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THE POLICY CHALLENGE OF PRIVATE LAND MANAGEMENT FOR CONSERVATION OF YELLOW-CRESTED COCKATOO AND ITS HABITAT IN MASAKAMBING ISLAND, INDONESIA

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Abstract: Yellow-crested small cockatoo (*Cacatoasulphureaabbotti*) is an endangered species lives in residential area with private ownership in Masakambing Island, Sumenep Regency, East Java, Indonesia. Recently, the population of the bird only remains between 22-25 birds. Their habitat requires 3 important trees to support their living: nesting trees, sleeping trees and feeding trees. However, conservation efforts are not easy as they share space for living with human. Besides that, in a small island, land is scarce and available resources are limited. Therefore, its conservation effort needs community involvement. Generally, sharing access to the land resources are intended to social and economic aspects. The study was aimed at finding out the distribution of important trees as habitat for yellow-crested cockatoo and propose land management policy in supporting its conservation activities in Masakambing. The analysis uses qualitative method with interactive model. The results showed that 90% of the bird's habitat was in a residential area with private ownership. The Private Land Conservation policy with conservation easement approach can be implemented to conserve yellow-crested cockatoo in Masakambing. Unfortunately, the Private land Conservation Policy and conservation easement approach has not been regulated clearly.

Keywords: Conservation Easement, Cockatoo, Masakambing Island.

A. Introduction

Indonesia is rich in biodiversity, and has numbers of animals and plants categorized as protected and endangered species. Referring to Government Regulation No 7/1999, there are 221 animals and 73 plants that listed as protected. One of them is yellow-crested cockatoo, an endemic species living in Masakambing Island, Kecamatan Masalembu, Sumenep Regency, East Java Province, Indonesia. This species has unique char-

acter, with its small body compare to usual cockatoo. Living in a small island in Masakambing, this species should share limited space and resources with inhabitants, and unfortunately, this place is not a conservation area, making it more difficult in designing conservation program to protect this species. In Indonesia, according to Act No.5/1990, conservation area is divided into 2 (two) categories: Nature Reserves (KSA) and Nature Protection Area (KPA). KSA is an area with certain

characteristics, on land and in water, having main function as a preservation area of diversity of plants and animals and their ecosystem and as a life support system. KSA consists of nature reserves and wildlife reserves. On the other hand, KPA is an area with certain characteristics, on land and in water, that have the function to protect life support system, preserve plant and animal diversity, as well as sustainable use of biodiversity and its ecosystem. KPA consists of National Parks, Grand Forest Parks and Nature Tourism Parks.

In Masakambing, yellow-crested cockatoo has to share living space with the inhabitants, who owned the land with private ownership. Some efforts has been implemented to preserve its existence, but unfortunately, it has not shown expected result yet. Recently, the population of small yellow-crested cockatoo only left 22 to 25 species, and tends to decline. Generally, decreasing population of endangered species are caused by expansion of agricultural land, over-exploitation of natural resources, urbanization, industrialization, pollution, fires, the presence of other species (exotic species), genetically modified organisms (GMOs), climate change, illegal trade, changes in habitat situation, limitation of habitat range (Castelletta et al. 2005; Zegeye 2016). In the case of Masakambing Island, the threat of yellow-crested cockatoo population comes from the decrease in area and quality of its habitat.

The discussion about endangered species conservation is important. Endangered species in the wildlife including yellow-crested cockatoo is one of ecosystem element as a part of the concept of Sustainable Development Goals (SDGs). This concept is a reference of the Millennium Development Goals (MDGs) that has been ratified as the goal of Indonesia's development. More clearly, Chen, et al (2019) states that the existence of ecosystems will provide services that has benefit for humans both directly and indirectly related to ecological processes, energy and information. This is in line with the theory of "*sustainability development*" which states the success of development can be achieved when the community obtain the benefit from resources both abundant and

scarce (Odum 1971).

Conservation efforts need to be conducted immediately involving not only biological technique approach but also multidimensional approaches. Sodhi, et al (2011) and Bennet, et al (2017) stated that conservation activities of protected animal are not related to individual animal only but correlated to habitat management. Discussion about habitat of yellow-crested cockatoo will strongly related to land and space management of Masakambing Island. However, this discussion become more challenging since the area of Masakambing is owned by individual ownership. Moreover, limited space and natural resources, as characterized by small island like Masakambing, put more pressure on its conservation effort.

