

Problems in Upper Brantas Watershed Governance: A Case Study in Batu, Indonesia

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ABSTRACT

The damage to Brantas River Basin (Watershed) has been increasingly critical due to forest encroachment and land use ignoring the rules of soil and water conservation. This study aims to examine the problems in the management of upper Brantas Watershed in Batu City, Indonesia. The method used in this research was descriptive-qualitative and the data were collected using participative observation in the field, in-depth interviews with the community of Brantas Watershed-Caring Farmer Group (Komunitas Petani Penyelamat Daerah Aliran Sungai Brantas-KPPDAS), discussion with experts, and Focus Group Discussion (FGD). This paper succeeded in extracting information about the fundamental problems causing damage to Brantas Watershed in Batu City. Those fundamental problems consisted of pragmatic behavior and ways of thinking of land use in the upper watershed of Brantas, government policies that were not aligned to the upstream conservation of Brantas Watershed, the low public awareness to actively participate in the upstream conservation of Brantas Watershed. Therefore, the management of upper Brantas Watershed needs to strengthen the cooperation (partnership) among stakeholders to save jointly the upstream of Brantas River Basin or Watershed.

Keywords: Upper Brantas Watershed, Public Policy, Participatory.

ABSTRAK

Kerusakan Daerah Aliran Sungai (DAS) Brantas semakin kritis karena perambahan hutan dan penggunaan lahan yang mengabaikan peraturan konservasi tanah dan air. Penelitian ini bertujuan untuk menguji permasalahan pengelolaan DAS Brantas bagian atas di Kota Batu, Malang, Indonesia. Metode yang digunakan dalam penelitian ini adalah deskriptif kualitatif dan data dikumpulkan dengan menggunakan observasi partisipatif di lapangan, wawancara mendalam dengan komunitas Kelompok Tani Peduli Daerah Aliran Sungai Brantas (KPPDAS) Brantas, diskusi dengan ahli, dan Focus Group Discussion (FGD). Makalah ini berhasil

menggal informasi tentang masalah mendasar yang menyebabkan kerusakan pada DAS Brantas di Kota Batu. Masalah mendasar tersebut terdiri dari perilaku pragmatis dan cara berpikir penggunaan lahan di DAS atas Brantas, kebijakan pemerintah yang tidak sesuai dengan konservasi hulu DAS Brantas, kesadaran masyarakat rendah untuk secara aktif berpartisipasi dalam konservasi hulu DAS Brantas. Oleh karena itu, pengelolaan DAS Brantas merupakan salah satu bagian atas perlunya untuk memperkuat kerjasama (kemitraan) antar pemangku kepentingan untuk menyelamatkan hulu Daerah Aliran Sungai Brantas

dan Daerah Aliran Sungai lainnya.

Kata kunci: DAS Brantas, Kebijakan Publik, Partisipatif.

INTRODUCTION

The economic condition of the community in the upper Brantas Watershed is highly influential on the sustainability of the DAS (Watershed or River Basin). Based on the research results and previous studies, it is found out that people today often consider water sources as a commodity / economic goods that must be exploited. Hence, we often encounter violations of watershed management rules that cause damage to upstream conservation areas ([Nugroho, 2011](#); [Harini and Suyini, 2012](#); [Bakker, 2007](#); [Tietenberg and Lewis, 2016](#)).

Brantas Watershed has strategic potential and function for most of East Java area. The damage in the upstream area can be ascertained to have a widespread impact including depletion of springs, drought in the dry season and floods in the rainy season. The indications of damage to Brantas Watershed include the shrinking of the number of springs in the upstream areas of the five mountains which are the Brantas sources namely Mount *Arjuno-Welirang*, Mount *Kelud*, Mount *Kawi*, and Mount *Wilis*. The sources of springs located in Batu City have dried up. Approximately, 11 (eleven) springs have dried up and the other 46 springs have experienced a decreased water discharge from 10 m³/s to be less than 5m³/s. If there is no significant improvement in the Brantas management for the next 2020, the Province of East Java will experience water deficits ([Setyorini, Khare, and Pingale, 2017](#); [Sholikhati, Harisuseno, and Suhartanto, 2014](#)).

The condition of rain catchment area in the upper Brantas Watershed is getting worse because of forest encroachment and

land use that ignore the rules of soil and water conservation. This triggers an increased soil erosion that can eventually lead to sedimentation in the river and river's infrastructure such as dam and reservoir, decreased base-flow, and drought in the dry season and floods in the rainy season like what recently occurs ([Maulidiyah, Anggoro, Suherman, 2017](#); [Yuwono, 2012](#)). The other problems include decreased water discharge or even the loss of many springs in Brantas Watershed, riverbed degradation and decreased water quality ([Sulistyaningsih, 2014](#)). Based on the Environmental Agency (BLH) of the Government of East Java Province, there are approximately 111 springs flowing to Brantas River. The logging and forest conversion activities are the main cause of the drying of 54 springs. Now, 57 springs remain flowing.

As found in many other watersheds, the logging and forest conversion activities in Brantas watershed are done to open an agricultural land and a built area (eg. settlements and offices). Consequently, the water absorption function of the land is lost and the *run off* flooding in the ground is getting bigger. Moreover, floods, land erosion, and landslides commonly occur. Meanwhile, in the middle areas such as Kediri, Jombang to Mojokerto, many sand mining activities are destructive. Therefore, many river dikes have experienced landslides.

