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2015

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A Forum of Humanosphere Science School [HSS]

**“Innovation in Science and Technology towards
Sustainable Future”**

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PREFACE

This publication contains papers that were presented at **the 5th International Symposium for Sustainable Humanosphere (ISSH)** that was held in Jakarta from 29-30 September 2015. All papers were formatted and edited before published without changing original meaning and views of the author(s).

The symposium is a part of **Humanosphere Science School (HSS)**, an annual event organized by a good collaboration among Research Center for Biomaterials - Indonesian Institute of Sciences (LIPI), Research Institute for Sustainable Humanosphere (RISH) - Kyoto University, and National Institute of Aeronautics and Space (LAPAN). The focus for this year event was **“Innovation in Science and Technology towards Sustainable Future”**.

This year, the committee has received 31 full paper submissions covering the field of atmospheric/ionospheric science, remote sensing (science and technology), biospheric science, geospheric science, general forestry, and community-based development and social economic science. The 2015 **HSS-ISSH** participants were students, researchers and lecturers coming from Japan, Malaysia, and Indonesia.

On behalf of the committee, I humbly thank you to all authors for the contribution and also dedicated editor team members who have spared their valuable time to take all the great efforts in the making of this proceedings.

Lastly I hope this proceedings will be a useful source of information and achieve its primary objective of disseminating new experiences and information to researchers, academics, policy makers and students.

Bogor, 30 December 2015

Apriwi Zulfiri, M.Sc
Chairman of ISSH 2015

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COMMUNITY INSTITUTIONS ON RAWA DANAU NATURE PRESERVE

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Abstract

The forest area has experienced a lot of pressure due to the increasing of encroachment activity over last decades. The existence of communities around forest areas plays an important role for the preservation effort because the function of these efforts strongly associated with interaction or society behavior. This study aimed to explain the community institutions that affect the function of forest management. The method used was a case study, in which data collection is done through in-depth interviews and participant observation. The results showed that the villagers of Cikedung knew the existence, meaning, functionality, and benefits of Rawa Danau Nature Preserve; also the rules that apply in the management of Rawa Danau Nature Preserve, as well as the status of the land that is in the nature reserve area of Rawa Danau Nature Preserve. Communities had developed some system of arable land, which is cultivated on their own system/heritage, maparo (profit-share system), pawn, and replace power. Economic factors became the main reason that caused encroachment activities being conducted by people in the area of Rawa Danau Nature Preserve. Various efforts have been made by stakeholders to overcome this encroachment activities, but it has not yet run optimally because they still tend to be project-based.

Keywords: *encroachment; institutions; nature preserve; rawa danau; stakeholders*

Introduction

Most of the conservation area is located at the area that loaded with conflict due to overlapping of various interests. According to Mehring et al. (2011) one of the reasons that cause it happen is because the formal institutions of government policy are not conformable accordancing to the needs of local communities. In line with the statement, Wiratno (2004) argue that the conservation community must help local communities to protect natural resources and fight against the global pressures, as well as develop mechanisms involving the various stakeholders. Feyrerabend et al. (2004) states that almost in all conservation areas in the world there are local people who live in surrounding protected area are depending on the conservation area. It proves that the achievements of sustainability in a conservation area are not being separated from the interaction or behavior of the people around it.

The research that conducted by Salampessy et al. (2015) demonstrated that the sustainability of conservation resource is maintain when community apply traditional ecological knowledge and establish the institutions; so that they are able to adapt and modify the environment as a form of owned cultural capital. In order to encourage the government policies to take side to the local institutions, Febryano et al. (2014) stated that the collaboration of various stakeholders is needed to improve the bargaining position of local institutions. In fact, according to Susetyo (2014), when the relationship between protected area administrator and local communities are in harmony, then it can be one solution to the problem of the high cost of exclusion in the management of conservation areas.

