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Environmental destruction management and natural resource conflict resolution due to illegal mining (case study in illegal mining at limited production forest of Bone Bolango Regency) Sukirman Rahim Primary School Teacher Education Faculty of Education Gorontalo State University Gorontalo City, Indonesia Email : sukirmanrahim@ung.ac.id This study is aimed at describing the existence of illegal gold mining within the area of limited production forest of Bone Bolango regency which caused some environmental damage and pollution in the body of water in the area of Bone watershed as well as causing conflict on the environment biophysics, and mapping the role of actors or institution within that conflict. The conflict between local community and the Gorontalo Minerals Ltd on utilization of limited production forest space.

The need for environmental management and appropriate conflict management which acceptable for all, government, local community, and company. Management which identify the cause and solution to minimize or reduce conflict. This study is a descriptive qualitative study with study case approach through field observation, parameter quality test, literature review, interview, and group discussion. This study reveals that there is an environmental damage such as mercury leakage into the body of the Bone river with the level of mercury >0.001 and with pH 7.25. Hence, it polluted the Bone river. The highest sediment is found within Tulabolo watershed by 196,430.26 tons/year and the lowest sediment is found on Nagata watershed by 42,113.6 tons/year.

Conflict between miners and company due to various actors involved in management of the limited production forest such as the village government, investor, miners, member of parliaments, local government officers, and law enforcement officers. This conflict has

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Email. transbahasa.go@gmail.com / Phone. +62 853 9862 5876

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led to social and economic jealousy within the community, which only benefits several actors.

Thus, physical conflict on spatial occupation is inevitable. Keywords: Environment, Conflict, Forest, Community INTRODUCTION The supporting components of environmental quality is forest, land, and water resources. These components are the basic capital for development that need to be properly manage and utilized for the welfare of the community by taking into consideration its long-term service and preservation of the resources.

Forest, as one of the main components is an ecosystem unit which consists of natural resources dominated by trees and is an integral part of other environmental components. The contribution of management and utilization of forest as mentioned in the national development framework has caused various negative excess and conflicts (Law (henceforth will be called UU) No. 32 of 2009 on PPLH, Chapter I, General Term, Article 1 (1 &2).

Level of forest destruction due to community activities such as farming, rattan cultivation, and illegal mining can be commonly found across Indonesian forests. The community claim the forest area as their source of livelihood. This claim by local community often caused conflict with companies who have the concession permit for cultivation the forest resources.

According to Rahim (2013) the average mercury released into environment due to mining activities are 20 units x 8 trommel x 0,5 kg Hg x 6 times processing = 480 kg mercury/day. This is the current condition. On the other hand, the region's capacity for damage control is very limited. The level of mercury released into the body of the Bone river which delta is Tomini bay in Gorontalo city has caused severe pollution.

This condition is often utilized by certain actors to frighten the community for the benefit of the company to be able to exploit the forest area which they have the mining concession. In addition, law enforcement cannot be effectively done as the capacity of the forest management unit is lacking compared to the gigantic problems that this unit are facing. Initial observation reveals that conflict in this limited production forest can be

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classified into two, latent conflict and manifest conflict.

First, latent conflict is basically on policy level. The undistinguishable authority between the ministry of ESDM (energy and mineral resources) and KLHK (ministry of environment and forestry) has impact on companies who have concession rights in cultivating the mining area within **the Bogani Nani Wartabone National Park**.

Second, the manifest conflict is rooted on the inability of the local government to prevent the emigration of illegal gold miners into the forest area, both local people and emigrants. This study will first describe the influence of mining on the biophysical condition of the forest area. second, map and describe the role of actors and institution in these conflicts.

RESEARCH METHOD Research method is considered as a set of process which consists of problem approach and method selection to produce necessary data. This study will describe facts and information obtained from the field, both directly and indirectly. The samples are drawn using purposive sampling technique. The sample criteria are villages inside and outside the forest area. The interviewees are selected purposefully from almost homogenous population.