The number of river biota has become extinct and the riverbed degradation is getting worse. It is becoming increasingly difficult to cope with when the sand mining becomes a source of public income. It enters the downstream when Brantas River broke out (in Mojokerto) into Porong River and Surabaya River. In this area, the river water is mixed with various wastes from industrial and settlements growing in the watershed ([Mawardi, 2011](#); [Tan, Dai, and Gao, 2016](#)). The extent of critical land in the upper Brantas River Sub-basin can be used as the indicator of the disruption of forest and land functions as production, ecological and social systems.

Overcoming the problem, the Government of East Java Prov-

ince has conducted various efforts and policies as follows: (1) In 2011, the Management Action Plan of Brantas Watershed was prepared, (2) In 2014, Academic Manuscripts on Regional Regulation of Watershed Management of East Java Province that combined Integrated Drafting Plan of Watersheds (*RPDAST*) of Solo, Brantas, and Sampean; and (3) The academic manuscripts would then be used as the starting point for the process of drafting the Regional Regulation on Watersheds of East Java Province ([Sulityaningsig, 2014](#)).

However, in the implementation of economic area development in the upper Brantas Watershed based on the conservation of fruit crops, there are still encountered various obstacles including: 1) the role of the parties in the watershed management is not in accordance with the action plan that has been designed; 2) There is no synchronization between the sectors in watershed management activities; 3) The budget of watershed management is still limited to the central fund sources; 4) The understanding of stakeholders in the implementation of Integrated Drafting Plan of Watersheds (*RPDAST*) is still low due to frequent changes of officials in the regions; 5) Not all regencies/cities have established Watershed Forum, while the established Watershed Forums have not been functioned optimally; 6) There is a lack of socialization of Integrated Drafting Plan of Watersheds (*RPDAST*) ([Kunihiko, Yudi, and Eikichi, 2015](#); [Judge and Nugroho, 2011](#)).

In this research, we found that the main problems that cause environmental damage in the upper Brantas Watershed covered (1) the pragmatic perspective and behavior of the community around the upper Brantas Watershed on the management and utilization of Brantas Watershed resources, (2) the government policies that were not in favor of the area conservation of the upper Brantas Watershed, and (3) the low public awareness in carrying out the area conservation of the upper Brantas Watershed.

LITERATUREREVIEW

MANAGEMENT PROBLEMS IN UPPER BRANTAS WATERSHED

[Nugroho \(2011\)](#) in his study suggested that almost all of the watersheds in Java have become critical. Watershed damage is also increasing every year. According to him, this can happen because of the conversion of forest and farm lands to settlements that are not followed by soil and water conservation efforts as well as due to the unclear direction and implementation of development in overcoming the problems of natural resources nationally. The consequence of it all is the increasing damage of natural resources and the environment such as floods, drought, pollution, erosion, sedimentation, eutrophication, and so on.

Furthermore, Kure, Tebakari, and Miyamoto (2016) explained several causes of the damage to watersheds in Indonesia and Asia, including: (a) inappropriate land use planning and management practices; (b) increased population growth; (c) poverty and economic decline due to resource constraints; (d) less supportive institutions; (e) protection and regulatory policies that do not restrict land ownership and use; and (f) uncertainty over the *de facto* use of land rights on forest land.

In another study, [Nawir, Gunarso, Santoso, and Hakim \(2016\)](#) found that in addition to the physical and socio-economic problems of the communities living in watersheds, institutional and legal issues that govern watersheds cause watershed damage. The main difficulty in managing watersheds in Indonesia is encountered in the process of integrating inter-sectoral activities. In performing their duties, each institution uses its own approach, method, and terminology depending on its sectoral interests.

On the other hand, based on the results of a study by the Directorate of Forestry and Water Resources Conservation (2011), watershed damage in Indonesia is increasing every year, causing very harmful excesses. In every year, there are always floods, landslides, droughts, and other disasters occurring. Watershed management activities have long been done yet the results achieved

are not optimal. One of the failure factors is emphasizing the command and control patterns with a *top-down* approach at the policy, operational, and implementation levels.

[Harini and Suyono \(2012\)](#) in their study found that there are three fundamental environmental problems, particularly in the area of upper Brantas Watershed. *Firstly*, forest destruction. The condition of the land in Bulukerto Village is currently at a critical approximate stage and most of the land is planted with pine trees. However, most of the pine trees are fallen. *Secondly*, threat of land damage. There is no any proper land management referring to the Law No.32 of 2009 on Management and Protection of Environment. *Thirdly*, threat of water sources (springs) death. Of the 250 existing water sources, 111 water sources have died/dried. We need to know that 80% of the irrigation and water supply in East Java is taken from the water sources (springs) in Batu City.

In line with the issue, [Pudjianto \(2009\)](#) in his study also found that the government has implemented the programs of forest and land rehabilitation through the *National Movement for Forest and Land Rehabilitation (GNRHL)*, but the results have not been as expected, even considered failed by various parties. This case is due to the implementation of GNRHL programs was still centrally (*top down*) on the government and less involved the community, particularly at the time of planning. Linear with the failed GNRHL programs, the government is now focusing on the implementation of the National Water Saving Partnership Movement (GNKPA).

[Hakim and Nugroho \(2011\)](#) found some issues of the management of upper Brantas watershed as follows: (1) institutions tend to implement '*top down*' approach although a participative approach has begun to be used; (2) only a few government agency policies are based on the qualitative data and knowledge documentation, and the sustainable land management methods are still weak; (3) sectoral approaches in land management are still prominent and the coordination and integration among stake-

holders are still weak; (4) project efforts at the community level are still based on a sectoral approach and less consider the impacts on watershed functions; (5) law enforcement is also weak; (6) there is increased poverty during and after the Indonesian economic crisis (1997-present); (7) local awareness about land degradation is relatively low; and (8) there is no effort to disseminate information/socialization in a participatory way.