The research on the role of local institutions in the management of conservation areas is crucial because the collective action undertaken by community through local institutional encounter many success, on the other hand organizing the conservation area management sponsored by the state are often doomed to failure. Therefore, this study aims to describe and explain the role of local institutions in the management of conservation areas, especially the nature preserve. Those Knowledge and

awareness will benefit various parties that involved in making a fair, prosperous and sustainable recommendation for conservation area management, so that this region can be preserved and beneficial for all parties.

Materials and Methods

The study was conducted in the village of Cikedung, District Mancak, Serang, Banten Province. Cikedung village is chosen as the study site since in this village there are three groups of people that doing their activities in the Rawa Danau Nature Preserve and those people are the official settlers, squatters and illegal tenants. This study uses a case study where data collection is done through in-depth interviews and participant observation. It's Involving interviews with 38 key informants. Data analysis was performed by analyzing the organizational and institutional of community (Uphoff 1986; 1994).

Furthermore, according Uphoff (1994), most of the local institutions is better seen as an organization rather than institutional. This happens because the local institutions have not gained status and institutional quality as a result of achievement and gained appreciation from the public. Capacity building at the local level includes the establishment and strengthening local institutions so as to strengthen the organization should be focused on the role and process of decision-making, resource mobilization and management, communication and coordination, as well as conflict resolution. So when these functions are carried out effectively, the organization will build support, loyalty and commitment that enables organizations to function more effectively, thus further increasing institutional status.

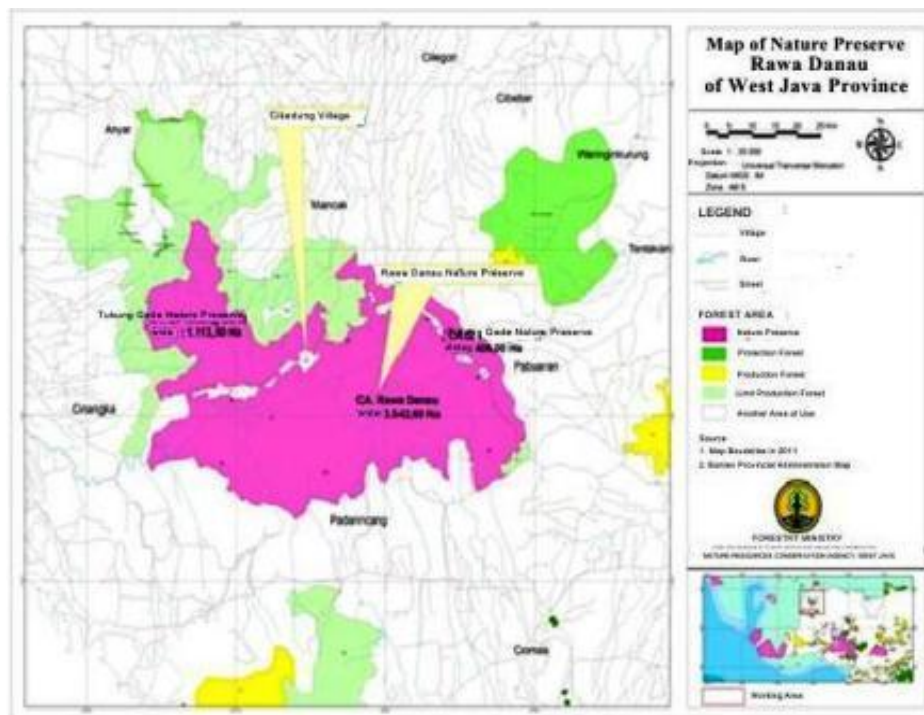


Figure 1 : Map of Nature Resources Conservation Agency. West Java Province (2014)

Results and Discussion

The Exploitation of Natural Resources at Rawa Danau Nature preserve

The forest area of Danau Nature preserve is about 2,500 hectare has been designated as a nature reserve by GB (Besluit van den Gouverneur-General) No. 60 Staatblad 683 on November 16, 1921. Administratively Rawa Danau Nature preserve area is included in the district of Serang, which is divided into three districts, namely: District Padarincang, District Mancak, and District Pabuaran. Based on the geographical location, Rawa Danau area is located at 06⁰8-06⁰11 LS and 105⁰56-- from

106⁰56 to 106⁰04 BT with a height of 80-200 meters above sea level and is 37 km from the city of Serang.