When a conservation area shares location with residential area, conservation program should be designed in a more careful way. The greatest threat of conservation of protected species when blend in resident is the degradation of habitat caused by livestock grazing, predators, fires and clearing of endemic vegetation (Smith et al. 1994). Even though the farming approach has been applied, without integrated management of farming activities, it will harm conservation activities (Saunders 1994). Specifically, in conserving bird species, the provision of nesting trees needs long duration despite having been conducted by good spatial planning and coordination and supported by the community (Manning 2004). Basically, it needs a big role relatively in vegetation structure, environmental control and good land management for bird conservation efforts (Daniels & Kirkpatrick 2006).

The policy of land management has significant affect for conservation efforts in both public and private lands (Merenlender et al. 2004). Considering the importance of land management for conservation, Gary, et al (2019) spesificaly have identified the location of animals, it is contributed to the land management policies for conservation efforts. The habitat of yellow-crested small coccatoo needs 3 important trees which consist of nesting trees, feeding trees and sleeping trees,

and are separated each other as different trees. The aim of the study was to find out the description of the distribution of important trees as habitat for yellow-crested small cockatoo and propose land management policy in supporting conservation activities of small-crested yellow cockatoo in Masakambing Island.

The research was conducted in Masakambing Island, located Masalembu Sub-district, Sumenep Regency, East Java Province, Indonesia. It has an area of 7.79 km² and located in Java Sea. The geographic location is 5°42' - 5°47' south latitude and 114°39' - 114°45' east longitude. Administratively, Masakambing Island is divided into two sub-village: Ketapang and Tanjung.

The data used in this research are primary and secondary data obtained from observation, interviews and literature studies. The interviewees were the key informants, consist of conservation figure of yellow-crested small cockatoo in Masakambing Island, the village government of Masakambing Island, The Agency of Natural Resources Conservation of East Java (BBKSDA of East Java), Non-Government Organization of KKI-IPP (Indonesian Parrot Conservation Project), and the Research and Development Center of Ministry of National Land Agency/ Agrarian and Spatial Planning.

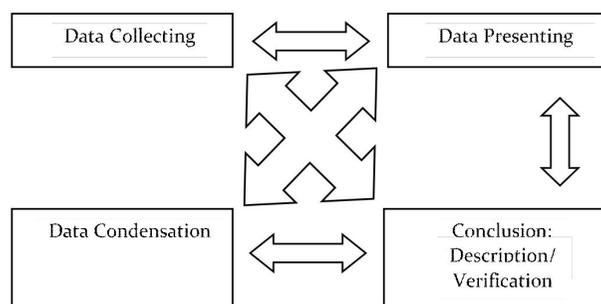


Figure 1. Qualitative Analysis with Interactive Model
(Source: Miles, et al (2014))

The data was analyzed using qualitative analysis approach. It was conducted by examining and interpreting non-numerical observation data to find the meaning and patterns of fundamental relationships (Babbie 2012). Qualitative analysis model uses an interactive model.

B. Distribution of An Important Trees for Yellow Crested Cockatoo

Small yellow-crested cockatoo requires at least 3 types of trees for their living environment: nesting, feeding and sleeping trees, and this trees are different from each other. The nesting tree is a tree used by the birds for breeding, laying eggs and taking care the cheepers. The birds will make a hole in a fractured branch, usually a decayed branch – or sometimes hole that has been left by other birds. This hole is usually made by the couple of birds before mating. The tree used by the birds for nestings have characteristics as follow:

- fracture of dead tree or weathered tree or tree cracks.
- height range from 8-25 meters.
- Diameter of 28-105 meters.
- located on a stem or branch at a height of 6-15 meters from the ground.
- the diameter of the hole is round or oval with a diameter ranging from 12-23 cm.
- the depth of the hole is 68 cm and the base of hole are wood chips and leaf fragments with thick is 10 cm.

There are several types of trees that can be used as nesting trees, but, currently, the active nesting trees are breadfruit, kapok, coconut, tamarind and magnifera. At present, there are 9 active nesting trees; 1 located in mangrove area and 8 of them located in plantations area and residential area. This nesting trees are concentrated in the Ketapang sub-village.

Meanwhile, feeding trees consist of fruit trees, seeds and flower nectar. Each species has different level of consumption for yellow-crested cockatoo . Based on the results of the KKI-IPP study, palm fruit was consumed at the highest level during the breeding period. Meanwhile, coconut trees was consumed at the the highest level during non-breeding period. This trees are spreaded along the island, in mangrove, plantation and residential area in the Ketapang and Tanjung sub-village. But, at present, the movement of yellow-crested cockatoo in the searching of food in the Tanjung sub-village is lesser than before.