UPPER BRANTAS WATERSHED MANAGEMENT MODEL

Brantas Watershed is a part of natural resources that have a direct impact on the development and welfare of the surrounding community. Therefore, all stakeholders, especially the government and community in the upper watershed of Brantas River must strive to conserve and maintain the watershed. [Adi, Jänen and Jennerjahn \(2013\)](#) conducted a study asserting that the government has made efforts to carry out an intensive conservation on the upper Brantas watershed through various projects. The main objectives of watershed conservation projects in the upstream area are to increase farmers' land productivity and income, and to encourage farmers' participation in the conservation of soil and water resources. The results of their study (2013) suggests that farming system of bench terrace (*teras bangku*) and contour terrace (*teras guludan*) conservation can increase the farming productivity and farmers' income, also can reduce the rate of erosion.

The management of upper Brantas Watershed can proceed well if it is supported by a comprehensive and sustainable government policy, the active role of academics in conducting an in-depth study of watershed issues, the active participation of the community around the watershed, and the feasible technology supporting Brantas watershed conservation. [Djauhari and Syam \(2016\)](#) argued that local government supports in the application of conservation technology is highly important because farmers are less able to implement conservation technology independently. In addition to the supports of local government, the role

of farmer groups and rural institutions is also very important.

In line with the results of [Djauhari and Syam's \(2016\)](#) study Agus, Husnain and Yustika (2016) in their study also showed that a successful management of watershed at least concentrates on two main pillars namely an appropriate technology application innovation and a participatory innovation of the related institutions. The State Forestry Company of Indonesia (*Perhutani*) has a key role for both of the above. Although it conventionally seems that the technical choice applied only in the land level, the State Forestry Company will increasingly have an overall role both in the framework of the management of the community's entire land and at the environmental context.

[Nugroho \(2011\)](#) in his study also produced a concept or model of watershed management that requires the active role of communities in the planning and implementation of watershed conservation programs. According to [Nugroho \(2011\)](#), the community participation model is very important in the watershed management because the problems on watershed are not only based on physical and technical problems. It is necessary to have a balance with the management of a participatory watershed. Additionally, according to Nugroho, the participatory development approach begins with the people who know best about the local community's life system, which is the community itself.

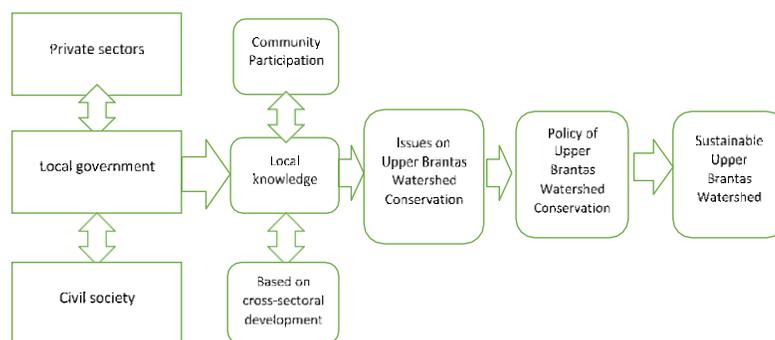
Therefore, [Nugroho \(2011\)](#) explained that the emergence of a paradigm of participatory watershed management development indicates two perspectives. First, the involvement of local communities in the planning and implementation of watershed management activities would color their lives so as to ensure that local perceptions and knowledge are fully considered. Secondly, the technology developed in soil and water conservation is indigenous that has long been known by communities with the consideration of social and economic approaches. Similarly, local knowledge (indigenous knowledge) as a part of social capital is utilized and explored to develop appropriate watershed technology and for the benefits of local communities.

Another result of a study that emphasizes watershed conservation based on community participation is one conducted by [Pudjianto \(2009\)](#). In his study, it is indicated that the success of the government in conducting watershed management is through the implementation of the *National Water Saving Partnership Movement (GN-KPA)*. The program is integrated between departments using participatory approaches involving local communities and social institutions, starting from the planning, implementation to evaluation phase. With a participatory approach, communities can actively participate so that the implementation of the conservation programs of forest, land, and water resource can be implemented in accordance with the needs and conditions in the community.

In addition to the community participation-based watershed management model as described above, it should be noted that Brantas Watershed management should consider and integrate agricultural and forestry development. Based on the results of the analysis, the Directorate of Forestry and Water Conservation recommends an integrated watershed management in which there is not only one sector developed (while the other sectors development is ignored). The management of watershed should involve all sectors and activities within the watershed system. If not, then the watershed performance will be worse which will ultimately decrease the production rate of the sectors depending on the watershed performance.

Therefore, the upper Brantas Watershed management model should prioritize the active participation of the community in the planning and implementation of watershed conservation, making the technology and knowledge of the local community as an input for the conservation policy of the watershed, and taking into account the cross-sectoral development such as agricultural development, forestry policy and natural tourism development.