Rawa Danau Nature preserve is an old volcanic caldera surrounded by hills Tukung Gede in the north and east which is also designated as a nature reserve Tukung Gede and a higher plateau in the southwest. Almost every time most of the forest floor is submerged by water with various depths of swamp from 2-10 m. About 15 small rivers flow in the region and flow to the west area which is the river Cidanau. Almost the entire region of Rawa Danau Nature preserve is a watershed (DAS) of Cidanau River. The reason to decide Rawa Danau as a Nature preserve area is to protect the flora and fauna that represent the forest ecosystem of fresh water (fresh water swamp forest) in Java and as a very important natural heritage since it is the only area ecosystem freshwater swamp forest and the only peat swamp forest that remain in Java. The plants that grow in Rawa Danau Nature preserve are dominated by a mixture of peat swamp vegetation. Endemic species that found in this area are *Derris danauensis*, *Glochidium palustre* and *Alocasia bantamensis*. Type of woods that used among other residents is including: Bayur (*Pterospermum javanicum*), Tangtalang (*Elaeocarpus obtusa*), Gempol (*Anthocephalus cadamba*), Jajaway (*Ficus sp*) and Mahogany (*Swietenia sp*). Protected animals include: Golden fish (*Cyprinus carpio*), Beunteur endemic (*Rasbora aprotaenia*), Fish Lendi (*Clarias nieuhofi*) (Setiadi, 2000).

By the wide of area around 2,500 ha, with the type of soil humus and alluvial Gleis Association gray, this land is a potential land for cultivation. This potency is used by the community, they often convert this land into paddy fields. The most fertile land and potential one is on this Cikedung block. Cikedung community used the land to grow rice during two cropping seasons and sometimes one growing season if it floods. Besides, they also exploit its potential by cutting wood for building public facilities and for firewood from the wood that has dried. The type of wood that is taken is Bayur wood. This timber extraction increased according to the increasing encroachment of land primarily for building huts/shacks. Timber extraction was identified by performing an incision (turn off / drying tree in question), it is certainly threatening the existence of this forest. Even fishing in this village is so often done by the community and the most fish that taken are catfish and fish Lendi. This activity certainly has implications to the ecosystem of the region.

The emergence of enclaves within the Rawa Danau Nature preserve occurs through a long process in line with changes in the chemical structure of biophysical and wetlands as well as by the colonial government policies that do depletion by deepening outflow of water from the lake through a waterfall Betung in 1835. This condition causes the forerunner to the enclave in Rawa Danau Nature preserve (Setiadi, 2000). The emergence of enclaves becomes an important determinant for the conservation of the Rawa Danau. This is because the enclave tends to increase and spread over several blocks watershed (DAS) which each constitute a separate village. Based on the results of surveys conducted by NGOs Rekonvasi Bhumi (2011), it's identified the number of squatters some 545 people (HoF) consisting of 533 men and 12 women, while the clearing area are identified as many as 31 blocks with an area of 851.80 hectares. Rawa Danau Nature preserve first opened by the tenants around 1965 with the construction of huts by people until the area develops into village (Rokhnani 2005). The identification results conducted by Nature Resources Conservation Agency (BKSD) in 2004 showed that of the total area Rawa Danau Nature preserve is about 2,500 ha, approximately 845.13 ha (33.81%) or 1/3 the total area of land has been tilled for agricultural crops such as paddy field and palawija. This activity has significant implications for the decreasing the total area of swamp forest and aquatic (Darmawan, 2002).

