

Public Perception and Participation in Environmental Preservation of Watershed

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(Received: June 9, 2015; Reviewed: Sept 10, 2015; Accepted: Aug 5, 2016)

Abstract: Environmental aspects have been some of the most argued about topics in society, including the role of the government as a stakeholder. Deforestation and illegal mining have been destroying the many ecosystems and rainforest habitats, including along the Katingan Watershed. The research objective is to describe public perception and participation in environmental preservation. The research used descriptive qualitative method and applying Spradley Domain Analysis. Primary and secondary data were obtained directly from field informants using interviews, observations and documentation. The research results show that the people's perception and participation in environmental preservation was categorized into two groups. The first group one stated that they did contributed out of personal and financial interests, whilst the second groups were simply following the instructions of the government and local leaders. In general, locals have different perception on how they utilize the natural resources. The management of natural resources was perceived as being done for economic reasons, with the assumption that it were used sustainably. People's involvement in preserving nature were affected their own needs either individually or collectively. Participation of the people in the conservation around the watersheds area was done for reasons of individual desire, solidarity, and to follow instructions from the government and Katingan Hilir leader. Environmental effort is carried out in activities aiming to protect and prevent damage to the area of the Katingan River. This lead to argue that diverse people's perception to preserving environment generates the difference participation in their awareness.

Keywords: perception, participation, and environmental preservation

1. Introduction

Deforestation is one of the main development issues in developing country, and Indonesia is no exception. Deforestation happens in almost all main island of Indonesia, including Kalimantan that covered around 17.3% over past ten years and by 2010, only 52% of total land area (Mettinen *et al.*,

2011). Forest has been destroyed due to fires, industrial logging, mining and intense land-use change that has impact on unbalanced ecosystem and natural phenomena. These activities are often considered as a precautionary indicator of water status; and these leads to water quality degradation, flood and drought, groundwater depletion, land sub-

sidence, erosion and sedimentation as well as seawater intrusion and this happen in Katingan River today.

Local livelihood throughout the Katingan watershed depends on its natural resources, including forest products (rubber, rattan, etc.), mining, agriculture, and fisheries. It is only accessible through water transportation along a tributary of the main river, making this lifeblood of the communities. In recent years, activities in this area have gradually decreased and this has had an impact on the economy, since it has become hard to obtain the main commodities of logs, rubber, and rattan. This problem is exacerbated by rising prices of the goods, and the silting of watersheds (increasing the sediment load) has a negative affects on water transport.

The river's siltation is a result of increasing soil moisture due to intense flooding (from upstream in the rainy season) that eroded the soil along the waterways. It is closely linked to the lack of protective vegetation along the riverbanks, which were lost as the forest around the river was exploited, even though according to the regulation of the Ministry of Environment and BPLHD Law No. 23 of 1997: "500 meters riverbanks side cannot be felled and should be being a conservation area functioning to restrain the rate of erosion into the waterways".

Uncontrollable deforestation caused the balance of the ecosystem in this region to be disrupted, leading to harmful floods and other disasters to begin to appear. Surprisingly, various events that arise are always treated with resignation and regarded as natural events "... all this situation happen is only part of natural disasters". The above

conditions are aggravated by the arrogance and greed of a group whose only concern is about profits and short-term interests, and without thinking of the continuity and sustainability of the forests. From the first observation, the Katingan community in general has a perception that the natural resources are for human beings and must be utilized as well as possible. This idea does not provide a positive indication in the circumstances, it can even be said that it is this perception that prevents the sort of good behavior that could prevent the environmental damage.

Perception is an internal reaction based on the impression, assessment, opinion, feeling, and interpretation of information one has obtained. Meider (1958) identified "perception-in-participation, meaning perceptual systems of an object enable one to participate as his/her awareness". The notion is that by perception a human can interact with his or her surroundings, for instance between humans and their environment, or humans with each other's. By sensing the nature conservation policy, people are expected to take on a social behavior in protecting the environment, and so contribute to awareness in the management of forest products as a preservation process. This has an indirectly effect on community income distribution (Suparwata *et al.*, 2016). It also can enhance the rural livelihood economy and has changed the way in which the majority of the rural agrarian communities view their farming enterprise (Mapila *et al.*, 2010) as one of socioeconomic development goals (Ekasari *et al.*, 2013) in globalizing economy era. It is still very important in pro-poor policy interventions, and the Indonesian government should

prioritize the revitalization of agriculture development (Arsyad, 2010) and critical land is one of the crucial issues to solve.

