

Improvement of regional cooperation in overcoming the problem of water resources in the decentralization Era in East Java Province, Indonesia

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ABSTRACT

Since the implementation of decentralization in Indonesia, the policies of each district / city have varied greatly with regard to sustainable development, along with the increasing number and needs of the population. By utilizing the available financial and potential, the district / city conducts a program of sustainable development activities, one of which is water resources. Problems arise when the affairs of water resources involve mutual interests between districts / cities, often with regional and sectoral egos. Therefore, the need for cross-sectoral and inter-regional coordination and cooperation is formulated by considering environmental sustainability and sustainability, especially water resources. Efforts to conserve and utilize water resources must be balanced in order to realize sustainable use of water for the welfare of the entire population both present and future generations.

Key word: Cooperation between regions, Water resources

Introduction

In the development of human life, water is vital for life and ecosystem sustainability. Water and water resources in Indonesia today are at a critical level marked by water scarcity in various regions, catastrophic floods, droughts, and very high pollution of water in Watersheds, both due to natural events but mainly because the people doing. Urban ground water is already in critical condition which is detrimental to the life of living things and the sustainability of ecosystems (Hill, 2010).

In an effort to maintain the sustainable use of water fairly by stakeholders, management of water resources should be done wisely. Concern for water should also reflect social, economic, environmental values and be carried out in an integrated manner,

namely: water resources, natural resources, forest resources, and other related resources. To support the management of water resources, stakeholders in the sustainability of water resources participate in organizing water resources management (WHO, 2008).

There are many factors that cause water and water resource problems including (Hill, 2010):

1. Increasing population and the rate of development growth.
2. Increasing water demand in various sectors of households, agriculture, industry
3. Increased changes in land use resulting in a lack of retarding and catchment areas.
4. Increased water pollution starting from the catchment area up to downstream by Household Waste (Non Point Sources), Industrial and Min-

ing Activities (Point Sources), Natural Events (sediment. Erosion, etc.), Other Development Activities

5. Weak law enforcement.
6. There is no institution that includes capacity; institution; HR; authority coordination mechanism; regulation; low participation of stakeholders; funding and implementation / pilot sites.
7. Lack of up to date maps of groundwater and surface water / river water conditions.
8. The development of the function of water which was originally only a social function today has become a social, economic and environmental function.
9. There is no balance between the Production System (water system), water distribution (water management) and consumption (water use)

While the management of water resources faces many obstacles including (Coussens 2009):

1. Not yet clearly differentiated boundaries of groundwater and surface water ecosystems in the management of water resources.
2. Upstream-downstream hydrological linkages have not yet become a consideration of surface water in the management of water resources.
3. Closure of vegetation in upstream watershed watersheds most of the watersheds studied are critical.
4. Changes in global climate and acid rain which affect the quantity and quality of rainwater.
5. Damaged / reduced groundwater catchment area (recharged area).
6. Increased erosion and sedimentation in most of the study basins.
7. Increased fluctuations in flow rates, especially in the central and downstream areas of the watershed.
8. Lack of inventory of water sources and / or springs.
9. Stakeholders of water resources have not synergized.

The purpose of this research is to make a study on increasing cooperation between regencies / cities in overcoming the problem of water resources in the era of decentralization, identifying forms of cooperation between regencies / cities in overcoming the problem of water resources, and formulating strategies to increase cooperation between regencies / cities in overcoming the issue of water resources.

Materials and Methods

This research is a policy analysis with a qualitative approach with in-depth interviews with officers who manage water and water users, especially those in border areas in 3 cities in Surabaya, Malang and Mojokerto. The informants of this study were water management officers and water users in the 3 districts / cities.

All data that has been collected, after going through the process of editing and classification then in addition to being analyzed are also interpreted. Data is selected and corrected first, especially regarding the completeness, accuracy and consistency. Then the data is processed with qualitative descriptive analysis (Li and Migliaccio, 2010).

Results

Malang City Water Resources Management

The Greater Malang area which includes Malang City, Malang district, and Batu City is an area that is not only adjacent in an administrative area, but also an interdependent area in the field of water resource availability.

Drinking water company customers in Malang City in 2017 were 149,572 customers, most of which (94.16%) were household customers. In 2018 the number of customers has increased to 155,853 customers (Central Bureau of Statistics, 2019a).

Malang City which is at an altitude of 399-622 meters above sea level in fulfilling the availability of raw water is more utilizing water sources that are outside the Malang City area. Among them, Wendit water sources with a discharge of 1,500 liters per second, Summersari and Karangploso water sources with a discharge of 40 liters per second. These three water sources are located in Malang Regency (Central Bureau of Statistics, 2019a).