FIGURE 1. SUSTAINABLE GOVERNANCE MODEL OF UPPER BRANTAS WATERSHED



TABEL 1 SUMMARY OF PAPER REVIEW ON PROBLEMS AND PUBLIC POLICY PROCESS MODEL IN UPPER BRANTAS WATERSHED GOVERNANCE

| RESEARCHER | ISSUES OF STUDY | RESULT OF PAPER |
|---|---|--|
| <i>Problems in Upper Brantas Watershed Governance</i> | | |
| Nugroho (2011) | Almost all of Brantas watershed in Java have become critical | Conversion of forest and farm lands to settlements that are not followed by soil and water conservation efforts as well as due to the unclear direction and implementation of development in overcoming the problems of natural resources nationally. |
| Kure, Tebakari, and Miyamoto (2016) | Flooding, storm surges, and other types of disasters are increasing in recent times, due to an increase in extreme weather and a rise in the sea level, caused by global warming heat island, etc. | One of the most important statements in the Sendai Framework is that public and private investment in disaster risk prevention and reduction through structural (tangible) and non-structural (intangible) measures are cost-effective and useful. They save lives, prevent and reduce losses, and ensure effective recovery and rehabilitation. Simply put, pre-disaster investment is far cheaper than post-disaster cost. |
| Nawir, Gunarso, Santoso, and Hakim (2016) | The physical and socio-economic problems of the communities living in watersheds, institutional and legal issues that govern watersheds cause watershed damage. | The main difficulty in managing watersheds in Indonesia is encountered in the process of integrating inter-sectoral activities. In performing their duties, each institution uses its own approach, method, and terminology depending on its sectoral interests. |
| Harini and Suyono (2012) | There are three fundamental environmental problems, particularly in the area of upper Brantas Watershed. <i>Firstly</i> , forest destruction. <i>Secondly</i> , threat of land damage. <i>Thirdly</i> , threat of water sources (springs) death | Of the 250 existing water sources, 111 water sources have died/dried. We need to know that 80% of the irrigation and water supply in East Java is taken from the water sources (springs) in Batu City. |

| | | |
|---|---|---|
| Hakim and Nugroho (2011) | Some issues of the management of upper Brantas watershed are that designed model of official government is not appropriate to be implemented. | (1) institutions tend to implement 'top down' approach although a participative approach has begun to be used; (2) only a few government agency policies are based on the qualitative data and knowledge documentation, and the sustainable land management methods are still weak; (3) sectoral approaches in land management are still prominent and the coordination and integration among stakeholders are still weak; (4) project efforts at the community level are still based on a sectoral approach and less consider the impacts on watershed functions; (5) law enforcement is also weak; (6) there is increased poverty during and after the Indonesian economic crisis (1997-present); (7) local awareness about land degradation is relatively low; and (8) there is no effort to disseminate information/socialization in a participatory way. |
| <i>Upper Brantas Watershed Governance Model</i> | | |
| Adi, Jänen and Jennerjahn (2013) | The government has made efforts to carry out an intensive conservation on the upper Brantas watershed through various projects. | The main objectives of watershed conservation projects in the upstream area are to increase farmers' land productivity and income, and to encourage farmers' participation in the conservation of soil and water resources. |
| Djauhari and Syam (2016) | Conservation of <i>Upper Brantas Watershed</i> should be based on technology and society participation. | Local government supports in the application of conservation technology is highly important because farmers are less able to implement conservation technology independently. In addition to the supports of local government, the role of farmer groups and rural institutions is also very important. |
| Husnain and Yustika (2016) | Two main sectors of <i>Upper Brantas Watershed</i> conservation are technology application innovation and a participatory innovation. | A successful management of watershed at least concentrates on two main pillars namely an appropriate technology application innovation and a participatory innovation of the related institutions. |
| Nugroho (2011) | The community participation model is very important in the Brantas watershed management because the problems on watershed are not only based on physical and technical problems | The participatory development approach of Brantas watershed management begins with the people who know best about the local community's life system, which is the community itself. |
| Pudjianto (2009). | The success of the government in conducting watershed management is through the implementation of the | The <i>National Water Saving Partnership Movement (GN-KPA)</i> program is integrated between departments using participatory approaches involving local communities and social institutions, starting from the planning, implementation to evaluation phase. |

RESEARCH METHOD

The purpose of this research was to identify the problem of upstream watershed management. This research used a qualitative approach by utilizing data collection methods through direct observation to the research sites and in-depth interviews with the local government and community.

By using qualitative method including participative observation in the field, in-depth interviews with the members of the *Watershed-Concerned Farmers Group (KPPDAS)* of Brantas, discus-

sion with experts, and *Focus Group Discussion (FGD)*, this research succeeded in extracting information about the underlying problems or issues that resulted in the damage to the upper Brantas Watershed in Batu City.

Primary and secondary data were also used as the basic information, especially for macro data. The research subjects that were successfully encountered were the Government of Batu City, Non-Governmental Organization (NGO) of *PUSAKA*, and Watershed-Caring Farmers' Group (*KPPDAS*). The data analysis was done using qualitative description, which has succeeded in collecting in depth information.

Prior to the observation, the researcher contacted the key informants including the Chairman of *PUSAKA* Foundation and the Chairman of the Brantas Watershed-Caring Farmers' Group. Besides, to get the information in more detail, the researcher used a method of *Focus Group Discussion (FGD)* by involving the stakeholders of the government of Batu City, the community including *PUSAKA* Foundation and Brantas Watershed-Caring Farmers' Group, and academics caring environment.

Thus, the sample was chosen purposively to those who involved in the development of the upper Brantas Watershed including the government, farmers' group, or non-governmental organizations. The secondary data were collected through documentation techniques deriving from the government and the results of the searches conducted by the community. The data analysis was done by qualitative-description (Miles and Huberman, 1984).