People taking part in the study seem to understand well that the forest in this region faces ruin if the exploitation of its products are not controlled, but by this understanding still has not translated into real action or the taking of precautions. Local's participation has also not been well coordinated yet, and it can even be said that their presence depends on the socio-economic benefits to the individual or group when doing activities that are preventing environmental damage. This leads to argue that in order to improve farmers behaviour (improving competency and participation), it is needed to step up performance of Agricultural Services (making action program properly, in other words) through extension program improvement, groups activity plan and operational cost management (Jamil *et al.*, 2016). Therefore, The objective of the study is to describe public perception and participation in environmental preservation.

2. Materials and Method

2.1 Research Site

This research was conducted in Katingan Watershed, Katingan Regency of Central Kalimantan, Indonesia (1°55'17.4"S 113°19'10.9"E) as displayed in Figure 1. Rainforest covers 60% of Katingan total land area of 1.780.000 ha, but the area of damaged forest is around 854.403,80 ha. Regrettably, environmental degradation and water pollution from decades; such as abrasion of riverbanks, silting of waterways due to annual flood; eventually reduce quality of

river water. The areas around watershed today is also facing the main threats such as open water bodies for settlements, burned forest for plantation, and illegal logging & mining which result in loss of valuable land. Extensive information provided from pre-survey respondents: "We have felt the impact of this environmental damage through the consumption muddy water from the river and increasing log prices due to the difficulty of finding them. It can be seen if we follow the waterways big trees are no longer found on either side of the riverbanks, and instead there are only large numbers of bushes or logged trees. Siltation is visible everywhere, piles of sand in the middle of the river are easily found, and this endangers the safety of passengers on water transport". Furthermore, Gold mining, non-timber forestry, and fisheries are the main source of livelihood for the local people. They mostly live within 50 m of the riverbanks. Data was taken in a specific location, Talian Kereng Village (population 1.352 with 328 number families) of Katingan Hilir District, area 66.300 ha (Table 1).

2.2 Interviews with Local People

The primary data collection techniques were in-depth interviews and observation, while the secondary data was collected using techniques such as documents, photos and statistics related to the focus research. The respondents were villagers, mostly from the Dayak tribe, who live around Katingan watershed, and were selected at random. Information was also received from (1) Katingan Hilir sub-district, who supplied data about the geography of the study areas, and (2)

Table 1. Land Distribution

Code	Village	Agriculture	Damaged Land	Settlement	Forest	Others	Total
001	Tewang Kadamba	157	3,246	3	75	119	3,600
002	Tumbang Liting	209	15,438	7	198	48	15,900
003	Kasongan Baru	0	4,902	32	1,985	81	7,000
004	Kasongan Lama	0	1,621	36	18,176	167	20,000
005	Talian Kereng	0	7,426	8	91	175	7,700
006	Banut Kalanaman	105	5,309	7	989	90	6,500
007	Talangkah	139	4,991	21	364	85	5,600
	Total	610	42,933	114	21,878	765	66,300

Area (ha) in different land use/cover categories from villages in Katingan Hilir district (Statistic 2010)