Sleeping trees are the trees that used by yellow-crested cockatoo in non-breeding period. Sleeping trees are dominated by coconut trees, and there was only 1 magnifera tree located in the mangrove area used by the bird for sleeping tree. It can be concluded that the sleeping trees will be close to the tall and deciduous trees. Those trees are used by yellow-crested cockatoo to monitor surrounding condition to ensure its safety and comfortability. Based on the distribution, the area of sleeping trees concentrated in the Ketapang sub-village only.

Based on an inventory that conducted by KKI-IPP (2013), interview with conservation leader in Masakambing Island and the observations, there are 14 species of trees that used by yellow-crested cockatoo for nesting, sleeping and feeding. One type of tree can have single or more than one functions. The distribution of functions of trees type is presented in table 1, while the distribution of the trees is shown in figure 2.

Table 1. The Important Tree Specieses For Yellow-Crested Cockatoo in Masakambing Island

No	Types of Tree	Function		
		Nesting	Feeding	Sleeping
1.	Coconut			
2.	Breafruit			
3.	Kapuk randu			
4.	Tamarind			
5.	Kedondong			
6.	Star Fruit			
7.	Galompe			
8.	Palm			
9.	Rumbia			
10.	Moringa			
11.	Duluk-duluk			
12.	Tanjang			
13.	Pidada			
14.	Magnifera			

Source: KKI-IPP (2018)

Currently, the existence of these important trees species are threatened by the introduction of new commodity cultivated by the inhabitant: clove. This commodity is cultivated widely because it has high economic value although it requires a high input intake (fertilizer, pest and disease control and irrigation). In fact, commodities with high input intake will damage the ecological system that has been exist (Kiley-

Worthington 1981). However, the introduction of new commodities needs much attention related to the existing of environmental conditions. Even crop cultivation which is oriented to generate incomes should be able to facilitate the protection of typical biodiversity (Khoury Et al. 2019a). Unfortunately, this condition become a global problems, not only in Masakambing Island. Khoury et al (2019b) found that agricultural cultivation in most countries and regions still did not meet conservation priorities.

The distribution of important trees for the life of yellow-crested cockatoo in Masakambing Island is more concentrated in Ketapang sub-village. It is caused by vegetation condition in Ketapang which is better compared to Tanjung due to the expansion of settlements and land conversion for other purposes. This expansion is mainly related to the increase of population in Masakambing. Recorded in 2012, the population of Masakambing are 1,115, and increased into 1,365 in 2017. Other land use change also occurred due to land clearing in mangrove area for shrimp and milkfish ponds.

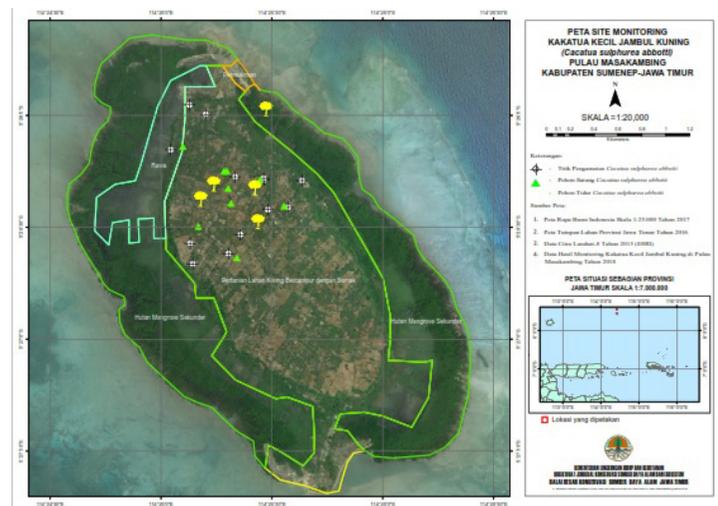


Figure 2. The Distribution of Important Trees for Yellow-Crested Cockatoo in Masakambing Island (Source: The Agency of Natural Resources Conservation of East Java 2018)

This condition becomes significantly alarming if land management to support habitat protection is not conducted immediately. Tight protection of the area from damage through appropriate zoning will support conservation programs

(Calado et al. 2014). Moreover, Masakambing Island, as a small island, has high vulnerability. Nurse et al, (2001) stated that the vulnerability and insularity of small islands are caused by geographical limitations of natural resources, water resources, infrastructure and human resources.