Malang also utilizes Banyuning and Binangun water sources which are within the Batu City area. In its management, the three autonomous regions have made cooperation agreements for the use of springs. Apart from the problem of the distribution of springs that are used to supply water needs in Malang Raya, the problem also occurs at the source of water used by the community to obtain clean water. Dozens of springs in Malang Regency, East Java are contaminated with *Escherichia coli* (*E. coli*) bacteria. So far the water source has been used by

the community for drinking water and clean water.

Malang Regency or Malang Raya region is the upstream area of the Brantas River because in one area that was once the Malang Regency area, Batu City has a water source that flows through the Brantas River and as we know, the Brantas River is the lifeblood of the community through which it begins from Malang Regency to Surabaya City (Central Bureau of Statistics, 2019a).

Brantas river water sources on Mount Arjuno and Welirang were initially numbered 80 and are currently reduced to 40 water sources, according to Malang drinking water company, which handles the Brantas River region. Malang Regency has vast agricultural and plantation land so water demand is one of vital thing to strive for (Central Bureau of Statistics, 2019a).

The projection results show that in 2032 efforts to process waste into something more useful and public awareness to maintain environmental quality have been achieved. The need for water for flushing (river maintenance) aims to keep the availability of river discharge along the irrigation canal as well as to control water pollution which is the main purpose of increasing the carrying capacity of the river. The percentage of water needs of Malang City in the next 2032 for domestic water needs is estimated at 22.03%, non-domestic at 8.81%, irrigation at 11.34%, livestock at 8.80%, industry at 0.07%, and for river maintenance is the largest at 48.95% (Admadhani, Haji, and Susanawati, 2014).

Surabaya City Water Resources Management

One way to look at community welfare is to see to what extent the percentage of people who use clean water. The measurement of the level of community welfare can be reflected from the average consumption of clean water by the community.

The customers of the Regional Water Supply Company in the City of Surabaya in 2017 were 555,584 customers, the majority (91.48%) were household customers. In 2018 the number of customers has increased to 562,361 customers (Central Bureau of Statistics, 2019c).

Water discharge generated by 6 installations owned by PDAM Kota Surabaya over the past 5 years has increased, namely in 2014 amounting to 9,338 liters / second, in 2015 amounting to 9,855 liters / second, in 2016 amounting to 9,934 liters / second, in 2017 amounting to 10,232 liters / second and in 2018 amounted to 10,975 liters / second

(Central Bureau of Statistics, 2019c).

Water pollution in Surabaya is a complex problem and a solution must be immediately sought, this problem is not only due to the reduced problem of water sources which decreases discharge but also the condition of water which is increasingly polluted by industries and household waste (Yudo and Said, 2019).

Water needs for the majority of Surabaya residents depend a lot on water supply from the Surabaya River. More than 5000 liters / second, the Surabaya Regional Water Supply Company takes water from the Surabaya River to be cleared and distributed to around three million residents of the City of Surabaya. Some industries around Surabaya River also utilize Surabaya River water (Central Bureau of Statistics, 2019c).

Kali Surabaya is in the downstream part of the Brantas river. This watershed covers 15 regions, namely Batu City, Malang District / City, Blitar District / City, Tulungagung District, Kediri District / Nganjuk District, Jombang District, Mojokerto District / City, Gresik District, Sidoarjo District, and Surabaya City. The area of the Brantas watershed is around 11,800 km². Every rain event in the 15 regions, runoff water will flow into Surabaya River and Porong River (both tributaries of the Brantas river).

The preservation of the forest in the recharge area of the Brantas river basin is a cornerstone for the preservation of the Kali River water. If the forest is well maintained, then the preservation of water will be well maintained. In the rainy season, infiltration will occur properly, so that surface runoff is reduced and river water discharge can be controlled. Mountain underground water that is the source of the Brantas on Mount Arjuno and other river water sources will be well preserved. In the dry season, drought will not occur. Enough water reserves are available, namely water in reservoirs and underground water. Underground water will continue to flow throughout the dry season to fill reservoirs, as water sources, springs, wells and so on.

Conversely, if the forests in the Brantas watershed have been bare, then every time rain comes, the water will run off as surface water, from the top of the mountain directly into the valley, through small rivers and will be collected at Brantas River and immediately thrown into the sea. It is inconceivable, if all the rainwater in 15 areas becomes surface runoff, massive and devastating floods will hit

Mojokerto, Sidoarjo, Gresik, and Surabaya. Because most of the water becomes surface water, the filling of underground water (infiltration) does not take place properly. The result is the absence of water reserves in the soil during the dry season. Water sources, springs, and reservoirs are threatened with water shortages, as well as the Surabaya River's water flow will be smaller and no longer sufficient for local water companies and other needs.