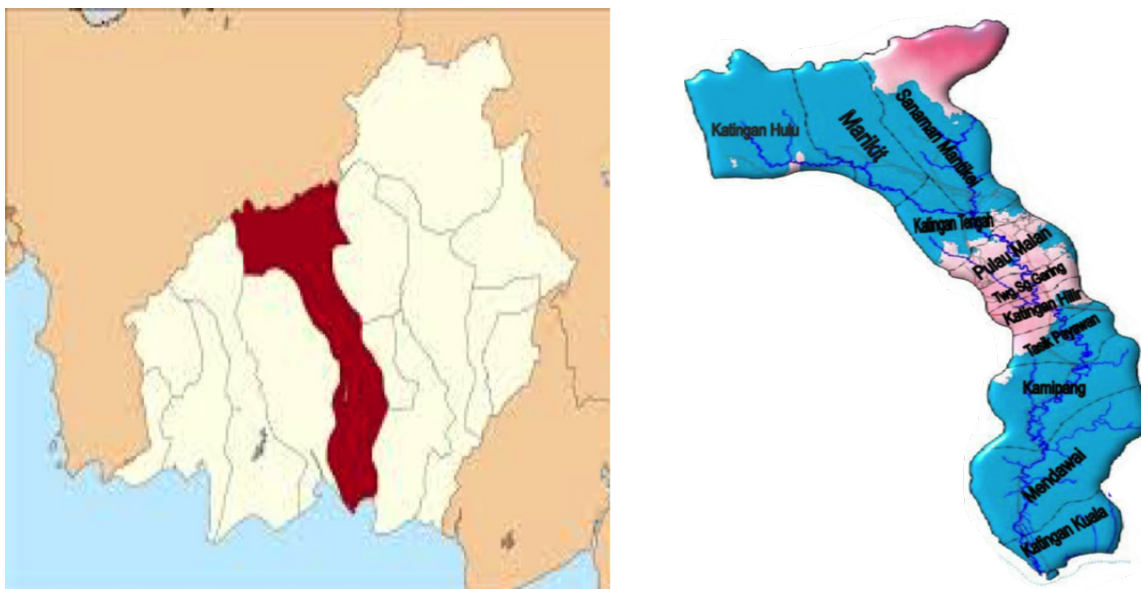


Figure 1. Map of Katingan District, Central Kalimantan, Indonesia

the chief of village, who provided information about local perception and participation in environmental conservation in general.

2.3 Data Analysis

Qualitative approach and strategy was used in the process study. Research assumes that individuals' or communities' livelihoods are often based on different motivations, coming as they do out of particular experiences and knowledge that shape a certain perception. Interpretative understanding of the subject is necessary in order to understand human behavior, and according

to Weber (2003) human behavior appears to be a consequence of perceiving the situation. To understand the public perception of environmental preservation in accordance with the condition, the researchers used a method 'emic perspective', that is, searching for concepts and ideas that are well known and familiar with the Katingan community. This is consistent with the opinion of Spradley (Bungin, 2001; Sholahuddin, 2005) who wants to learn from the community about the society's own concepts and idea of environment they live in, and what actions are carried out in response to it. Forms to take data

in village use a *Domain Analysis*, observing a social situation (set of behavior carried out by people in a social situation) to discovering the cultural scene (Bungin, 2007), and to assess possible variations of the domain, Spradley suggests to use some kind of universal *Semantic Relationship*. To ensure the validity of data used, the results of this study need to meet specific standards in accordance to their credibility, transferability, dependability, and conformability (Schwandt *et al.*, 2007).

3. Results

3.1 People's Perception on Environmental Preservation

Studies have made some general statements about the local understanding and perception of preserving the environment: (a) perception represents the internal reaction upon an object would lead to one's behavior. One respondent expressed it thus: 'the understanding of the environment is a mental activity that can produce either positive or negative behaviors. Furthermore, positive behavior that correlates to conservation aspects is generally found in somebody who has positive thoughts to preserve and maintain well the surroundings, (b) assessment of an object depends on the person who gives the interpretation of it. Interpretation is closely related to a person's education level. Someone with a higher education tends to produce a wider response in the object observed, (c) people do not understand well when the researcher asked a question about the decreasing environmental carrying capacity causing natural damage from internal and external factors, and/or increasing the

population. They only knew that the problems were due to many years of illegal logging in this area.

