Sustainability of Water Resources in the Upstream Watershed-Based Community Engagement and Multistakeholder Cooperation

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Abstract: The communities engagement become the backbone of the conservation in the Citanduy upstream watershed. It functioning as a major deal and the first one in keeping his own Watershed. This paper based on Community Engagement Grants (CEGs). Program Society-based empowerment approach is also emphasized in the viewpoint of environmental law that is useful to set governance and sanctions in watershed management. The type of activity to be undertaken are the expansion of awareness programs communities of the existence and condition of the watershed Citanduy, the formation of a cadre of conservationists environment that is primarily directed to children and women, the institutionalization of customary law environment, and afforestation by planting 100,000 prolific trees, tree conservationists, and Sunda endemic tree in the land surrounding the watershed upstream Citanduy. The Program involves several partners and stakeholders who helped in substance and operational support activities in the field.

Result of program shows that Community Engagement Grants need cooperation among stakeholders by positioning the community as main subject of changing, not as subject who does not understand their needs to change.

Keywords: Upstream Watershed, water security, Community Engagement, Multistakeholder Cooperation

1. Introduction

The existence of natural resources that can be renewable, especially water, is essential for humans, because humans are very dependence of the water in their life sustainability cycle, that people in this earth and on other planets can not live without it. Much more water, which is a natural resource that man at all times, whether for drinking, food ingredients, Eating Wash latrine (MCK), and others [1]. The growth of world population is increasing and the demand for water is increasing push more water than the strengthening of the economic value and social function. The condition has the potential to create conflicts of interest (horizontal and vertical) between sectors, between regions and the various parties related to water resources. To that end, the continuity and sustainability of clean water supply must be well managed and cared for by all sides, including the community, to realize the management of water resources in an integrated sustainable by always fulfill the function of the environment and economy in
harmony and maintain a balance between the ecosystem and power environmental support, as mandated by Law No. 7 of 2004 on Water Resources (Law 7/2004). Conflict between groups may be more massive because water resources is one resource capture vital [2].

According to data from the Council of Water Resources (2014), the amount of water in the world now around 1.404377 billion km3 and the amount of fresh water only reached 33,705,048 km3 (2.4% of total world water) as well as the number of 131 460 km3 of surface water (0.009% of the amount of water in the world). This shows that the conditions for protecting and preserving the water supply has been serious, because the amount of water in the world amounted to only 2.4 percent. This condition raises awareness of the importance of water security that is related with certainty that everyone has easy access to clean water and affordable price in order to achieve a healthy life, decent and productive [3].

Water security is mentioned UNESCO [4] are measures to meet the need for clean water and the need to obtain a sufficient supply of clean water. The security of water conditions in line with the fulfillment of the right of every human being to have access to clean water and inadequate fulfillment of the needs of clean water so that in order to fulfill the need for clean water, some efforts for the preservation of clean water continue to be done.

The problem of water security is also happened Citanduy Watershed which extends from West Java to Central Java and covering 10 districts/cities at Ciamis, Tasikmalaya, and Cilacap. Citanduy watershed consists of critical land in very critical level for about 2460.88 ha (0 , 67%), critical level for 14793.38 ha (4.05%), potential critical for 117,730.22 ha (32.27%), quite critical for 63911.16 ha (17.52%), and not critical for about 165,977.10 ha (45.49%). Citanduy waterhed is one of 22 watersheds in Indonesia that are classified critically since facing various ecological problems such as erosion and sedimentation which causing flood, the reduction of area, the decrease of lagoons depth, river pollution, environmental degradation quality and other related problems. The 2013 Ministry of Public Works data stated that the Citanduy watershed have erosion level which categorized as very danger is 26,764.31 ha (7.34%); categorized as danger level is 37,499.02 ha (10.28%).

The land erosion that was being wider is 104,927.13 ha (28.74%), and the smaller erosion level is 195,682.27 ha (53.63%). The total erosion is 28,962,668.00 tons / year. This condition is exacerbated by the landslide level of Citanduy watershed which can be classified as highly vulnerable of 2,639,80 ha (4.26%), the area that potentially flood is 129,053.72 ha (35.37%), the area that somewhat prone to flood is 3,735.43 ha (1.02%), and for about 216,528.88 ha (59.34%) is not prone to flooding. The degradation of Citanduy watershed condition has threatened the availability of clean water and even drinking water for people around watershed because in the dry season there will be a drought.

If we are referring to water resource potential, it is influenced by its physically characteristic which consist of various type and formation of stone, relief or topography, type of soil, and land use. Those characteristics will influence water resource potential that can be seen from its differences of quantity and quality in each area [5]. The potential water resource can be seen from its quality of water surface and spring water potencies. The water surface potencies are river, pond, lake, reservoir, and dam. The area of Citanduy river fed by 17 branches of river. The understanding of positioning community as actor of changing is based on the fact that the former community engagement grants were positioned community as object, not a subject. On the other hand, this paper will be exploring community to become actor of changing.

