox, a man wishes to get from point A to point B. In order to traverse the distance, he has to traverse half the distance. In order to traverse the remaining half of the distance, he first has to traverse half of that distance, leaving one quarter of the total distance remaining to be traversed. But in order to traverse that distance, he first has to complete half of that. In this pardox, the man always goes half of the remaining distance and never arrives (Sternberg and Grigorenko, 2007). Thus, we can only make many efforts to reduce conflict management in nature preserve or to minimize it gradually. Many approaches and techniques to handle conflict resolution, one of them is strategic planning application. A strategic plan is a tool that provides guidance in fulfilling a mission with maximum efficiency and impact. If it is to be effective and useful, it should articulate specific goals and describe the action steps and resources needed to accomplish them. As a rule, most strategic plans should be reviewed and revamped every three to five years. Strategic plans are comprehensive documents that cover all aspects of an organization's work, including programs and services, management and operations, fundraising and finances, facilities and governance. Depending on the orgnization's scope and emphasis, a plan might also describe approaches to enhance marketing, internal and external communications, membership development and administrative system (Mittenthal, 2002).

Materials and Methods

The study was conducted in Seho Small Island (SSI) located in Sula Islands. SSI Nature Preserve is one of the conservation areas located in West Taliabu Subdistrict, Taliabu Regency, North Moluccas Province. The selection of SSI as one of the nature preserve areas was based on Decree of the Minister of Transmigration, Republic of Indonesia, No. 492/Kpts/Um/10/1972 dated on October 14, 1972, and then determined as the nature preserve based on Decree of the Minister of Forestry No. 320/Kpts-II/1987 dated on October 12, 1987 with land size of 1,250 Ha. The villages selection was done in a purposive sampling technique. Bobong Village (Customary Village) and Wayo Village (Incoming Village) were selected as the sample of the study. The respondents were determined by a purposive sampling technique based on considerations among local community in doing activities and utilizing the forest area of SSI. Socio-economic and cultural data of community were obtained from questionnaires and indepth interviews with community and key informants. The steps in the study were the inventory of vegetation potentials in field and the inventory of socio-economic and cultural community. The identification of vegetation potentials in the forest area of SSI was carried out through the inventory of vegetation