3.2 The locals' involvement of Environmental Activities

Respondents residing near riverbank have a diverse comprehension about preservation. One example was that of planting crops in the yards. Individual or groups did this work, and there was a large variation in the size area they cultivated. Their gardening techniques also have their own patterns, though they tend to cooperate with neighbors, and or three male workers take turns on cleaning the farm and then doing the planting. They plant varieties of fruits, vegetables, or any kind of long-term crops such as durian, jackfruit, *rambutan*, etc. They tend to consider this work as an effort to protect the environment, since they are utilizing the degraded land to be used as a productive land. Some locals also stated that environmental protection also includes actions such as household cleaning, gardening in the yard, cleaning trash in river, and planting mangrove on the riverbanks in order to prevent abrasion.

Nature conservation was also raised by one informant who chairman of Joined Farmers Group (namely GAPOKTAN). A Respondent stated: "... government provides counseling to group of farmers for the planting of seeds that we plant simultaneously on degraded land. They were planted in the house yard, in the river bank, and in some other places that are considered suitable for seed we received. These programs however have not been repeated again, the planting

of trees, so far as I can remember, was only carried out once". This statement shows that the government instructed this group to plant rubber, durian and rambutan, the activity was carried out jointly by the members. Furthermore, their involvement towards the environment are strongly dependent on their needs, and they tend to forget about conserving when they need to improve their own welfare, and it is in these situations when they often do things like plantation activities or slash and burn farming. For instance, when faced with particular situation that requires them to carry out a sustainable task, they then rapidly remember a positive attitude to the nature.

3.3 *Public Participation on Environmental Preservation*

A wide variety of responses obtained from informants relating to their understanding of participation as follows; (a) government has no significantly effort to preserving the environment in Katingan River; mostly just suggestion/advertisement such as forbid to throw rubbish in waterways, encourage people provide their own bin and clean their houses, (b) proven discovery of informants provide interpretation to protecting nature is how utilize as much as possible without destroying it. By this fundamental understanding, it would provide a positive contribution to stabilize the surroundings, although internal interest (economic factor) of person/group are still alarming the nature, (c) various complaints were expressed by some people when interview. Many of them are not concern on how they would sustain the nature. It is considered that the balancing nature

would repeat itself, which is means people do not need to act toward their surroundings, (d) villagers' involvement in preserving the environment are encouraging while we look at the number of partisipants who directly take part in reforestation by planting protective trees; ie. rubber, rambutan, durian, rambutan, etc.; and mangrove around riverbanks, although it is not by their own initiatives but by instruction from government, (e) unfortunately, government always urge people but they just act only a symbolization.

3.4 *People's Initiatives in preserving area*

Community activities were initially driven by government requests, and they typically receive the sources or funding necessary to start reforestation by preparing land and seeding treatment for plantation. However, one farmer noted while that this is happens once, it is rarely repeated, and even of the subsidies are allocated, and this led the villagers to not continue to maintain the action. The farmer's disappointment over the funds not being distributed to them resulted in them deciding to cultivate their own land to keep their independence.

Spontaneity effort. This effort depended on individual/ groups who have same interests, financial compensation for their family. It seems that how they react depends in part on how their ancestors acted: "Our whole family work as farmers. In general, most of my family's livelihood is sustained by farming including clearing land for gardening the short-term plants (Cassava) and long-term trees (Rubber). We never thought that our activities are part of preserving the

environment. Actually our work is driven as family needs, and if this activity is considered a good action to preserve the environment, then of course, I feel happy that have indirectly participated in environmental conservation efforts, even though my family and I did not realize this". It can be seen that they tend to work spontaneously without considering some factors, including season, weather, time and land they cultivated. They only planted kind of trees for food or furniture, which was considered as productive trees (rubber, rambutan, durian, rattan, jack-fruit, etc.) for family welfare. The interesting things here are community care in utilizing of degraded land that was formerly illegal logging activities.