Natural resources exploitation that ignores Nature preserve principles has show a negative impact on the functionality and avail of Rawa Danau Nature preserve. According to Melisch (1993), the land encroachment have an impact on the benefits and functions of Rawa Danau Nature preserve such fluctuations of Cidanau river water discharge is too high, the loss of several specific wildlife habitats, and reducing the area of the buffer zone which has functions to protect swamp forest ecosystems in Rawa Danau Nature preserve. With Cidanau river water discharge fluctuations, it will disrupt the function of the nature reserve in maintaining the sustainability of watershed Cidanau which is very vital in the providing water for the citizens of Cilegon and Serang and Cilegon industry. Resource exploitation in Rawa Danau Nature preserves is a threatened for the sustainability of area survival function. Agricultural activity and settlements in the north and south as well as the clearing of land for agriculture and water uptake causes the acceleration of erosion succession, eutrophication and

draining that cause the changes of the ecosystem. The use of pesticides for agriculture, fishing and logging threatens endemic species that are protected in this region.

Besides of the land, the water in this area is a natural resource that has great potential. This swamp is a meeting place for several large and small streams with one of the function of Rawa Danau Nature preserve is as a flood control on Cidanau watershed that empties in the Sunda Strait. Aside from the community, Cidanau watershed water is used by Group Krakatau Steel in Cilegon. Water uptake by Krakatau Tirta Industri (KTI) in Cidanau watershed is located at 2 km before the beach in the area Cinangka. This proceed of water has the capacity of 2 m³/sec. Later, this processed water is distributed for industrial and domestic consumption. The need of water has increased, especially during the dry season due to fluctuations in water discharge. It makes PT KTI frequent cleaning water weeds in waterways Cidanau. The cleaning has the impact of accelerating the silting and succession of the swamp. Meanwhile the availability of water in the swamp ecosystem is required by organisms that need water such as fish.

Local institutions in Rawa Danau Nature preserve

Communities around the Rawa Danau Nature preserve are generally farmers who have average educated of elementary school that rarely have other capabilities aside of farmers. This matter has implications for the increasing need for land. The standard quality of people welfare around Rawa Danau Nature preserve, especially the people who work on land in this area is generally poor. Their houses are mostly house on stilt and bamboo chambered, although there are some of houses that have been permanent. Residents around the region are mostly migrants aiming for arable land. Until the 1990s the number of immigrants is increasing alarmingly that caused a third of the area turned into agricultural land (Darmawan, 2002).

Cikedung village is a village that directly interacts with Rawa Danau and Tukung Gede Nature preserve area since it is located right between that areas. Based on monograph of Cikedung village, in 2014 the total population is 1729 inhabitants. The people in the Cikedung village divided into three (3) characteristics of the community, namely: *First*, the official Settlers (enclaves), they are the community of people who already there before the appointment and establishment of Rawa Danau Nature preserve region has existed. *Second*, the illegal settler community, the community of people who live inside the areas and even building houses in the area of Rawa Danau Nature preserve. *Third*, the community of squatters, they are the community of people who work on land in the area of Rawa Danau Nature preserve. Most of Cikedung villagers are comes from Serang area. The presence of migrants whether from Bandung, Ciamis, Tasikmalaya, Pandeglang, and Cirebon, caused by the bond of marriage, and this immigrant population is mostly become a community of illegal settlers and squatters. Society already has an understanding and knowledge of the role and function of the area. people have understood that a wide range of activities that disrupt or impair the function of nature reserve area is not permitted, also not allowed to take wood and animals around the area and they may not work the land in the nature reserve area but because of the economic needs, the activity of exploiting natural resources in the region such as land encroachment, fishing and logging are still hard to break.

At the level of village government, there is a system that still perform to choose the village chief, it call "Jawara" system (People who have the fysical strength). That system allows the community to give full support to the person who has the power to fight for the rights of people, especially to face the conflicts with area managers. Moreover, individual problem solving society continues to be fought by each individual. The people have not been well organized in a community organization. Currently, existing organization that exist is formed by the area manager of Community Rural Conservation (MDK), which has the goal of empowering communities through livestock support worth Rp.40.000.000, - for each group and the group was finally formed two groups with the number of each group around 20 people.