potentials. The initial activities were to make the flow of observation and make the measuring plots of observation. In the inventory activity, the sample was collected by using a systematic sampling technique. The activities were carried out through direct interviews with local community with access to the forest area of SSI. The data were analyzed using a vegetation survey, SWOT, and QSPM analysis techniques. The analysis of SSI management plan was carried out by using the Geographical Information System (GIS) assisted by Arc Gis Ver. 10.1. The initial step of processing was carried out by importing data of Shuttle Radar Topographic Mission (SRTM) in a raster format and data of the land cover of Taliabu Island. The mission objective of SRTM is to obtain single-pass interferometric Synthetic Aperture Radar (SAR) imagery to be used for Digital Elevation Model (DEM), also referred to as DTM (Digital Terrain Model) generation, i.e. topographic maps. Coverage of the Earth's land surfaces is provided between the latitudes of -54^o and +60^o, representing nearly 80% of the land masses (Kramer, 2012). The results of the interpretation of Landsat 8 satellite images were in a vector format. Landsat 8 was developed as a collaboration between NASA and the U.S. Geological Survey (USGS). NASA led the design, construction, launch, and on-orbit calibration phases, during which time the satellite was called the Landsat Data Continuity Mission (LDCM). The Landsat 8 scene size is 185-km-cross-track-by-180-km-along-track. The nominal spacecraft altitude is 705 km. Cartographic accuracy of 12 m or better (including compensation for terrain effects) is required of Landsat 8 data products (Iron, 2016). The next step was to clip them in accordance with the studied areas. The process aims at gaining data of the area to be analyzed for the mapping. Several processes carried out to get the boundary maps, topographic and slope, and land cover of SSI as follows: (a) The initial step in making the boundary maps of SSI was started by making a fill accumulation and then making a flow accumulation. After the calculation of the number of existing flows in the studied area was carried out, the next step was to determine the boundary area in the studied area; (b) The topographic maps were made by using data of SRTM as results of clipping, then the reclassification of terrain height. The altitude determined was classified into five classes, i.e. < 100 m , 100 – 150 m, 150 – 200 m, 200 – 250 m, and > 250 m of above sea level; (c) The making of slopes was started by determining the slopes, and then the re-classing of slopes. The determination of slope class was done for 5 classes, i.e. slope class < 8% (plain), 8 – 15% (slope slightly), 15 – 25% (steep slightly), 25 – 40% (steep), and > 40% (very steep), (d) The mapping of land cover was done based on the results of interpretation on the Landsat 8 satellite images. From the results of the image interpretation and groundcheck, the areas of SSI consisted of four classes of land cover, i.e. forest, mixed garden, mangrove, and settlement, (e) The making of SSI watershed map based on result of terrain height map, slope map and land cover map; (f) The data as the results of spatial analysis from GIS was than overlaid to get a picture of information about the morphology of boundary area in the sites of the study. A delineation process was carried out to the studied area based on the zonafication of management, including core zone, buffer zone, and utilization zone. The determination of zonafication in the studied area was carried out by considering the characteristics and morphology of boundary area in the site of the study. Final map production was overlaping between watershed map and zoning area of core, buffer and rehabilitation map; (g) Implementation of strategic plan for nature preserve of SSI. The data obtained were then analyzed by using a SWOT analysis method. The SWOT analysis was basically the identification of various determining factors. The analysis of such strategic factors consisted of the analysis of internal and external factors. The analysis of internal factors was carried out by formulating a matrix of Internal Strategic Factors Analysis Summary (IFAS) and external factors by formulating a matrix of External Factors Analysis Summary (EFAS). The next step was to make a list of priority to be implemented. Quantitative Strategic Planning Matrix (QSPM) was a technique that can objectively be applied as the prioritized rank alternative strategy (David, 2006).

Results

Socio-cultural and biodiversity aspect in SSI

Based on the history of region, Seho Island is one of the small islands in Taliabu Island Regency and adjacent with Kano Island and land of Taliabu Island. SSI has sufficiently good biodiversity and resource utilized by community within and around the forest area of SSI. According to history, initially the community occupying the Seho Island and Bobong land

is the original tribe of Taliabu consisting of Mangee Tribe, Seboyo Tribe, and Kadai Tribe. Derivations of the three tribes are: Panto Tribe (Lifung clan, Kapita clan, Laribunga clan, a mix of Tobelo), and Jojano clan. From the story of community, the tribe occupied Seho Island since 1913, particularly since the incoming of one of the missionaries from Ambon, i.e. Priest Popoko Daruba. Meanwhile, the community occupied the land of Taliabu Land in Bobong since 1960s that initially occupy old village/old Bobong. In addition to the tribes above, there are also other tribes such as Bugis Tribe as well as Buton Tribe occupying the lands of Taliabu Island. All the tribes are considered as the incoming tribe/community.

Biodiversity aspect in SSI can be illustrated through the Important Value Index (IVI) approach. An IVI which was the summation of tree relative density, relative frequency, and relative basal area was used to define tree dominance (Barker *et al.*, 2002). The results of the IVI calculation in SSI at each step of tree growth as follows: at the seedling level, the results of the IVI calculation showed that the *Shorea* sp had the higher IVI than other species. The IVI of *Shorea* sp was 92.46%, while that of *P. pinnata* was 14.35%. This means that at the seedling level the dominating species was the *Shorea* sp, this is because the type of wood has a relatively higher value than others. In the inventory activity, the species of several vegetations are not known.

The Watershed-based forest management and zoning area of SSI

Based on results of the overlay of land cover map, slope map, and altitude map, the map of watershed and the map of zoning area in SSI were made. These maps were re-overlaid for the combined map between the map of watershed and zoning areas for SSI as presented in Fig. 1 and 2.