3.5 *Human behavior on the environment*

Human behavior is heavily influenced by some basic factors, such as perceptions and environmental factors, both physical and social. Especially influential factors include mindset, customs, and beliefs, whilst supporting factors can be education, employment, cultural, and social strata. For all or these factors, the mutual relationship between humans and the surroundings is reflected through social behavior committed by citizens on nature. The behavior of the locals makes it clear that they are people who value nature highly and are always working to preserve it. They show this through their actions, such as only taking the things as needed. Another activity is to maintain and protect sacred trees (Spirit house for Dayak people who still in Kaharingan belief). These types of trees must not be felled both because it brings disaster on their belief, and because

some grows above the sacred graveyards. This is a clear demonstration of the local wisdom of the environmental that exists in the area. Adaptation to the environment that exists in the Indonesian citizen is something that has been passed down the generations, and guidance in utilizing its resources was part of the local wisdom of a society, so that through local knowledge people should be able to withstand the crises that befall them. The persistence of local wisdom in one place however cannot be separated from the influence of other factors that affect human behavior towards its nature in the longer term.

4. Discussion

Perception. People awareness toward environment is part of spatial perception; an interpretation correlated to the background, culture, mindset and experience of the individuals. A wide variety of perceptions is expressed by informants, playing an important role in their acceptance. The data analysis which obtained from the answers suggest that perception is a thought from someone which will later be realized or implemented into a behavior or actions.

Community has a positive perception towards the preservation and value of the environment; this can be seen from the people's behavior in managing their local surroundings, something that was initiated by the government or local leaders. This activity based on the nature of mutual assistance, and co-operation with a full sense of brotherhood. By analyzing respondents' views, it can also be said that their awareness starts with perception, such as when the forest

burn, they will shape the preparedness and rapidly cope with the possibility of damage caused by the fires. The act of perceiving is an adjustment process by adapting behavior to certain conditions. Hence, any perception that leads to the realizing of a behavior that

Table 2. Semantic Relationship suggested by Spradley

Semantic Relationship	Relationship Form	Explanation	Data	Find
Strict Inclusion	X is kind of Y	Natural Resources in Katingan watershed is a part of people's livelihood	Local perception in this area is the natural resources are there for human survival and must be utilized as well as possible	People's daily activities around Katingan watershed are gardening, cutting down trees, mining, etc.
Spatial	X is a place in Y	People lived in Katingan watershed are more dependent on their surroundings	People are involved in conserving nature due to reasons of personal income, for example planting or felling trees in their forest around where they lived	People's understanding that their family welfare is sourced from nature is part of their perception in preserving the environment
Cause Effect	X is a result of Y	People involvement in preserving natural resources is as manifestation in concerning their environment	Individual or group initiatives doing environmental activities	Local's own initiatives on participation are dominated by individual or group interest, either in order to meet their needs or else through various solidarity activities undertaken at suggestion from community leaders or government
Rationale	X is a reason for doing Y	Degrading environment has changed people perception toward the preservation	Some people's involvement in preserving nature are driven by personal interests People living around the river have a different perception in how they can implement their actions towards environmental preservation	People's mindset about preserving the nature is difference, it is dependent upon individual needs
Location for Action	X is a place for doing Y	Katingan watershed is a location to do research	The study is located in Katingan watershed, Talian Kereng Village	Katingan people know well that their environment has been damaged due to huge over exploitation, but their understanding not yet turned into real action to take precautions
Means-End	X is a way to do Y	Protecting the environment means sustaining ecosystems on earth	Perception in environmental conservation is an attempt to maintain the carrying capacity of nature	Community ideas in sustaining and preserving include nature are not doing activities that can damage it, such as illegal logging & mining in waterways. Also, if felling trees, they must also carry out reforestation so as to balance the environment
Function	X is used for Y	Forest prevents erosion that can result in flooding and maintain the people and ecosystem survival	The community worked together to resolve the various problems that exist, such as land clearing	Damaged land is utilized in gardening, planting crop trees; these have been done in group or individual as part of preserving nature
Sequence	X is a step (stage) in Y	Knowing people perception and participation to protect the environment will allow the government to establish and implement appropriate policies	Farmer's group, GAPOKTAN, planted trees in the riverbanks to prevent landslide, abrasion, etc. The government implemented a program in environmental management due to the local's needs	Protective trees are planted as an activity in preserving nature The community contributed to activities that were organized from governments and so have a tendency toward a particular purpose
Attribution	X is an attribute of Y	People awareness toward environment is part of their willingness to live peacefully	Logging and mining activities began to decrease in order to preserve the environment In local belief, certain types of trees should not be destroyed, such as the tree near the graveyard.	People are starting to reduce the range of activities that can cause damage to the environment. It is as a manifestation of their participation in preserving the nature Public awareness of environmental protection are formed through a variety of social situations

is both fast and responsive is highly desirable.