2. Theoretical review

Management of natural resources and integrated sustainable water security in line with the definition promoted by UNESCO [6]. Water security challenges facing complex and interrelated and become a major theme of water issues in order to achieve a security, sustainability, and feasibility for humans both locally and internationally. When water security conditions are not going well or when access to water is disturbed, people face acute human security risks that are connected with poor health and bad life.

Citanduy River region is one of the Cross River Basin Province, located in the province of West Java and Central Java the south in accordance with the Decree of the President of the Republic of
Indonesia Number 12 Year 2012 on the Establishment of the River Basin (02:10 WS Code A2). Citanduy watershed is one of the priority watersheds in Java. Priority watershed sedimentation is caused by a very large part of the river downstream Citanduy. Geographically Citanduy river area located at position 1080 04 'until 1090 30' east longitude (BT) and 70 03 'to 70 52' South latitude (LS). Citanduy DAS consists of six (6) Sub, namely Citanduy upstream subzone, subzone Cijolang, Cikawung subzone, subzone Cimuntur, Ciseel subzone, subzone Citanduy Upper and subzone Segara Branches.

Critical lands, erosion and flood-prone is increasing from year to year so that the necessary government efforts and public participation in the environment to not aggravate land degradation and improve watershed Citanduy back role as a source of clean water supply providers. Community activities around the watershed Citanduy directly and indirectly affect water quality, sustainability of water supply and environmental conditions Citanduy watershed. During this watershed Citanduy into the sand mining areas, use of forests for the surrounding community activities, community activities such as for irrigation and household activities. Community activities in the utilization of this water has exceeded the carrying capacity of the environment surrounding the watershed Citanduy characterized by the onset of flooding in the rainy season and the river drying up in times of drought.

Besides reducing floods, droughts, and landslides, watershed conservation will bring multi-effects. Therefore, water conservation should get great attention. Currently, the water conservation in the city becomes one of the main keys to ensure availability and increasing of water supply in accordance with water demand [7]. The society needs to have knowledge about condition of riparian zones which is weak inherently ecosystems. The urban development activity is necessary in order to avoid increasing of water temperature and light intensity which are very disturbing the watershed natural ecosystems [8].

Ellis [9] showed the most important element of society in conservation is at household level. Conditions that affecting the involvement of citizens at household level are due to endogenous factors such as relationships/relations in social, institution, and organization. Meanwhile the exogenous factors consist of trend and policy as well as threat/interference. That condition needs to be considered because providing access for society to be able to participate in various conservation activities, including watershed are in the community. In order to conducting conservation or watershed management, there are two approaches which related to community-based activities and society participation. Those are: 1) rational choice approach, where the person or group will behave in certain ways since logic of appropriateness engagement as the result of cognitive understanding and internalization process that takes relatively long time and a "groupthink" is formed. Meanwhile, 2) in normative approach, the behavior of person or group is a response of rules or incentives, where the rules can be formal rules in form of Laws, as well as non-formal rules from society agreement [10]. The involvement of stakeholders is stated by Williams [11] that " allows local stakeholders to identify politically and socially acceptable management practices”. This collaboration is contribute concrete step and could be operated effectively. Technically, the stakeholders will also prepare needs at the location of can be liaison from servant team to the society as participant of program.

Watershed conservation is very important since river is clean water resource asset for drinking and other interests, ecological conditions as source of animal protein, as well as social culture and local wisdom. Those are ecological values of riparian area that are important to be managed for watershed conservation, where the nature which has river vegetation could be helpful for Keeping the water quality and clarity by reducing sediment and run-off nutrient from land, reducing the level of flood by increasing water retention time (but not to the level of river dried when dry season), keeping low water temperature by providing deposit, energy affects variation by influencing light quality and terrestrial organic matters input, providing habitat for aquatic invertebrates and fish (for instance are in the form of cover of leaves and woody debris accumulation), and for land plants as well as animals, providing breeding area for native birds (for instance blue duck) and fish (for example anchovies, providing suitable corridor for native plant and animal extension as well as space for high species diversity, and improving soil stability and minimizing cliff erosion at the river [12].
3. Methodology

The location of the program is at Cikadu village, Guranteng, Pagerageung district, Tasikmalaya regency, and at Pasir Jaya village, Buana Mekar, Panumbangan district. Those areas are placed side by side at the Citanduy watershed. Both locations are located about 260 km from Jakarta city. The locations are chosen because especially for Cikadu village, it is the location of Community-Based Services of the University of Indonesia before (November 2014-June 2015). Several stakeholders were synergized with that program which resulted in positive changes and impacts for Cikadu village.