Core zone is a nature preserve area, which is not disturbed by human activities (undisturbed core area). Only research, education, training, and monitoring activities are allowed. The core zone is the forest area of SSI (1,250 ha) located in the area of nature preserve. The core zone has a land cover such as a forest area located in the central part of SSI and non-forest area. Buffer zone is an area around the core area or the wild life area. The size of buffer zone determined is 664.64 ha. The area of buffer zone has topography such as plain to hilly regions with height ranging from 0 to 250 meter of sea level

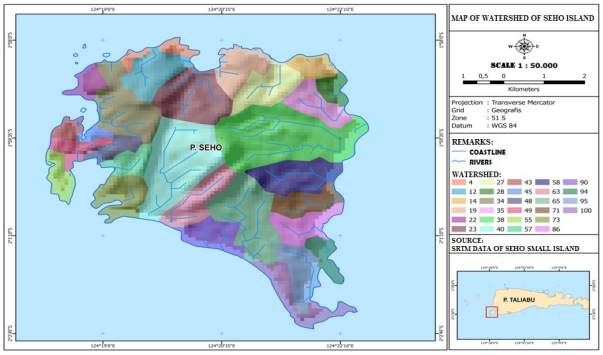

Fig. 1. The Watershed of SSI

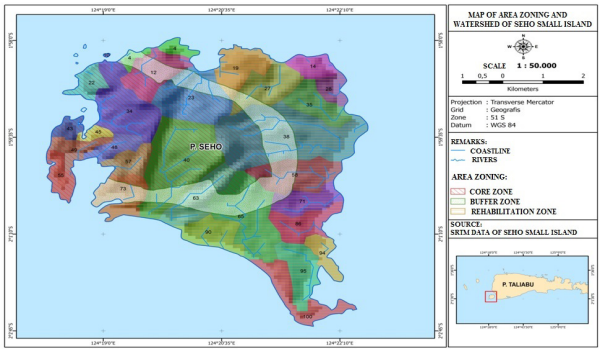

Fig. 2. The Combined maps of watershed and zoning areas for SSI (Source: Wenno *et al.*, 2016).

with areal slopes ranging from 0 to 40%. Rehabilitation zone is an area outside the area of buffer zone. Land cover in this zone is such as mixed garden, local community settlement and mangrove forest area in the coastal area of the zone. Beside that, there are community settlement areas in this zone. The area of rehabilitation zone is 1,758.36 ha. It has topography such as plain region with altitude ranging from 0 to 200 meter of sea level with slopes ranging from 0 to 40%. The results of field observation showed that in the zone most of the areas were no longer forests, but the areas of mixed garden.

Analysis of the strategic plan and QSPM

The first step in implementation the strategic plan analysis is identification of internal and external factors and followed by a SWOT analysis. Several internal and external factors that become the considerations to determine the priority of plans in the management of SSI Nature Preserve were as follows:

a. Strengths: (a) it is determined as the wild life conservation area based on Decree of the Ministry of Forestry, the Republic of Indonesia Number 320/KPTS-II/1987 date on 12 October

1987 with size of 1,250 Ha, (b) it has diversity in flora, particularly *hosa* wood species, (c) it is a forest area as a buffer zone for the life of surrounding community, (d) the presence of mangrove forest along seashore as a green belt, (e) It is a type of the wet tropical rain forest ecosystems that have a sufficient good community growth and have a salodic formation.

b. Weaknesses: (a) The unavailability of data on potentials and information of wild life, (b) The minimum infrastructure in the area management, (c) The overlapping of the area and lands owned by local community, (d) The low level of education among local communities, (e) Lack of the controlling function of area manager.

c. Opportunities: (a) The support by Central Government in the policy of biological natural resource conservation and its ecosystems, (b) Sufficient perception among local communities about the existence of conservation in the protection of area, (c) The willingness and consciousness of local communities to directly involve in the management of area, (d) The strong and existing order of local culture, (e) The presence of mangrove forest that can be developed as the natural tourism object around the area, (f) The advances of technology and science.