Involvement. Some methods are used to take advantage of forest products without damaging the biodiversity. People prioritized a mutual cooperation that fosters the wider acceptance of nature conservation measures; it can be seen that when there needs to be a work project, the chief of village will collect everyone and give out some brief information before it starts. They mostly implemented reforestation in critical land areas and around the ports of the Katingan river; the work is done together, some people preparing seedlings, some hoeing while others drive seeds into the hole. This can take place because of the principle on working together to resolve the existing problem. This attitude is represent as a reflection of local wisdom.

Preservation practices of the local people together with government are planting mangroves, rubber, etc. Another activity is also carried out with the tree selection system if they need timber to make houses, fire wood or furniture; that is, selective harvesting of mature trees leaving others as a seed source for natural regeneration. The emerging positive attitude is reflected in

the national policy on logging activities and nowadays farmers are gradually turning to work in agriculture, particularly farming in damaged areas where there is no landowner. They are however occasionally cutting trees for their own particular interest.

Participation. Many villagers took part in conservation activities on the suggestion of government authorities, while others did so due to individual values, but both of these imply a sense of responsibility to act. It can be said that this value can affect individual behavior in threatening their environment, and the behavior could be turn into positive or negative act. It is based on a public perception that is not always in line with the participation; positive perception does not always produce positive participation. Internal (family welfare) and external factors (government instruction) are main reason in their attendance. It is good that we still find participation measures that would not only benefit for individual but also the mutual group interests; this is evidenced by existence of the farmer's group, namely GAPOKTAN. This group consistently performs routine environmental activities, including helping landowners who need cultivate their own land to

Figure 2. Intercropping in degraded Land around river



Intercropping (rubber & pineapple) in degraded land



Hisbiscus trees around river

be planted. This act would have a high impact on conservation values.

Initiatives. Protecting the environment is an effort to maintain the capacity of the nature to cope with changing conditions from the negative impact due to human activities. This is highly dependent on their intervention in terms of managing or exploiting their area around the Katingan watersheds. Humans will seek to exploit natural resources to get a living from it, and this will indirectly affect the quality of the environment, and sometimes come up against the limited source support. In the long term, this will ultimately have an impact on the man himself.

Locals preserved their surrounding by planting productive crops such as durian, rambutan or other trees have high profit in degraded land. Even if they are more influenced by personal interests, they still consistently cared for the environment (see Figure 3). This is due to people's belief that the environment is very important to human survival. And they also believe that nature can regenerate itself. This statement appeals to a condition where people live long enough to see an area covered with dense natural succession trees without reforested by local communities.

Informants said that another program done was the planting mangroves and hibiscuses to prevent landslide on the riverbanks by group of students, villagers, village leader and government. A past, government project with the locals was the planting of a million trees. Unfortunately, this kind of activity does not continue. The biodiversity suffers much loss because human activities become bigger and more uncontrollable, while there

is less and less conservation actions. Other efforts that reflect the preservation are selective logging and reforestation, cooperation work and cleaning up yards.