When the water debit is low, the Kali Surabaya water is often faced with water pollution problems. Along the Surabaya River there are more than 40 industries and domestic activities that have the potential to pollute the water of the Surabaya River. Industrial and domestic wastewater discharged into Surabaya River during small river water discharge will greatly affect the quality of river water. Kali Surabaya, which is determined as a class I water body (based on Government Regulation No. 82 of 2001), has never reached the required water quality, namely biochemical oxygen demand (BOD) maximum of 2 mg/L and dissolved oxygen (DO) of at least 6 mg/L.

In one of the regional water company intakes in the Jagir River in Surabaya, river water quality monitoring has been carried out since 2010-2013. From these results an average BOD value of 5.715 mg/L, an average Chemical Oxygen Demand (COD) value of 22.86 mg/L. Total Suspended Solid (TSS) concentration obtained an average of 59.59 mg/L. dissolved oxygen concentration obtained an average of 3.27 mg/L, and an average PH of 7.05 (Yudo and Said 2019).

Concentration of organic matter in Surabaya River is relatively high, and tends to increase especially during the dry season. It can be seen that the highest BOD concentration can reach 14.84 mg/L and the highest concentration of Chemical Oxygen Demand (COD) can reach 53.87 mg/L. When compared with Class I Water Quality Standards in accordance with PP No. 82 of 2001, this shows that Surabaya River water has been polluted by organic pollutants is quite high (Yudo and Said, 2019).

With the increasingly poor quality of raw water originating from Surabaya River, with conventional processing, the use of chemicals is also getting bigger, as a result the processing costs will become more expensive. In addition, if the concentration of pollutant compounds in raw water is very high, then conventional processing with chemical deposition will not be able to eliminate the pollutant com-

pounds (Worch 2012). Excessive application of chemicals, especially chlorine, can cause side reactions between chlorine and pollutant compounds to form organo-chlorine compounds which are carcinogens (Roberts, James, and Williams, 2014).

Mojokerto City Water Resources Management

The water supply used by the community in Mojokerto City is from the regional water company, even if it uses only part of the well water. Whereas the source of water used for both drinking and irrigation water production is the source of water from the Brantas River.

Drinking water company customers in Mojokerto City in 2017 were 4,947 customers, most of whom (96.26%) were household customers (Central Bureau of Statistics 2018). In 2018 the number of customers has increased to 5,186 (Central Bureau of Statistics, 2019b).

Many people claim that they use drilled or underground water because the water supply from the local water company is very minimal. This condition was acknowledged by Supardi (40 years old), a resident of Gedeg village, who claimed that there was a lack of clean water from the regional water company.

Mojokerto City has 2 sources of raw water namely Jubel gravity water and Brantas river water. Raw water derived from gravity water has an average TSS of 3.5 mg/L and an average TDS of 166.25 mg/L. The total parameters of the coliform bacteria were 0 MPN and the average pH was 6.9. Whereas raw water from Brantas river water has an average TSS of 60.5 mg/L and an average TDS of 166.25 mg/L. The total parameters of the average coliform bacteria were 7142 MPN and the average pH was 6.925 (Keman *et al.*, 2007). Many water resources in Mojokerto are already polluted and contain lime so that the conditions are unfit and unhealthy for consumption.

Discussion

Conflict management of water problems is a very important issue for collaboration given how crucial water management is. Although the law has clearly stipulated, its implementation is not as simple as imagined. This means that the government must have an integrated system as the main weapon to overcome the problem of the water crisis. The regional autonomy should be an instrument to be able

to manage water resources better.

Cross-sectoral and inter-regional coordination and cooperation must be formulated by considering environmental sustainability and sustainability, especially water resources.

To realize that, it is possible for cooperation between regional governments in the management of natural resources, especially water resources. In the Law on Regional Governments it is stated that regions have the authority to carry out cooperation between regions in terms of natural resource management starting from the utilization, cultivation, impact control, and preservation. In fact, autonomous regions are allowed to share the results of the utilization of these natural resources. However, regions are also required to conduct environmental and spatial alignment and land rehabilitation.