d. Threats: (a) The access of local community around the area to the forest by clearing the area for the mixed garden, (b) The activity of forest clearing out and illegal logging, (c) The hunting and trading of wild animals, (d) The low enforcement of law, (e) The claim of customary land/right by local communities in the area

Based on the results of data processing in the matrix of evaluation on internal and external strategic factors, it can be known the values of each matrix, which then will be included into the quadrant analysis. The value of matrix in the evaluation of internal strategic factors was: the total of Strengths–the total of Weaknesses = 2.826 - 2.00 = 0.826, while the value of matrix in the evaluation of external strategic factors was: the total of opportunities–the total of threats = 2.628 – 2.200 = 0.428. The value of matrix in the evaluation of internal strategic factors is presented in Fig. 3.

Based on Figure 3, the results of quadrant analysis show that position of the management of SSI Nature Preserve was located in Quadrant I. The position describes that the management of SSI Nature

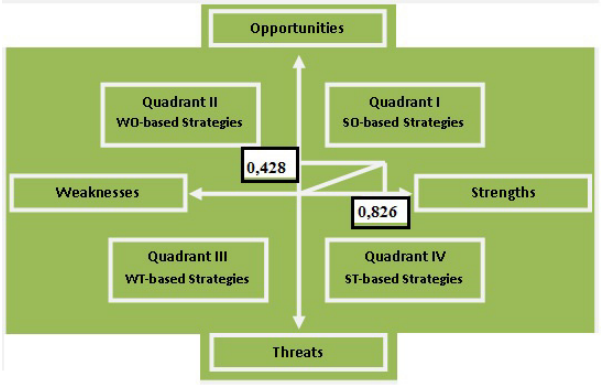

Fig. 3. The Value of matrix in the evaluation of internal strategic factors

Preserve face various Threats, but it still has the strengths from the internal aspects. The strategy necessary to develop was to use the strengths to utilize the opportunity, so that they can be used to solve weaknesses.

In addition to stratified strategies for the list of priority, there was only one analysis technique in literature that was designed to determine a relative attraction of feasible alternative action. The technique was Quantitative Strategic Planning Matrix (QSPM). The advantage of QSPM is that a set of strategies can be evaluated gradually or collectively. As an example, the level of corporation can be evaluated first, followed by the strategy at division level and the strategy at functional level. There was limitation in the number of strategies that can be evaluated or the number of strategies that can be evaluated in a time using QSPM. It can be stated that whether you are more supportive of the "emergent" or "deliberate" approach to strategic planning, there is widespread agreement that formulating strategies begins with development of a clear vision and mission, followed by an internal and external assessment, which leads to establishing long term objectives, and finally generate and decide among specific strategies to pursue (David *et al.*, 2009).

The priority of strategies that will be implemented was determined through the evaluation on the alternative options of strategy with QSPM approach. The step was carried out to determine which strategies were considered as the best to implement. The QSPM matrix will determine the relative attractiveness of strategy on the key factors from internal and external environment. Several SO-based strategies selected including: (a) The optimization of the

management of SSI Nature Preserve with priority on the ordering of areal boundary, (b) The increase compatibility in function of the utilization of nature preserve area in accordance with the regional spatial plan, (c) The increase of local community participation and collaboration with other stakeholders in the management of nature preserve area, (d) The application technology in the management of nature preserve area, and (e) The promotion and development of other ecotourism around the nature preserve area. Based on the calculation of QSPM, it can be concluded that the priority of strategy was deter-