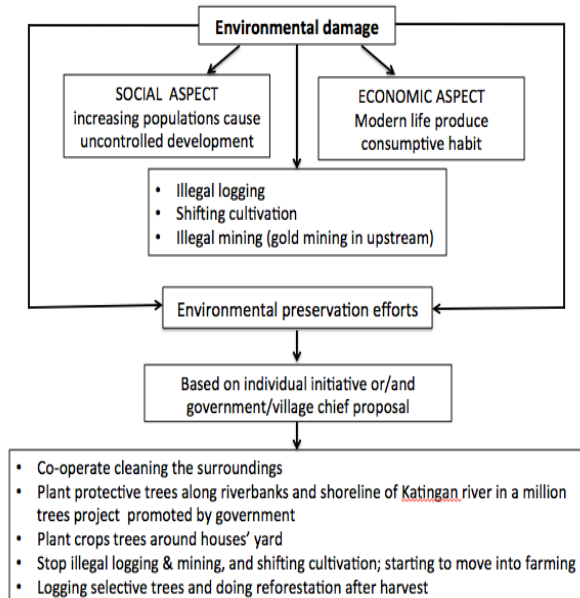


Figure 3. Socio-economics aspects of Environmental damage

Human Behavior. People's behavior towards their surroundings is affected by external conditions as the changing nature of the river function for the local livelihood. This linkage can also create constructive or destructive habits. The study found that people became aware of problems, one example of which happened during the dry season, when people of the community jointly watered the forest fire that burned most of a nearby plantation. However, sometimes they still cannot resolve it either individually or collectively. One reason is the difference in response of the public environment itself. Mutual relationship is also reflected in a reciprocal interaction between human and their surrounding that can be seen on how they harvest their crops. It is this mean that nature provide all their needs. Another term is that

Table 3. Minor and Major Propositions on Environment Preservation

<i>Minor Propositions</i>	<i>Major Proposition</i>
1. Diverse perceptions in environmental preservation can cause different behavior/actions	
2. Behavioral adjustment is part of perceiving things	
3. Reforestation, selective logging, degraded land use which were done by the individual or group are part of preserving environment	
4. People participate in environmental activities, but did not serve as a main duties; it is due to the internal (financial support) and external factors (government instruction)	Diverse people's perception to preserving environment generates the difference participation in their awareness.
5. Forms of participation which was implemented in the real programs are mostly just kind of symbolization	
6. Individual, group, local chief together with government conducted various programs in an effort to preserve the environment	
7. Community is maintaining local wisdom in the preserving environment	

human is also giving feedback to nature by taking care of it. This relation is absolutely needed both human and environment.

Referring to determinism theory, all probability and dialectic in interaction between human and the nature are not eternal. It is due to limited nature resources and increased demand of it as development purposes for supporting people's current life. People behavior that are consumptive in social life lead them to do more exploitation toward their environment, whilst previous relationship, mutualism, has turned into parasitism. The norm of local wisdom in society was eroded due to consumptive lifestyle. To avoid this problem, the norms that from time to time have been prevailing and closely related to relationship need to take into account its impact on the future opportunities. The issues have become contradicted as increasing human needs and their survival toward nature. However, by informing people the knowledge to do preservation and to use natural resources

wisely can affect the community decisions in determining appropriate policies as well as deciding whether or not to retain of its local wisdom.

It is important to note that public perception in the preserving environment in Katingan Watershed is relatively good; they have been able to take actions in positive behavior despite constituted by the certain factors. Furthermore, they were generally able to participate, but they rarely want to involve extensively. It can be said that they are mostly forced by internal and external factors while they take part to this activities. And it may happen due to their local wisdom that triggered them to be wise in utilizing natural resources as participation program in protecting nature.

5. Conclusion

It is important to emphasize that local communities' perception about environmental preservation showed a lot of variation, but did however most strongly depend on

personal interests. Family welfare is one of main reasons people exploit nature, but at a time when government support of nature protection is decreasing, the people are beginning to become aware and show a positive attitude in their treatment of the environment. Their awareness has led to the reforestation of land formerly used for illegal logging, selective logging when felling the trees, and utilizing critical lands, all of which are parts of the preservation of nature, and which were done either by individuals or as group work together with the government or chief of village. However, local participation on preserving nature cannot be maximized yet. It can be determined that their involvement was not for them personally a high priority, and instead they took part due to internal and external factors. This condition is exacerbated by the lack of government support. Public efforts to protect the environment have been shown better. They were generally done as the people's own initiatives or by government instruction, which would be implemented in preservation activities. In these modern times there some people who are still upholding local wisdom to manage the nature as through cultural methods. One example of this local community knowledge is the existence of sacred trees cannot not be cut down or destroyed.

Acknowledgment

The author is very grateful to all the interviewees whose participation made this study possible. Special thanks to Muhammad Arsyad, Ph.D. for his valuable comments and suggestions on earlier drafts of the manuscript and that significantly improved.

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