The foregoing is implemented in Government Regulation No. 16/2005 concerning the Development of Drinking Water, which mandates that the government, including regional governments, must guarantee the availability of clean water needed by the community. However, so far the existing coordination is still sectoral, even if there is cooperation between regions, the context of cooperation is still weak. The cooperation paradigm is still oriented towards obtaining regional user fees or increasing local revenue. The cooperation has not yet led to a guarantee of community service for joint water needs. Similarly, discussions between regional governments in a joint effort to shoulder the burden of conserving water resources are very minimal discussed.

The tendency in the cooperation agreement on the utilization of water resources so far is only an agreement about the amount of the cost of water utilization and use. More than that it is rarely discussed.

The agreement should clearly indicate responsibility, sanctions, and efforts to conserve water resources. This is important not only for the sake of legal certainty, but it involves the livelihoods of many communities in terms of water availability and the sustainability of potential water resources which are always a potential need for conflict.

Collaboration on water resources issues between several Regencies / Cities that utilize water resources in the same place should be done because with this collaboration all parties will be responsible for the preservation of water resources used by the surrounding community.

The Regional Water Supply Company of Surabaya City and Malang Regency actually also have problems with water sources. Limited water sources in the two regions, requires both of them to make a breakthrough by utilizing water sources that are outside the area of the City of Surabaya and Malang Regency.

The problem of the lack of water resources and the increasing need for clean water experienced by the two Regional Water Supply Companies in East Java. In fact, for Malang Regional Water Supply Companies, most of them utilize water sources outside the Malang City area, such as Batu City and Malang Regency. Of the 16 raw water sources that are utilized by the Municipal Water Supply Company of Malang City, 9 sources are outside Malang City. To be able to take advantage of water sources outside the city of Malang, a mutual agreement must be made in a Memorandum of Understanding (MoU) between the two regions. In the MoU, clearly stated the rights and obligations of both parties in utilizing the said water source.

Likewise, in the city of Surabaya, in addition to utilizing surface water sources in Surabaya River, it also utilizes other water sources. Such as Umbulan spring, Plintah, Toyoarang, and Duren Sewu. Not only that, the Surabaya Regional Water Supply Company also still fetches water in Pasuruan. To date, the Surabaya Regional Water Supply Company has been able to serve at least 67 percent of the total population of Surabaya. The clean water distribution system implemented by the Surabaya Regional Water Company uses a zone system. This system is to make it easier to monitor areas that have been served, in the process, and for which there is no Regional Water Company network. The collaboration between the two regions is one example that deserves further improvement.

To answer these problems, the effectiveness and efficiency of water resources management activities need to be created, it needs to be collected, discussed and formulated aspirations, desires, engineering and gait of all stakeholders through the means of communication of equal distribution of information and consultation, networking on an International, National, Local scale to achieve a consensus and commitment as input for all parties concerned in the management of water resources.

The establishment of a continuous network of information and communication stakeholders in overcoming all the problems of water resource man-

agement is a principle to achieve the success of the preservation of water as a public asset.

In addition, in dealing with these problems, especially in the era of regional autonomy as it is today, a district / city government cannot solve the problem of water resources only in its own territory. But more than that, cooperation between districts / cities is needed to overcome this. This is because the problem of water resources is complex and interconnected with one another.

Conclusion

From the research that has been done, to formulate a strategy to improve policies between regencies / cities in overcoming this water problem, it can be concluded that: 1) Collaboration related to water resources between regencies / cities that are very close to each other needs to be carried out, because with this collaboration, local governments will be able to jointly carry out conservation and preserve water resources that can be used together. 2) This collaboration is currently felt to be not optimal, because cooperation is only limited to maintaining and knowing how and how much water needs are used by each region. Therefore, improvement is needed to make a breakthrough in how to conserve water resources to be able to continue to meet the water needs of both regions. 3) The geographical location and hydrological conditions of an area also determine the presence or absence of water availability. Areas that are at the head of a river or at a higher position tend to have large water sources. The opposite occurs in the lowlands or downstream areas of the river.

Suggestion

This water problem needs to get attention not only from the government but also for people who use water. Water is a renewable resource, but there needs to be good management so that it does not turn into non-renewable resources or even become a disaster. Conservation of water resources must be carried out from upstream to downstream. Forest rescue and reforestation programs are now a top priority in the context of water conservation. Then water management in reservoirs, river management, water quality management, integrated man-

agement between River Flow Area and aquifers and efficient water allocation. Equally important is the savings in water use by the community.

Conservation efforts and utilization of water resources must be balanced in order to realize sustainable use of water for the welfare of all people both in present and future generations. This is where the importance of the concept of sustainability in the development of water resources.

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