Table 1. The SWOT analysis of SSI Nature Preserve

No.	Internal Strategic Factors	Weights		Scale	Value
		Absolute	%		
	Strengths				
1.	It is determined as the wild life conservation area based on Decree of the Ministry of Forestry, the Republic of Indonesia Number 320/KPTS-II/1987 date on 12 October 1987 with size of 1,250 Ha,	4	0.174	3	0.522
2.	It has diversity in flora, particularly *hosa* wood species	4	0.174	3	0.522
3.	It is a forest area as a buffer zone for the life of surrounding community	4	0.174	3	0.522
4.	The presence of mangrove forest along seashore as a green belt	3	0.130	3	0.390
5.	It is a type of the wet tropical forest ecosystem with a sufficiently good community growth.	4	0.174	2	0.348
6.	It is a type of the wet tropical rain forest ecosystems with a sufficiently good community growth and a salodic formation.	4	0.174	3	0.522
	Total	23	1.00		2.826
	Weaknesses				
1.	The unavailability of data on potentials and information of wild life	3	0.20	2	0.40
2.	The minimum infrastructure in the area management	3	0.20	2	0.40
3.	The overlapping of the area and lands owned by local community	3	0.20	2	0.40
4.	The low level of education among local communities	3	0.20	2	0.40
5.	Lack of the controlling function of area manager	3	0.20	2	0.40
	Total	15	1.00		2.00
No	External Strategic Factors	Weights		Scale	Value
		Absolute	%		
	Opportunities				
1	the support by Central Government in the policy of biological natural resource conservation and its ecosystems	4	0.182	3	0.546
2	Sufficient perception among local communities about the existence of conservation in the protection of area	4	0.182	3	0.546
3	The willingness and consciousness of local communities to directly involve in the management of area	4	0.182	2	0.364
4	The strong and existing order of local culture	3	0.136	3	0.408
5	The presence of mangrove forest that can be developed as the natural tourism object around the area	4	0.182	3	0.546
6	The advances of technology and science	3	0.136	2	0.272
7	Total	22	1.00		2.628
	(1), (2 (3), (4), (5) the advances of technology and science.				
	Threats				
1.	The access of local community around the area to the forest by clearing the area for the mixed garden	3	0.20	2	0.40
2.	The activity of forest clearing out and illegal logging	3	0.20	2	0.40
3.	The hunting and trading of wild animals	3	0.20	2	0.40
4.	The low enforcement of law	3	0.20	2	0.40
5.	The claim of customary land/right by local communities in the area	3	0.20	3	0.60
6.	Total	15	1.00		2.20

mined by evaluating the ranking of strategies based on the value of Total Attractive Score (TAS) from the largest to the smallest. The order can be seen in Table 2 as follows:

The status of customary community land ownership is actually divided by customary figure with average land ownership size of 5 - 20 Ha. Meanwhile, lands for the incoming community for gardening are gained by buying them and there are also given for free by the customary community. Based on customary norms, the criteria usually used in determining the status of land ownership as the borders are dead rivers, stones and big trees. Community living within a forest area will usually affect the condition of biodiversity in a forest area. This can be seen from the community activities in an area because they greatly need the potentials of existing natural resources in a natural area. The need for the natural resources is to meet their daily life needs. The forest area of SSI with the altitude ranging from 0 to 250 m of above sea level has various type of ecosystem, including the type of low plain forest ecosystem, coastal and mangrove forest ecosystem. The forest area of SSI has in part been determined as nature preserve area. The determination of nature preserve area is based on the mostly western distribution of *P.pinnata*, and it is necessary to protect. Based on agroforestree database, *P. pinnata* is a medium-sized to fairly large tree up to 40-47 m tall, with bole up to 100-140 cm in diameter. Leaves with 3-13 pairs of leaflets having dentate margins and alternate secondary veins ending in a tooth. Inflorescence and calyx often hairy. Native from India, Papua New Guinea, Philippines, Solomon Islands, Sri Lanka. *P. pinnata* occurs in primary and secondary forest (Orwa *et al.*, 2009). Moreover, *P. pinnata* is adapted to the warm to hot, humid and wet subtopical to tropical region from 14^0 N to 20^0 S with mean annual rainfall ranging from 1,500 to 5,000 mm. In its native range in Malesia, it is found in undisturb mixed dipterocarp, forests up to 700 m altitude, often on alluvial sites and along or near rivers and streams, but also on hillsides. In secondary forest it is ussually present as a pre-disturbance remnant (Lim, 2013). In the SSI forest area, there are the types of commercial wood such as White Meranti (*Shorea sp.*), Red Meranti (*Shorea selanica*), Bintanggur (*Calophyllum sp*), Kayu Besi (*Intsia bijuga*), Palapi (*Heritiera* sp), Gondal (*Ficus variegate*), Sengon (*Albizia* sp) and Rattan (*Calamus* sp). In addition, there are also other forest products such as sago and natural jasmines. These types can be utilized by local community to meet daily life needs and increase their income.