C. Land Management Policies of Yellow-Crested Cockatoo Conservation and its Habitat

Indonesia has already implemented policy of conservation activities as regulated by Act No 5/1990 concerning the Conservation of the Biodiversity and its Ecosystems. The law states that conservation activities consist of protection, preservation and utilization and can be conducted in the area of the Nature Reserve Area (KSA) which consists of nature reserves and wildlife reserves. Moreover, they can also be conducted in the Nature Protection Zone (KPA), which consists of National Parks, Grand Forest Parks and Nature Tourism Parks. Unfortunately, this regulation is hardly applicable in the habitat of yellow-crested cockatoo in Masakambing Island where almost all land were possessed by private ownership.

Likewise, the policy of PP 7/1999 concerning Preservation of species of animals and plants still faces obstacles. In this policy, preservation activities are directed including identification, inventory, monitoring, habitat and population development, species rescue, research and development. In the case of conservation of yellow-crested cockatoo in Masakambing island, the habitat development activities will be constrained by land ownership.

A more general and more possible policy to be implemented is Act no 26/2007 regarding spatial planning. In this Act, spatial planning can be directed in favor of the conservation efforts of yellow-crested cockatoo and their habitat. Through this regulation, the structure, pattern, arrangement and implementation of the land (in spatial perspectives) will be framed on the effort to conserve yellow-crested cockatoo and their habitat.

Furthermore, through PP 15/2010 regarding the implementation of spatial planning, the fo-

cus will be on providing policies related to the conservation of yellow-crested cockatoo in Masakambing Island. Through this regulation, Masakambing Island can be determined as a national strategic area. National strategic area is a region of which spatial planning is prioritized because it has a very important influence nationally on state sovereignty, national defense and security, economic, social, cultural, and/ or environment, including areas that have been designated as world heritage. Considering that yellow-crested cockatoo is classified as one of the 25 national priority animals, in accordance to SK Dirjen PHKA No. 200/IV/KKH/2015, it is possible to establish Masakambing Island as a protected area or national strategic area. Likewise, this animal has become a world concern where IUCN has placed as critically endangered species. Through this stipulation, it is hoped that the program and funding will get better attention.

Unfortunately, the regulation facilitation has not yet been able to be utilized optimally by the Sumenep Regency Government. The Government of Sumenep Regency through the Regional Regulation of Sumenep Regency Number 12 /2013 concerning Spatial Planning (RTRW) of Sumenep Regency has not yet accommodated to the interests of the Masakambing Island region as conservation of yellow-crested cockatoo. The policies and spatial planning of Sumenep has not been favor of yellow-crested cockatoo and its habitat conservation. This regulation only mentioned on the increasing of coastal and small island ecosystems conservation.

In fact, the village government of Masakambing Island has established policy through Village Regulation No. 1/2009 concerning Protection of yellow-crested cockatoo and their habitat. This Regulation states that there are rights, obligations and participation of the Masakambing Island village community in protecting yellow-crested cockatoo and their habitat. The regulation also mentions the prohibition for not having, storing, trading and carrying out yellow-crested cockatoo and its parts. The regulation also regulates habitat protection for the birds. The removal

of nesting trees and feeding trees of yellow-crested cockatoo are prohibited, and the regulation clearly mentions the trees species in detailed. Explicitly, the regulation also mentions sanctions in the form of money and other.

D. The Proposal of Land Management Policy for the Yellow-crested cockatoo and its Habitat Conservation

It is difficult to set up Masakambing as a conservation area in a whole, since all of the land in this island is owned by people with private ownership. Moreover, limited land and available natural resources, aggravated by the need of the people for livelihood, make conservation effort become more challenging. A sharing living space for the people and the birds should be designed carefully. However, it is possible to design a conservation program by the concept of Private land Conservation (PLC). According to Capano et al (2019) PLC is land under private ownership such as individuals, families or other non-public institutions that is managed to support biodiversity conservation goals. Capano also stated that PLC is useful for (i) increasing all protected areas, (ii) increasing the diversity of stakeholders that involved in making conservation policies, (iii) increasing the connectivity of ecological and socio-economic, and (iv) reducing social conflict. This PLC become a challenge for 11 Aichi Biodiversity targets which states in 2020 at least 17% of terrestrial and inland water areas and 10 % of coastal and marine areas, especially areas that are very important for biodiversity and ecosystem services, need to be conserved through systems that are managed effectively, fairly, representative, well connected and ecologically (Bingham et al. 2017).