The methodology of activities is conducted through some stages, those are:

a. Problem identifications in the field which are related with activities of the people and the water resources at Citanduy watershed.

b. Knowledge sharing by transfer of knowledge and success story of watershed management at other places. It also shares about the problem and the people urgency to participate with Citanduy watershed conservation accordance with the perspective of environmental laws.

c. Program implementations are in form of activities such as tree planting in accordance with Citanduy watershed vegetation, simple technology water management, and other conservation actions. This step is replicating the PROKASIH program (Clean River Program) and SUPERKASIH program (Statement Letter of Clean River Program) from the government which involving not only the industry but also the people.

d. Monitoring the success and sustainability of programs by supervising how far the participants followed the program and when they go back to their environment, they can maintain the clean water sustainability based on empirical experience during the training.

These activities are supported by the Provincial Government of West Java (BPLHD West Java), Assistant Deputy of Public Organization Role Engagement from Ministry of Environment and Forestry, Department of Plantation and Forestry of Tasikmalaya regency, Department of Plantation and Forestry of Ciamis regency, and “Geliat” as local NGOs who became partner in the field. Each of them has contributed in this program. The program objectives are giving socialization, training, simple and applicable watershed management to the people through environmental law perspective for clean water sustainability program at Citanduy watershed. The society becomes an important stakeholder in this case since they are the closest part of watershed area, most interest, and have great potential for being an agent of changes.

4. Result and discussions

The Citanduy watershed topography is in form of mountains at the Northern and mainland at the Southern which bordering with Nusakambangan island. According to its topography, Citanduy watershed divided into 3 parts, namely the upstream watershed, middle watershed, and downstream watershed. Understanding and participation of the community to maintain the sustainability of natural resources are needed in order to maintain watershed functions Citanduy as water providers in the region of West Java and Central Java. So far the Government has made various efforts such as Critical Land Rehabilitation Movement (GRLK), National Movement for Forest and Land Rehabilitation (GNRHL / GERHAN), as well as reforestation activities to address environmental problems in the watershed Citanduy. But the GOI's effort has not been optimal so that the community engagement efforts must be continued. Responsibility for the preservation of the watershed Citanduy can not be completely handed over to the government, because without the participation of the community then no matter how much development efforts and improvements made by the government will not solve the problems Citanduy critical watershed lands [12-13].

Community involvement should be based on the awareness of society to contribute to maintain the stability of ecosystems in the watershed Citanduy and not do activities that cause environmental and
river damage. In addition, community involvement is done by taking into account local knowledge as recognized by Law No. 32 of 2009 on the Protection and Management of the Environment (Law 32/2009).

### Table 1. List of Changing of Community Engagement in Location

| No | Condition before                                      | Activities                                                                 | Condition after                                           |
|----|--------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------|
| 1  | Sedimentation threat cause of unmeasured logging.      | It has been planting almost 30 thousand trees fixed with watershed characteristic. | The empty area is planted with various trees nowadays.     |
| 2  | Low of community careness in downstream watershed conservation | Cooperation program which involving community is hold.                    | The sustainable *gotong royong* (working together) is happened. |
| 3  | No penalties for environment broker actor              | Local regulation based on social culture of local community is established. | The people begin to follow the environment laws that were made together. |

Related to the number of community activities that damage the environment in the watershed Citanduy, we need to hold social interventions in the form of environmental law enforcement efforts to deal with these problems and training and socialization of public participation to environmental sustainability in watershed Citanduy. Enforcement of environmental law is based on Law 32/2009 taking into account the principle of ultimum remedium namely the application of criminal law enforcement as a last resort after the application of administrative law enforcement is considered unsuccessful.

When people are able to participate actively in clean water sustainability program, the task of government will be easier and the state budget will be more efficient for watershed normalization project. On the other hand, the failure of community involvement will make people apathetic with the watershed and potentially damage the watershed. It will result in decreasing of clean water supply and finally becoming problems of the government to fix and fulfill that supply.

### 5. Conclusion

The expected results are the growing of people’s understanding and concrete action of conservation management about the important of people’s participation in supporting clean water supply at Citanduy watershed. The surrounding society is an important stakeholder for this purpose, because they are the closest part with the watershed, the most dependent, and have great potential as agents of change. When people are able to participate actively in clean water sustainability program, the task of government will be easier and the state budget will be more efficient for watershed normalization project. On the other hand, the failure of community involvement will make people apathetic with the watershed and potentially damage the watershed. It will result in decreasing of clean water supply and finally becoming problems of the government to fix and fulfill that supply. Moreover, the involvement of related stakeholders is obligatory for the success of program since its characteristic of supporting and cooperating each other.

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