Specifically, this research was conducted in Sumber Brantas Village of Batu City. Sumber Brantas Village, which was formerly administratively belonged to the government of Tulungrejo Village of Bumiaji District in Batu City, has officially become a Preparation Village of Sumber Brantas. At the same time, the Mayor of Batu City, Drs. Imam Kabul, Msi. Mhum, inaugurated the Head of Preparation Village of Sumber Brantas, precisely on December 20, 2005.



In particular, this research referred to the definition of watershed according to Government Regulation (PP) No.37 of 2012 Article 1 in which it is stated that watershed is a land area united with a river and its tributaries, which serves to accommodate, distort and drain water from rainfall to lakes or seas naturally (where the boundaries on land are topographical and the ocean boundaries up to water areas are still affected by land activity). Watershed management is a human activity in utilizing watershed resources to improve the economic welfare of the community while maintaining the sustainability of the watershed ([Sunaryo, et al., 2002](#))

The data of documentation indicated that Brantas river area (WS) is a national strategic river area and becomes the authority of the Central Government based on Government Regulation of Public Works No.11A of 2006. The BrantasRiver area is 14,103 km² across total 15 regencies/cities (9 regencies and 6 municipalities) that consists of 4 watersheds that are: (1)BrantasRiver Watershed of 11,988 km² (25% of East Java Province area) covering 6 Sub-basins and 32 Basin Blocks; (2) The Middle Watershed of 596 km² covering NgampoRiver, Tengah River, and TumpakNongko River; (3) RinginBandulan Watershed of 595 km² covering KlathakRiver, KedungbantengRiver, NgrejoRiver, and

Sidorejo River; and (4) KondangMerak Watershed of 924 km² covering Glidik River and Bambang River. The number of the residents in Brantas river area in 2005 was 15,884,000 people (43% of East Java Province area) with an average growth of 0.99% and a density of 1,272 people/km² (BBWS, 2013). One of the areas of the Brantas watershed/river basin that suffered severe damage was the Sumber Brantas Village (see Figure 2. (a) and (b)).

RESULTS AND DISCUSSION

This research succeeded in answering the key question “*What are the fundamental problems causing the environmental damage to the upper Brantas watershed in Batu City?*” The in-depth interviews were conducted with the research subjects consisting of the Government of Batu City, the Chairman of PUSAKA Foundation, and the Chairman of Brantas Watershed-Caring Farmers’ Group. They all gave transparent and in-depth information. Broadly speaking, they had the same opinion that the upper Brantas watershed should be taken care of through conservation.

However, in another side, based on the data of interviews, documentation and direct observation, the research suggested that the underlying problems causing environmental damage to the upper Brantas watershed were pragmatic interests in the form of instantaneous economic interests, government policies that were not pro to the conservation of Brantas Watershed, and low public awareness of the conservation of upper Brantas Watershed.

PRAGMATIC INTERESTS OF THE UTILIZATION OF UPPER BRANTAS WATERSHED RESOURCES

The upstream area of Brantas, particularly in Bumiaji District, has altitude above 1,500 mdpl, making it suitable for planting trees such as guava and coffee. However, there were still many people who were not willing to plant perennials. They preferred vegetable crops due to its faster harvest time. From the environmental side, planting vegetable crops on land with a high slope is very dangerous because it can cause a landslide. Most of the

people in the upper Brantas watershed had a pragmatic way of thinking. They made forest encroachment without considering the environmental damage that might occur.

In line with the findings above, [Muhaimin and Hanani \(2014\)](#) in their study found that cultivating land in the hills could trigger a risk that is not small. That is, if there is not accompanied by soil conservation efforts, it will result in land degradation and erosion. Furthermore, such a condition can make the land become critical and barren. A high erosion rate is a serious problem on the damage or sustainability of land resources in the watershed of upstream and has a negative effect on the watershed of downstream.

One of the vegetable farmers, when confirmed by the researcher about his willingness to grow hard crops/trees (perennials) such as guava, coffee, and persimmon, claimed to refuse it. According to him, planting hard crops/trees (perennials) took a long time to harvest while they wanted to get income sooner by planting vegetables (Interview on April 17, 2015). Such a perspective made the Brantas watershed more critical. Therefore, according to a study conducted by [Pusparini, Bisri, and Ernowati \(2013\)](#), the upper Brantas watershed with the total area of 17,343.77 Ha is an area that has a problem of land criticality. The critical level of land in the upper Brantas watershed was determined by the percentage approach of land cover, slope, erosion, and land management. The land belonging to the highly critical criteria with the most widespread was open fields and shrubs.

This is understandable because vegetable crops can give tremendous results to farmers. Hence, it was very rational if they were reluctant to plant perennials (hard crops/trees). Therefore, the reforestation process was hampered by the activities of the communities surrounding the forest who cultivated the barren land with seasonal crops, especially vegetables. Linear with this, the results of a study conducted by [Syam \(2003\)](#) suggests that the utilization of barren or dry land, especially in the watershed of

upstream which is generally by planting seasonal crops (eg. vegetable crops), has a direct impact on the environmental damage in the upper Brantas Watershed.

[Syam \(2003\)](#) stated that dry land, especially in upstream watersheds, generally faces severe environmental degradation problems that can decrease the land productivity, increase erosion and sedimentation, and trigger widespread flooding in the rainy season. The problem requires serious attention because it can hinder the development of agriculture, particularly the increase in food production.