Discussion

Socio-cultural and biodiversity aspect in SSI

From the results of interview with community in SSI, it can be known that especially the original tribal community usually utilizes the forest products only from their own land/customary land and they are not necessary to ask permission. For the nature preserve area, community within SSI is not brave to enter the nature preserve area to collect woods, although from the results of the field observation, it can be seen that there are the customary community lands included into the land of nature preserve. This is because the community within SSI considered that the nature preserve area has been owned by government after being established as the nature preserve area, so that by their self consciousness, they often make protection and inspection over the area. Howeover, there are communities outside SSI, such as those from Bobong, Wayo, Luwuk, and others that enter to collect woods within the nature preserve area of SSI. For the incoming community, they may collect the forest products such as woods but must gain permission from the customary tribal community and must report to the head of village. The woods collected are also only for certain neces-

Table 2. Result of Quantitative Strategic Planning Matrix (QSPM)

No	Alternative Strategies	TAS
1.	Optimization of the Nature Preserve of Seho Island with priority on the ordering of areal boundary	**11.59**
2.	The increase of compatibility in nature preserve area utilization with the regional spatial plans	**10.87**
3	The increase of community participation and collaboration with other stakeholders in the nature preserve management.	**9.78**
4.	The application of technology in the Nature Preserve of Seho Island.	**10.22**
5.	The promotion and development of other natural tourism destination around the nature preserve area.	**10.98**

sity within the village, but not to sell outside the village.

Based on biodiversity in SSI, the results of the IVI calculation at the sapling level showed that white *Shorea* sp had the highest IVI value of 36.70%, *Agathis* sp 33,00%, *S. selanica* 27.61%, *F. variegate* 23.91%, and one of the unknown species had the lowest IVI value of 12.79%. For the poles level, the species hosa (*Lixe sp*) has higher IVI value than that of other species of wood. The IVI value of *Lixe* sp was 64.72%, *S. selanica* was 62.89% and *Shorea* sp was 58.32%. It can be explained that at the poles level, the area was largely dominated by species of *Lixe sp*, followed by the species of *S. selanica* and *Shorea* sp. At the poles level, the lowest IVI was other commercial species with IVI of 24.31%. For the tree level showed that there are several species of vegetations dominating the SSI forest area. The mostly dominant species at tree level was *Lixe sp* with IVI value of 94.82%, followed by the species of *S. selanica* with IVI of 47.17%, *Shorea* sp of 39.34%. Meanwhile, the lowest IVI was *Albizia* sp with IVI of 3.52%. The inventory of fauna species both bird and mamalia was obtained from interview with commu-

Table 3. The First five-years period

No	Strategies	Activities	Projection
1	Optimization of the management of SSI Nature Preserve with priority on the re-determination	a. Inventory and identification of the potentials of SSI Nature Preserve b. The arrangement of database and information on the area of areal boundary c. The re-determination of boundaries and the determination of management block	The achievement of area function conservation
2	The increase of compatibility in nature preserve area utilization with the regional spatial plans	a. The inventory of ecological, economic and social potentials for community b. The management of area potentials in accordance with the regional spatial plans c. The protection of nature preserve area	The compatibility of wild life area utilization function and the Regional Spatial Plans
3	The increase of community participation and collaboration with other stakeholders in the management of nature preserve	a. The involvement of community and other stakeholders in the arrangement of comprehensive management plans b. The strengthening of area management resource capacity	The role of community and other stakeholders in an integrative manner
4	The application of technology in the management of SSI Nature Preserve.	a. The inventory of needs for the area management activities requiring technological innovation b. The utilization of technology in utilizing the area management by preparing web-based database.	The achievement of innovative area conservation
5	The promotion and development of other natural tourim destination around the nature preserve area.	a. The inventory and identification of area potentials for natural destination activities b. The preparation of supportive facilities for natural tourism activities around the area	The distribution of data and information about SSI Nature Preserve