The selected samples are the head of families who have correlation with the utilization of forest resources. The number of the head of families are 6,175. However, to collect necessary indepth information, snowballing technique is used. The data analysis are carried out in three parts, 1) content analysis; this analysis is carried out to strengthen and harness the issues within the study using relevant research result, journal, documents, regulations, ministerial decree, government regulations, and the focus group discussion result; 2) interpretation of ArcView GIS version 3.3 analysis. This analysis is necessary to see the biophysical changes of the limited production forest through map overlay using this ArcView software.

This biophysical condition then followed by measurement of environmental parameters; 3) synthesis, various results from partial analysis is descriptively synthesized and becomes the basic to formulate various alternatives of environmental destruction management and conflict resolutions from the involved actor mapping. **FINDINGS AND**

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DISCUSSION Biophysical Condition and Forest Environment The result of spot image overlay of the Indonesian Map with the forest area of Gorontalo province which showcased several resident areas and illegal mining by the local community which belongs to the concession area of the mining companies.

Areas utilized by the community for illegal mining activities are hard to identify by merely using the map. Therefore, to identify the illegal gold mining location, the coordinates obtained from the field using the Global Positioning System (GPS) is used. The mining sites within the forest area includes some Tulabolo and Bondawuna villages in Suwawa Selatan Subdistrict, and Tulabolo Timur, Tulabolo Barat, and Bangio villages in Suwawa Timur Subdistrict.

Based on the Indonesian Map with the scale of 1:50,000 issued in 1991, Satellite Image of ETM Landsat in 2005, Alos Image in 20006, and the ground truth in 2010 on land utilization of Bone watershed in 2010 reveals that the land utilization is dominated by forest by 81.32% which consists of primary forest 50.19% and secondary forest by 31.13% of the total area of the watershed. The primary land area is 5,230.029 ha (57.75%) and secondary forest area is 2,846,951 ha (31.44%) meanwhile dried land farming area is 220,998 ha (2.44%) and wetland area is 125,817 ha (1.39%), bushland area is 236,643 ha (2.61%) and is feasible for farming area expansion to support the increase of regional revenue from agricultural sector as one of the main revenues for this region.

The plantation area is 300,251 ha (2.44%), and residence area is 72,036 ha (0.80%), and body of water is 23,593 ha (0.26%) from the total area of watershed. The impact from this land utilization has caused high sediment in the body of water of Tulabolo river. The analysis of sediment reveals that the highest sediment happened in Tulabolo sub watershed by 196,430.26 tons/year and the lowest is in Nagata sub watershed by 42,113.6 ton/year.

This high sediment is due to the rapid erosion in the Tulabolo sub watershed, thus caused many materials to be lifted. This is worsen by high rainfall, which increased the river debit and quicken the sediment transport to the delta of the river. Balihrsti research (2009) showed that the residue of gold mining using mercury (Hg) has polluted

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the Bone river as seen in Table 1 below.

Table 1 : Result of Quality Test of Bone River Water

No	Parameter	Unit	Test Result	Maximum allowed level	Method specification	Class I	Class II	Class III	Class IV
A. PHYSICAL									
1	Conductivity	uS/Cm3	72	(-)	(-)	(-)	(-)	(-)	(-)
2	Total Dissolved Solid	mg/l	198	1000	1000	1000	2000		
3	Total Suspended Solid	mg/l	13	50	400	400	400		
B. CHEMICAL									
1	DO / Dissolved Oxygen	mg/l	5.61	6	4	3	0		
2	BOD / Biological Oxygen Demand	mg/l	0.63	2	3	6	12		
3	COD / Chemical Oxygen Demand	mg/l	0.58	10	25	50	100		
4	Mercury (Hg)	mg/l	<0.001	0.001	0.002	0.002	0.005		
5	Ammonia as N	mg/l	0.05	0.5					
6	Nitrate as N	mg/l	0.33	10	10	10	20		
7	Nitrite as N	mg/l	<0.01	0.06	0.06	0.06	(-)		
8	pH	-	7.25	6-9	6-9	6-9	6-9		
9	Phosphor (P)	mg/l	<0.15	(-)	(-)	(-)	(-)		
10	Sulfate (SO4)	mg/l	12.80	400	(-)	(-)	(-)		
11	Lead (Pb)	mg/l	<0.01	0.03	0.03	0.03	1		
12	Phenolic	mg/l	<0.1	1	1	1	(-)		
13	Oil & Grease	mg/l	<0.1						
14	Detergent (LAS)	mg/l	<0.1	200	200	200			