Therefore, we argued that, in the context of environmental damage in the upper Brantas Watershed, the community's understanding needs to be increased, especially the vegetable farmers' understanding to participate in considering the forest conservation. Nevertheless, based on the results of in-depth interviews with the farmers in the upper Brantas Watershed, the farmers were keen to plant annual crops such as red guava, oranges, and coffee. This finding is also in line with the results of [Syam's \(2003\)](#) study showing that farmers are generally less aware of the benefits of the crops so that their motivation to develop annual crops is relatively small. For example, in Sumber Kembar Village and Srimulyo Village (Brantas watershed), the annual crops were less treated resulting in many crops died.

The low public awareness for the conservation of Brantas watershed through annual crops (*standing crops*) made the use of protected forestland, production land, and conservation land more unbalanced as showed by the data in the following table.

TABLE 2. PROTECTED FOREST, PRODUCTION AND CONSERVATION LAND AREA IN BATU CITY

| Area of Forestry | Protected Forest | Production | Conservation | Total |
|------------------|------------------|------------|--------------|----------|
| Batu | 387.20 | 728.60 | - | 1115.80 |
| Bumiaji | 1164.4 | 2338.6 | 4641.70 | 8644.20 |
| Junrejo | 918.20 | 392.90 | - | 1311.10 |
| Total | 2969.80 | 3460.10 | 4641.20 | 11071.10 |

Source: Department of Agriculture and Forestry of Batu City, 2015.

The land use that did not concern on the protected forest land (as the table above) would have a direct impact on environmental degradation resulting in flooding and soil erosion as happened in 2004 on the upper Brantas watershed in Batu City. The impact of the unrestrained land deforestation and degradation in 2004 was the attack of flash floods in the Brantas upstream. The residential area (settlement) and yards at an altitude of 1,500 mdpl were hit by flash floods, destructing some villages around Brantas river flow in Batu City that were previously never flooded. It seems to be a scream of nature to not ignore the conservation in Batu City and the surrounding areas. In Pujon, belonged to Malang regency near Batu City, were also hit by floods that claimed many casualties in 2010 and early 2014 (Figure 3. (a) and (b)).

For comparison, the case of floods in Batu City as described above is similar to the floods that occurred in the Ciliwung area caused by the land use that does not pay attention to protected forest land and watershed conservation. [Pawitan \(2004\)](#) in his study revealed that the pattern of land use in the area of Ciliwung is still dominated by agricultural fields and plantations, reaching 61% of the upper Ciliwung Watershed and 73% of the middle Ciliwung Watershed. The changes in the land-use pattern give impact on the absorption capacity reduction, particularly seen from the proportion of the settlement area change in the Middle

FIGURE 3. (A) UPPER WATERSHED FLOOD HITTING THE SETTLEMENT; (B) IRONY: FLOOD IN THE UPPER BRANTAS WATERSHED FOREST



Ciliwung, so it will increase the surface runoff resulting in floods in the upstream area of Ciliwung to Jakarta.

Another impact of forest land use that does not pay attention to protected forests and conservation is the diminution of water sources/springs. For example, in Bumiaji District of Batu City as the upper Brantas watershed, there were 111 water sources, of which around 57 water sources remain today with details of 20 water sources in the area of agroforestry and 37 water sources spreading over the lands owned by the residents. Furthermore, according to [Harini and Suyono \(2012\)](#), fundamentally there are some changes in forest functions, including: the decrease of forest area in the location, the diminution of springs, the erosion of fertile soil layers, the occurrence of landslide, the siltation of rivers ultimately bringing an impact of change towards critical land. Land criticism in the upper Brantas Sub-basin/watershed mostly occurred in areas with steep slopes ranging from 40-60% to >60% in the mountains of *Anjasmoro*, *Arjuno*, *Panderman* and a small part of Mount *Wukir*.

On the other hand, the critical land issues of Brantas watershed could not be separated from the rapid increase of population that was not accompanied by the increased education level and the provision of jobs that were sufficient for the communities ([Rahardjanto, 2013](#)). This has triggered the movement of communities in the watershed area to penetrate forests, resulting in the degradation of upper watershed functions as a conservation area. Based on the results of the *Focus Group Discussion* (FGD) conducted in this study, it was confirmed that over populated rural areas caused a land tenure become narrow and resulted in an intensive land management that often caused dis-external economy such as the occurrence of erosion exceeding the permitted level and ultimately led to sedimentation that would disturb river channels and other water structures.

Besides, the over population growth in rural areas where the level of dependency was mostly on agriculture sector would cause a hunger of land. Such a condition, if not accompanied by legal

awareness, will result in land grabs, illegal logging and other environmental disturbances that may cause natural disasters such as floods, landslides, and droughts ([Dewi, Trigunasih, and Kusmawati, 2012](#); [Mawardi, 2010](#)).

THE NON-OPTIMAL GOVERNMENT ROLE IN UPPER BRANTAS WATERSHED CONSERVATION

The unsustainable forest management, as well as unwell ordered settlement and industrial development, also can result in watershed damage. In addition, the mainstreaming of forest investments ignoring the functions of forest areas as the foundation of people's welfare, the loss of community's access and control of the environment, and the increased forest industries, is also noted as a major problem related to the withdrawal of watershed management performance ([Pasaribu and Suradisastra, 2010](#)). This condition indicates that the government's partisanship towards watershed conservation is minimal. Based on the results of this research, the government policies tended not to favor the critical upper Brantas watershed. The minimal partisanship of the government policies to the regional crisis in Malang (especially in Batu City) can be seen from:

1. The determination of tourist areas in the southern part of Batu City (Batu and Junrejo Districts) by altering the area of slopes of Mount *Panderman* into a physical development area as a central tourist destination.
2. The licensing for tourist destinations in the region to use the wells of underground water so as to have a direct impact on the presence of discharge of residents' water wells located in lower land/area.
3. The implementation of regional autonomy as an effort to bring community participation in the development, which has not been able to realize the improvement of the environmentally sound economy.