nity, the recognition of voice, through nest, and the tracks of feet found in the SSI. The wild animal species of SSI include Moluccan babirusa (*Babyrousa babyroussa*), Sula scrubfowl (*Megapodius bernsteinii*), Pied-Imperial-pegion (*Ducula bicolor*), Wild boars (*Sus scrofa*), Rusa deer (*Cervus timorensis*), Blyth's hornbill (*Rhyticeros plicatus*), White cockatoo (*Cacatua alba*), Brahminy kite (*Haliastur indus*), Sula Barn-owl (*Tyto nigrobrunnea*), and Citrine lorikeet (*Trichoglassus flavoviridis Wallace*). Meanwhile, according to local community living around the SSI, the wild animal species in Seho Island include pig, deer and deer pig as those often hunted by local community.

The results of calculation of IVI entirely showed that at the level of seedling and sapling, the genus of Shorea, particularly *Shorea sp*, largely dominate, while at poles and tree levels it is dominated by the species of *Lixe sp*. In other word, at seedling and sapling levels, the species of *Shorea* sp has sufficiently good regeneration level. However, at pole and tree levels, the species of *Shorea* sp no longer dominated. This can be due to competition among the species and also due to the activity of wood collection by the surrounding community. From the results of the calculation of IVI, it can be known that the species of *P. pinnata* was only found at the levels of seedling. Meanwhile, at sapling, poles and tree level, the species of *P. pinnata* was not found. Thus, there is need of much effort to maintain *P. Pinnata* through enrichment planting and seedling maintanance mainly in core zone of SSI.

The potentials found in SSI will be threatened by the excessive forest exploitation by the surrounding community. Therefore, the policy to conserve the existing potentials should be made and applied. In general, one of the local wisdom forms in SSI is a rule to not collect and utilize any woods excessively. In addition, related to the forest management, local community that want to collect woods from SSI must report to customary chief. This is because the authority to make a decision about permission to collect woods is owned by the customary chief. In the past, there was a customary ceremonial place in

Table 4. The Second five-years period

No	Strategies	Activities	Projection
1	The optimization of the management of SSI Nature Preserve with priority on the re-determination of areal boundary	a. The maintenance of area boundaries b. The reconstruction of lost/ damaged area boundaries	The achievement of area function conservation
2	The increase of compatibity in wild life area utilization with the regional spatial plans	a. The handling of inventory results through database management in accordance with regional spatial plans b. The development of data monitoring, evaluation, and reporting system	Compatibility of nature preserve area utilization function and the Regional Spatial Plan
3	The increase of community participation and collaboration with other stakeholders in the management of nature preserve.	c. The involvement of community and other stakeholders in the arrangement of comprehensive management plan	The role of community and other stakeholders in an integrated manner
4	The application of technology in the management of SSI Nature Preserve.	a. The development of web-based area promotion tools and other multimedia	The achievement of innovative area management
5	The promotion and development of other natural tourim destination around the nature preserve area.	a. The development and management of other natural tourism destination centers around the area b. The development of small business among community favor of the natural tourism	The distribution of data and information about SSI Nature Preserve

SSI regarded as a forbidden place. However, over times, the place has no longer existed. The ceremonial place is usually used not only for customary ceremony, but also for keeping tools such as lance, machete, and so on. Community still applied non-irrigated agriculture and their life is not settled. Usually if any member of the family dead, local community will move and seek a new land, and follow a cycle of 3-4 years to move into a new land. Customarily, the new land that will be cleared out is usually treated by customary ceremony by giving foods for the forest by Areca and the land is then cleared out and opened. The customary community in the Taliabu Island has also opened for new strange people. This can be seen from the fact that a newly coming community starts to occupy Taliabu Island. The presence of newly coming community will greatly affect the existence and conservation of ecology, the socio-cultural aspects of customary community in SSI and Taliabu Island. If the external community come, external culture will also affect the existing original culture in the local community in SSI and Taliabu Island. In this case, custom and culture of society related to the management of forest will lost because the external culture comes from the outside.