Reduction of vegetation is seen through massive number of trees being cut down and the some of the trees are taken and used by the community as fire log, and some as log to be sold.

The fauna in this forest area who feel threaten with this logging are often spotted in the residence area up to the lower part of the hill. According to Alikodra (2010) in general wildlife creature's management has interest in regulating number of individuals, increase or decrease of the birth rate, increase or decrease of the mortality rate, or to regulate its habitat to change the population density and species spread.

The fauna in this forest are often captured to be sold or slaughtered by the community such as Anoa (endemic animal that looks like a mix of wild boar and deer). Various

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destructive community activities spotted within the forest area are presented in Figure 1 below. Source: Documentation from 2008 and 2012. Figure 1. Various Community Destructive Activities A. illegal logging, B. Anoa being captured by the community, C. destructive activities for mining purposes, D.

Protected endangered bird Biophysically, all mining activities are destructive to the balance of forest ecosystem. The pollution in the body of the river, loss of vegetation due to land clearing activities, the threat toward the habitat of the endemic and endangered species, loss of carbon storage area, and destroyed research site, and the undervalued ecotourism service.

The common sight within this forest are now small tents covered by tarps and the sound of the motor to run the trommel, which disregard the forest functions. Government efforts often faced "resistant" as the offered solutions are unable to replace the community income. Actors and institutional involvement within the conflict. The findings and analysis from several previous studies as well as new findings in the field, revealed that there has been "negligence" toward the conflicts.

These conflicts appear to have not accidentally emerge, rather, they look like some scenario set by some actors to achieve individual purposes. Revealing a conflict needs to be carefully done, especially conflict related to ethnicity, religion, or election conflicts. Nevertheless, conflict in Bone Bolango regency is slightly different as it is a conflict of forest area disputes for mining purposes.

The conflict has fluctuated in the last decade. The conflict was accumulated in 2010 when there was an overlapping of the National Park area being proposed within the spatial planning (henceforth will be called as spatial planning or RTRW) document to be downgraded into a Limited Production Forest (henceforth will be called as HPT).

However, the "conspiracy" between government and company was leaked into the community, hence, triggered a conflict. Wulan et.al (2004) wrote that conflicts that often happened in protected forest areas are due to overlapping of concession area or protected area with the area occupied by the community and due to the limited access of community to gain the benefit from the forest, either to obtain its resources or as

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residence area.

This accumulation of community's dissatisfaction is often topped by the efforts of local government to try preventing the community from gaining access to the forest with the assistance of armed forces. This had happened in 1992, when an effort to force the illegal gold miners out from the forest was led by a police officer. This eviction effort was due to the company report to the police that there was a mining activity within the company's mining concession area.

Efforts to evict the illegal gold miners/local miners from the forest is often taken when there is a conflict in mining area as well as when there is a report from the community on the destruction of forest and the pollution of environment. The actors in this study are mostly played the role of individual interest and group interests.

The involvement of these actors within the conflict can both strengthen, weaken, or cover up the conflict. The actors referred in this study are local community within the forest area, community leader, miners, investors, religious leader, village officers, political figures, police or army officers, member of parliaments, member of NGO, and antagonist figures.

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Source: processed data, 2012 Figure: The result of conflict mapping in Limited Production Forest (HPT) Bone Bolango From this figure, researcher carry out actors mapping based on the result of meetings and analysis on the involvement of actors and institution in the field. I was not focused on the conflict between the community and the company, rather on the chain of conflicts that has been discussed on as the variables that caused the conflict and from the findings on the crucial role of central government which has made conflict escalation.