However, in the case of Masakambing, the concept of PLC does not solely solve the problems. Conservation management policies on smaller scope are still not binding yet and have top-down character. In fact, effective and efficient conservation efforts are suggested to have a bottom-up character that start from awareness and continued with community participation. The review of Thaman, et al (2016) explained the bottom-up

conservation activities showed better results as happened in Fiji Likewise, the existing policies still emphasize the prohibition and accompanied by sanctions that seem coercive. In fact, incentive policies need to be implemented to raise awareness and community participation in the conservation of yellow-crested cockatoo and their habitat. This is demonstrated by the success of bird conservation in Ethiopia and Costa Rica has been mentioned that effective and efficient success use the incentive approach (Sekercioglu. 2012).

Other alternatives that can accommodate those needs is the concept conservation easement. The topic of conservation easement on PLCs is very popular. Capano, et al (2019) reported that conservation easement term is mentioned 508 times in journal abstracts regarding PLCs. This is compared more to the term of landowners that are mentioned 329 times and the program 326 times. The popularity of conservation easement was also discovered at a conference in California. Communities prefer to implement conservation easement because they still can use their land even though certain management rights are restricted (Cheever 1996).

In fact, conservation of yellow-crested cockatoo and its habitat in Masakambing Island would be very revolutionary effective if all of the island area were turned into KSA or KPA. But, this is a difficult choice because many residents will lose land ownership, productive activities and long-established social and cultural roots will be uprooted. The best policy solution is application of conservation easement. Through the conservation easement policy, the community still owns the land but is restricted to use their land for conservation purposes with consequence community will receive rewards or tax reduction (Gustanski & Squires 2000; Kiesecker et al. 2007). The principle of conservation easement is voluntary by placing land ownership permanently on the community, land using for conservation purposes, avoiding high costs and avoiding of socio-political complexity and stability (Merenlender Et al. 2004).

If this policy is applied in Masakambing Island,

communities that have important trees for yellow-crested cockatoo can still own and control their land but there are regulations and management restrictions. Consequently, the community who have important trees will get a reward, incentive or tax reduction. This policy has aimed to provide the protection and conservation for the habitat that is needed by yellow-crested cockatoo in Masakambing Island.

The next challenge is the formulation of policy related to the form regulation in a more detailed and clear way. It is needed to carry out study to determine who will carry out conservation easement. Merenlender. et al. (2004) provide several alternative stakeholders that have potential to do the conservation easement; such as private institutions, partnership institutions or government on central or regional level. Therefore, to measure the degree of involvement, a stakeholder engagement study is needed. The study is intended to identify stakeholder and the degree of importance and influence on the conservation of yellow-crested cockatoo and its habitat, but yet to determine who does what (Reed et al. 2008).

At this time, several stakeholders who have been involved in the conservation of yellow-crested cockatoo and its habitat have been identified: the village Government of Masakambing Island, The Agency of Natural Resources Conservation of East Java (BBKSDAJawa Timur), NGO KKI-IPP. However, it is very possible to propose the Sumenep Regency Government, the Government of East Java Province which have regional authority; and National Land Agency/Ministry Spatial which has a domain in spatial planning. These stakeholders must be encouraged to participate.

E. Conclusions

The important trees for yellow-crested cockatoo habitat (nesting trees, feeding trees and sleeping trees) are mostly located in residential and plantation areas with community ownership. At present, Kapok randu become dominant trees for nesting, and coconut trees for sleeping. Private Land Conservation (PLC) policy with conserva-

tion easement approach is needed to be considered to support yellow-crested cockatoo conservation in Masakambing Island. Even tough, central government has regulation to facilitate implementation of that policies, but generated regulation in local government has not been supported yet. Spatial Planning (RTRW) of Sumenep Regency has not been accommodate Masakambing Island as yellow-crested cockatoo conservation area.

F. Recommendations

Spatial Planning (RTRW) of Sumenep Regency must be reviewed immediately to accommodate conservation of yellow-crested cockatoos in Masakambing Island. Further studies need to be conducted to determine the appropriate stakeholders to carry out conservation easement approach. Recently, there are 3 stakeholders involved in the conservation of yellow-crested cockatoos, they are the village Government of Masakambing Island, The Agency of Natural Resources Conservation of East Java (BBKSDAJawa Timur), NGO KKI-IPP. It is possible to invite other stakeholders such as Sumenep Regency Government, the East Java Province Government and National Land Agency / Ministry of Spatial.

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