The society is carrying out the system of arable land consisting of working on their own land/legacy, Maparo (profit sharing), Pawn and Replace Power (Rokhani, 2005). The working on their *own land System/legacy* is the system of work where the plots tilled by owner either ground-owned or areas where arable lands are opened by them and carried from generation to generation, usually the claim area of arable lands is quite wide ranged between 1-3 hectares. Tenants on this land are usually wealthy and respected by community (public figure). *Maparo* (profit-sharing) system is a system

where tenants working on arable land owned by another person or land area that has been opened with certain compensation agreed by both parties. Generally, the distribution yield is 50% to 50% for the tenants and land owners. Maparo system applies on property land or in land area. *Pawn system* is a system in which landowners provide arable land for cultivation to others to pay the cause of the borrowing money within a certain period, if the loan money has been repaid and then the land is returned to the land owner. *Replace power* system is a system in which tenants pay a claim to the first tenants in exchange for the work to open up land for cultivation in the soils. The growing of arable system imposed by the villagers Cikedung is related to the role of other parties who also take benefits from the result of community arable (Free rider). The result of this research identify there are role of the actor / merchant (loan sharks) that actively lending money to the community and the role of land owners from outside the village who manages the arable system in this society.

Factors behind the occurrence of encroachment activities that undertaken by the community around the Rawa Danau Conservation area, especially by people at Village Cikedung partly due to the relatively low income levels (Rp 1.500.000 / Household), lack of jobs and high encouragement from others or acquaintance to encroachment inside the area. For this reason, it is necessary to increase the community empowerment program for improving the local economy and conservation education in order to form understanding of the importance of preserving the region. The importance of increasing the capacity of the community can be done by increasing awareness and better education about the causes of degradation and possible solutions, as well as assistance to develop alternative sustainable livelihoods.

Involvement of Various Stakeholders in Management of Rawa Danau Conservation

Technical Supervision of Rawa Danau Nature preserve including the Resort working area of natural resource Nature preserve Subsection (KSDA) Banten. While the executive of technical field is done by the field rangers office cooperate with surveillance center at the Resort BKSDA Nature Reserve Rawa Danau and Tukung Gede conservation . There are many attempts were made by the area manager to solve the problems above, such as: (1) Regular Patrol either independently or joint patrol with rangers n community, (2) Actively performing counseling, (3) Making the affidavit of termination encroachment to stop their activities, (5) Coordination with stakeholders including Muspika and community leaders in order to overcome the region encroachment of Rawa Danau Nature preserve.

Furthermore, in order to tackling the encroachment activities, the Local Government issued various rules and agreements including :

- (1) Regent Level II Regional Head Serang District through letter No. 750 / 280-017.4 Huk-Ek / 1985, dated April 6, 1985 banned the use of land around the Nature Reserve of Rawa Danau Nature reserve, tenants were resettled to Sumatra (Riau and Aceh) as many as 274 KK.
- (2) In 1987 is known that the tenants there are coming back, then Regent Level II Regional Head serang District warned back through letter No. 470/575 / Pm. / 1987, dated October 11, 1987, nature reserve area Rawa Danau Nature preserve is completely free from the cultivation and illegal settlements,
- (3) On January 9, 2006, "Juheni: PHBM Right For Cultivators Rawa Dano"; Member of Commission A of the DPRD Serang asked the central government through PT. Perhutani to immediately implement a program of collaborative forest management (CBFM) for tenants in the Rawa Danau Nature preserve
- (4) On 13 January 2006, "Pandji: Cultivators Rawa Dano resettled"; ASDA II Pandji Tirtayasa: Serang District Government will offer resettlement as one solution to the problems of the rural landless Rawa Danau Nature preserve region. Perhutani in collaboration with local governments to develop CBFM around Rawa Danau Nature preserve and Local Government expect water use Rawa Danau Nature preserve aside profits to empower communities.
- (5) The year 2010 the new Head Resort, Mr Dede Rusdirman take a firmness attempted to eliminate encroachment activities/illegal cultivation in the region.