On the other hand, the formulation of policies and regulations is largely determined by who are the public officials and

political officials ([Nugroho, 2010](#)). For example, at first, one of the compromises offered by the State Forestry Company of Indonesia (*Perhutani*) in facing the crisis of the upper Brantas watershed was replacing vegetable crops with annual crops. Of various options, there were offered *porang* and coffee to be planted in addition to staple crops (standing crops). However, the government bureaucracy ([Sulistyaningsih, 2013](#)) did not approve the suggestion of the community and the State Forestry Company. Right after the turn of the Mayor, this idea became the program of Batu City Government, to stop planting vegetables as a catch crop/intercrop in the agroforestry land and replace them with coffee plants. Even in early 2009, the Government of Batu City provided various incentives to accelerate the implementation of coffee planting ([Sulistyaningsih and Narto, 2014](#))

The case above reinforces the argument stating that forest management policies are heavily dependent on policy choices made by the ruling political officials at the period. Such a condition is a direct impact of the regional autonomy system that demands the turnover of local leaders every five years. In the context of politics and democracy, the system is recognized as a form of local government system progress. However, in another side, regional autonomy has adversely affected the management of forests in various regions such as forest management in Brantas Watershed, Batu City.

In relation to the regional autonomy impact on the management of forests and watersheds, [Suganda, Atmodiwirjo, and Yatmo \(2011\)](#) in their study showed that, at present, there is a tendency that the economic aspect is more emphasized than the social and environmental aspects. This is related to the authority of each regency/city or province in regulating its own territory through regional autonomy and the tendency to raise its own Regional Revenue (*PAD*). As a result, each region can utilize the existing natural resources without any environmental preservation. Watershed management is also included in this tendency. This is certainly a problem, especially since watersheds

generally cross several administrative areas, both regencies/cities, and provinces, making regional autonomy-based management threaten the sustainability of the watersheds.

On the other hand, the unclear role of inter-governmental agencies/institutions in the management of watershed has had an impact in poor watershed management in which the government ultimately cannot organize the watershed optimally. [Karyana \(2007\)](#) in his study indicated that there were nine government institutions involving directly in the management of Ciliwung watershed. Of the nine institutions, there were four institutions that had a determining position and role in formulating and conducting the spatial policy and watershed management program, covering the Department of Spatial and Environment of Bogor Regency, the State Forestry Company of Indonesia, the Department of Agriculture and Forestry, and the Watershed Management Hall. The analysis results of *ISM* suggests that the position of the institution that has a large influence in the management of Ciliwung Watershed is not in line with its role in decomposing and carrying out the policy on watershed management.

Moreover, [Karyana \(2007\)](#) mapped that the management of Ciliwung watershed has not been harmonious yet. The disharmony is shown by the low interdependence between institutions on the elements of tasks, activities, and resources. From the three elements, the coordination between institutions involved in the watershed management is only at the level of resource utilization. The institutional problem in the Ciliwung Watershed does not refer to the problem of the institution as an organization, but it tends to relate to inter-institutional relations, that: government agencies/institutions involved in the Ciliwung Watershed management have not had programs and activities oriented to solving the problems of watershed institutions; policies and roles of the central government have not been effective in addressing the problems occurring in the Ciliwung watershed.

The formal institutions for the conservation of Brantas Wa-

tershed basically consist of: (1) institutions established in the form of watershed forums either at the District, Provincial or National levels and also several sub-districts; (2) government agencies/institutions such as the Departments of Agriculture, Forestry, Plantation, Environment, Irrigation, the State Forestry Company of Indonesia (*Perhutani*), Water and Energy Resources, Brantas River Basin Operator (*Perum Jasa Tirta*), R. Soerjo Forest Park, Bromo Tengger Semeru National Park, Community Institution, and the Extension Workers of Forestry, Plantation and Agriculture and others, along with Groups of Forest Farmers, Dry Land Farmers, and Wet Land Farmers. If the contributions of these institutions to the empowerment of the conservation are reviewed, the roles are relative and dependent on their respective Tasks and Functions (Tupoksi). However, in its practice, the roles and contributions of the formal institutions to Brantas Watershed conservation have not shown any positive impacts on the watershed sustainability. ([Halimatusadiah, Dharmawan, and Mardiana, 2012](#); [Brantas Hakim and Nugroho, 2012](#); [Harini and Suyono, 2012](#); [Hakim and Nugroho, 2011](#)).

LOW PUBLIC AWARENESS FOR UPPER BRANTAS WATERSHED CONSERVATION

The efforts to conserve the Brantas Watershed by various parties experienced various obstacles. Based on the results of this study, the constraints of Brantas watershed conservation covered: (1) the dominance of economic orientation defeating ecology; (2) the environmental action that had not been a sustainable agenda (*Ceremonial-Sporadic*); (3) the low public awareness on forest and water conservation; and (4) the non-conservation system of land and forest management (non-environmentalist regulation).