Since the second generation up to the seventh generation of concession area contract (henceforth will be referred as KK), it has had a strong implication on the community livelihoods, especially those who live in the surrounding forest area. The existence of the company has created various perception and feedback from the community.

This was worsen by the involvement of actors who want to gain individual and group benefits, involvement of political figures who had also added the dynamic of conflict. On the other hand, environmental management is a program implemented by a company or business owner to ensure that their business do not cause any potential damage to the environment and carry out their business operation is environmentally friendly (Fahmi, 2011).

The role of Non-Government Organizations found in this study is categorized as institutional role, however, there are NGO actors who utilize this conflict for their individual purposes. Ideally, the role of NGO is only on assisting the community in formulating and designing the solution toward the conflict, and the offered solution in this case is the community mining area (henceforth will be called as wilayah pertambangan rakyat or WPR).

This WPR conflict gains positive responds from the community who expect that there would be some legalization or acknowledgement on the mining activities that they are currently operating within the forest area. However, this local community mining area is yet clearly understood by the NGO, including the Community Development for the people that would be relocated.

The community development concept is hindered by the regulation from the

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government. Community development involves social capital development, strengthening the social interaction within the community, unite them to communicate properly toward a true dialogue, to reach understanding and social actions (Ife and Frank, 2008).

From the conflict analysis (from interview and literature review) and focus group discussion with community representatives, government officials, NGOs, and company representatives. The following core of conflicts are identified: There are many activities within the Bogani Nani Wartabone National park which means there are various interests on the utilization of resources within the conflict area of HPT.

The ongoing conflict, lack of solutions, and resolutions has escalated the conflict, and made it more unclear for the utilization of conflict area became unclear on the rights to utilize the area and the resources within the area. This situation made an impression that the status of the utilization of HPT area is an open access without any significant control from the government.

The new opening of road access to Pinogu (an enclave sub-district within the national park) has increased the dynamic of conflict in the community and has impact on the environment. This situation needs a well-planned management. Horizontal conflict in the area between local community and the illegal mining, and vertical conflict in the bureaucracy (local-central) government.

Conflict in regulations also happened due to distribution of authority among the policy makers that often overlap and have unwanted consequences. Regulation related to utilization area who belongs to the concession area of the company and the community area are not written, hence, community feel that they are free to utilize the area.

CONCLUSION Data from sediment study revealed that the highest sediment by 196,430.26 tons/year is found in Tulabolo sub watershed and the lowest sediment was found in Nagata sub watershed by 42,113.6 tons/year.

The large amount of sediment found in Tulabolo sub watershed is suspected due to the illegal gold mining by the community. The destruction and disturbance toward endemic flora and fauna in this region is due to the forest clearing for gold mining. The existence

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of illegal gold mining, aside from its positive impact of increasing the income for certain individual and groups, its negative impact such as environmental destruction has outweighed this positive income. The mercury that polluted the body of the Bone river has exceeded its maximum allowed level of <0.01 mg/l and reduce the water pH to 7.25.

This condition has influenced the physics of the Bone river as the water source for Gorontalo drinking water company (PDAM Gorontalo). The complexity of the conflict in this area is also worsen by the interference certain actors and institutions. Political pressure through local government policy has caused the management of this limited production forest unclear.

The involvement of certain actors within this conflict has often caused negative effect. The actors referred here is the local community figures, investors, village officers, political figure, armed officers, member of parliament, and member of NGO.

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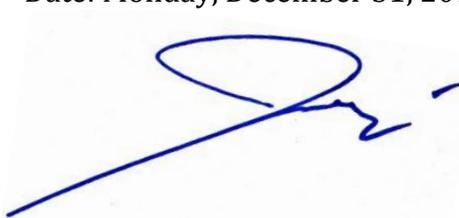
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Date: Monday, December 31, 2018




Novriyanto Napu, M.AppLing., Ph.D.
Director

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