Several of rules are made by the Government in this area has not been significantly provide a way out for overcoming this encroachment activities. Efforts to settle the boundary that often become a conflict between the community and the manager has been attempt for its solution. Gege land settlement boundaries Cikedung village with nature reserves have been done administratively

settlement with settlement boundaries by Hall Strengthening Forest Areas (BPKH). However, often time people still claim the land as his own. Poor education and economic urgency become a obstacle factors in efforts to settle the conflict. On the other hand, people have not been encouraged to participate in the management area, people only considered as a burden instead of working partners, that's why the effort of law enforcement and settlement encroachment has not been resolved. The management tries to improve the community through conseling and empowerment activities, which is until now has not had significant impact for the community. The weakness of institutions in management of Rawa Danau Nature preserve suggests that regional management organizations fail to meet the needs and expectations of the community to be actively involved in the sustainable management of the region, especially to resolve the encroachment of land conflicts, the manager has lost the support and his institutional status. In this case, the involvement of various stakeholders is required.

There are several roles performed by multiple stakeholders with interests At Rawa Danau Conservation such as: Environmental Management Agency (BPLH) of Serang Local governments activities: Providing the seeds, setting up the warning signs, also socialization the function of area for the public. Nature Resources conservation agency (BKSDA) in West Java also actively improve the function of the area with extension programs and economic empowerment program through the provision of livestock and bee cultivation. The Ranger is contributing to the security of the region and actively assisting in outreach in the community. Forum Communications DAS Cidanau (FKDC) is a forum led by the Governor of Banten involving 60 government agencies, private sector, NGOs, universities from the provinces of Banten which served to increase the participation of various stakeholders in it in water resource conservation efforts in the watershed Cidanau this time those stakeholders is planning to conduct Environmental services reward program cooperate with KTI as the effort to ensure the stock of water. (Kompas, 2015). PT. Krakatau Tirta Indonesia (PT.KTI) is a company that using the available water resources in the nature reserve area Rawa Danau Nature preserve. There are some roles that performed by KTI for society Rawa Danau Nature preserve, such as: Providing seed for planting trees in Rawa Danau Nature preserve, supporting the counseling activities for the community, as well as the provide the incentive funds to 16 teams local community (PAMHUTSWAKARSA) and Non-governmental organizations (NGOs) named Rekonvasi Bhumi which contribute the effort to preserve Rawa Danau Nature preserve region, including: conduct the research on the various activities of encroachment in Rawa Danau Nature preserve, support the joint socialization cooperate with managers, and conduct the environmental Nature preserve education for student (high school level) around Rawa Danau Nature preserve.

The role that conduct by stakeholders have not well collaborated yet. Each party perform its own role independently and it's make the problems in this region are not optimally overcome. Although the benefits that can be gain from the Nature preserve for the survival of wildlife and ecosystems as well as the surrounding community is related one to another. Disruption or destruction of one part will affect the entire region, that's why the management should be done thoroughly and integrate with the supporting factors in the part of system to maintain a substantial presence and its function. (Mc Nelly, 1992 in Wiratno et al 2004). Collaborative management is consider as one of solution to overcome this problem of Rawa Danau Nature preserve in which each party has a difference in terms of capacity and management focus, both are expected to be complementary rather than making competition with each other in implementing their role (Wiratno et al, 2004).

The Local institutions have an important role in the management of conservation areas. Exploitation of resources by various stakeholders has affected the function and role of the region is increasingly concerned. The institutional of local society dominated by three character of community has a high dependence on the region and has important implications for the sustainability of the region. The involvement of various stakeholders is indispensable for strengthening the local institutions for the preservation of the region.

Local community institutional in the village of Cikedung should be strengthened through collaboration between the Government, local NGOs, national and international, universities, research institutions, private companies through CSR, and others. The collaboration is expected to improve the bargaining position of local institutions

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