The life of local community in SSI is generally almost the same, both in livelihood and education level. Generally the main livelihood of local community is farming. Agricultural plants mostly utilized by the surrounding local community include tubers, coconut, durian and clove. In addition to the species of agricultural plants, there are also the species of forestry plants often utilized by the surrounding community, such as *Agathis* sp, *Shorea* sp, *Albizia* sp. All the species were utilized to meet their need for life, such as for consumption and to build house or to be sold and the money can be used to meet other needs. Other potentials often used by the local community around SSI were wild animals. The wild animals found in the SSI forest are basically hunted frequently. The wild animals are hunted for consumption and to be sold. The species of wild animal often hunted include deer pig, pig, deer and cockatoo.

The Watershed-based forest management and zoning area of SSI

Watersheds in SSI as presented in Figure 1 are largely damaged due to the clearance out of forest by community around the forest area, both for settlement and agricultural land. The clearance out of forest led to the decreased size of forest in watershed of SSI. In general, the decreased forest area impacted on the decreased water carrying capacity in the watershed area due to the low capacity of infiltration. Forest is an area for water absorption that is very useful for the conservation of water reservoir around the area. Land use change from forest into settlement or agricultural area in a watershed will affect hydrological quality. The core zone as the wild life conservation area should be conserved for the forest sustainability. In the watershed-based forest management in SSI, the core zone should be conserved as forest through replantation, particularly in the areas dominated by mixed garden or agroforestry area. In the core zone, one of the vegetation species that can be planted is *P. pinnata,* because it is an endemic species in the SSI area. This should be done in order that the nature preserve of SSI can be conserved as the most western area for the distribution of *P. pinnata.*The replantation activity is not only carried out in the core zone, but also in watersheds located in buffer zone and rehabilitation/transitional zone, particularly in mixed garden areas. This was because the watershed condition with land cover of mixed garden will greatly affect the hydrological condition of each watershed. Selection of replantation area can be found more easily by using the combined map of watershed and area zoning of SSI as presented in Figure 2. Based on the result of GIS processing, maps combination of watershed and zoning areas can be made well and it is useful for managing SSI Nature Preserve. In this case, we can make nature preserve planning in short term or long term period and also planning of replanting *P. pinnata* and *Shorea* in watershed which have low density of vegetation.

Analysis of the strategic plan and QSPM

Based on analysis of the strategic plan and the calculation of QSPM, it can be known the priority of the strategies determined by the ranking of strategies based on the values of TAS from the highest to the lowest as follows:

It is expected that the breaking of activities in accordance with the priority of strategies helps to achieve the objectives and outcomes in detail in terms of achieving the goals of management in the periods of five years and ten years.

Conclusion

Position of the management of SSI Nature Preserve was located in Quadrant I. It means that the management face various Threats, but it still has the Strengths from the internal aspects. The strategy necessary to develop was to use the strengths to utilize the opportunity, so that they can be used to solve Weaknesses. The ranking of strategies based on the values of TAS from the highest to the lowest: (a) Optimization of the management of SSI Nature Preserve with priority on the re-determination of areal boundary, (b) The increase of compatibility in nature preserve area utilization with the regional spatial plans, (c) The increase of community participation and collaboration with other stakeholders in the management of nature preserve, (d) The application of technology in the management of SSI Nature Preserve, and (e) The promotion and development of other natural tourim destination around the nature preserve area. Beside that, based on spasial analysis result it can be determined core zone, buffer zone and rehabilitation zone including watershed area. Avaibility of these maps is very useful for improving forest land degradation in SSI Nature Preserve mainly in enrichment planting of *P.pinnata*.

Acknowledgements

The authors would like to acknowledge the Maluku Natural Resources Conservation Agency (BKSDA Maluku) for the financial support on this research in 2014.

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