In line with the findings, Suganda, Atmodiwirjo, and Yatmo (2011) also pointed out that there is a similar case namely *Situ Gintung* case, indicating that the occurrence of disasters around the watershed is related to the uncontrolled spatial execution,

and lack of infrastructure maintenance in the upstream area. This case also indicates the importance of environmental management in watershed areas at the macro level. In addition, this case also suggests the effect of economic aspects that can trigger communities to exploit the environment in order to gain profit. This is due to the lack of good public policy made by the Local Government. Therefore, [Imansyah \(2012\)](#) asserted that watershed damage is caused by the density of population settlements, the river pollution by domestic and industrial waste, and others resulting in disasters such as floods, droughts, and landslides. The matter should be solved jointly between the government and the community.

Related to the low public awareness of watershed conservation, [Dewi, Trigunasih, and Kusmawati \(2012\)](#) illustrated that watershed damage is accelerated by the increased utilization of natural resources as a result of population growth and economic development, the policies that have not aligned to natural resource conservation, also the low public awareness and participation in the context of natural resource utilization and conservation.

Given the upper Brantas Watershed destruction as explained above, the PUSAKA Foundation and the Brantas Watershed-Caring Farmers' Group have started to conduct conservation with hard crops/trees (perennials). The selected crops are the type of guava, arabica coffee, and persimmon because:

1. These fruit crops have conservation and economic values in accordance with the height/altitude (at 1,500 mdpl) and the soil conditions.
2. Guava and coffee crops have easy maintenance, low cost, and relatively short growth period, interspersed with persimmon plants as long-term reinforcement plants.
3. By planting these crops, there can be pioneered a center tourist village of picking guava and coffee, considering that the tourism potential in Batu City is good while guava fruit has not been well developed.

FIGURE 4. (A) VEGETABLE CROPS IN SUMBERBRANTAS; (B) UPPER BRANTAS WATERSHED CONSERVATION, TUMPANGSARI, WITH GUAVA AND VEGETABLE CROPS.



Practically, the refusal of the community to plant standing crops/plants was quite great. The Chairman of *PUSAKA Foundation* stated that: “It takes *patience and persistent struggle* to give understanding to the community to be willing to plant these standing crops/trees because the fact is that farmers have got used to planting vegetables and experienced its benefits. Thus, it is not easy to change their defenses instantly. For that, we need to embrace the peasant communities/residents and prove to them that conservation with standing crops/trees can prosper them productively. This is the challenge.” (Interview on June 8, 2015). The farmers in Bumiaji District mostly grew vegetable crops. This is very rational considering that vegetable crops provide a promising advantage and do not take a long time to produce. On the other side, this matter threatens the sustainability of the slopes/upper Brantas watershed to prone to landslides. However, changing the way people think to replace the plantation of crops other than potatoes and carrots (has become a dominance) is not easy.

The attempt to change the community mindset to move from planting vegetables to standing crops is not an easy matter because they think very pragmatically on what kind of plants they can harvest faster. Thus, it is seriously difficult to change them

into standing crop cultivation. In line with these issues, [Pranadji \(2012\)](#) explained that the destruction of the values of the rural community is an important factor causing the powerlessness of communities and the decline in local management of ALK. The efforts to improve watershed management need to not only be aligned to community empowerment but also need to be integrated with socio-cultural transformation and rural economies. Models of rural community empowerment in the effective management of ALK are based on the strengthening local social capital.

According to [Nugroho \(2012\)](#), the problem of community's reluctance to replace the plantation of vegetables with standing crops (watershed conservation plants) is caused by: the planning of land use forms and inappropriate management practices; the increased population growth; the poverty and economic downturn due to resource constraints; the existing institutions that are less supportive; the protection and regulatory policies that do not restrict the land ownership and use; and the unconfirmed *de facto* use of land rights on forest land. In the context of conservation of the watershed damage, [Imansyah \(2012\)](#) revealed that the government together with the competent parties are expected to immediately draft educational activities that can educate the public. At the very least, the community will understand and comprehend the basics of nature's sustainability safeguarding, starting from small things like dumping in its place.

Furthermore, the conservation of upper Brantas watershed needs to be done through a collective movement among stakeholders so that all relevant elements or institutions (including the local community) can have the responsibility for jointly preserving and maintaining the watershed. [Halimatusadiah, Dharmawan, and Mardiana \(2012\)](#) explained that one of the initial steps to overcome the increasingly severe watershed damage is forming a movement of the community to maintain and caring jointly the watershed ecosystem. To realize the movement of the community, it is needed a container that can accommo-

date aspirations and coordination in managing the watershed. In its principle, the watershed institution is established on the awareness and needs of the communities living around the watershed to implement a better watershed management.

CONCLUSION

Finally, this research has mapped and outlined the causes of upper Brantas watershed/basin damage, covering: (1) the community's pragmatic behavior and way of thinking in the management and utilization of land around the upper Brantas Watershed. Most of the community prefer planting seasonal crops (eg. vegetable crops) to planting standing crops (eg. coffee and guava crops) as watershed protection plants; (2) the government policy that is not aligned to the upstream conservation of Brantas Watershed. The local government in the era of regional autonomy has a broad authority to manage watershed areas. Unfortunately, the authority possessed is not utilized for watershed conservation area; and (3) the low awareness of the community to conserve the watershed continuously.

The management of upper Brantas Watershed must strengthen the cooperation (partnership) among stakeholders to jointly save the upstream area of the Brantas watershed. The government as policy makers should involve other stakeholders to participate in the planning, implementation, and evaluation of the management policy of the upper Brantas Watershed. Through the partnership, the upper Brantas watershed can be saved so that the watershed can support the acceleration of regional, national, and state development.

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