



Clean Water Crisis in Bali: An Analysis of Regional Policy in Realizing Ecological Justice-Based Water Security

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Abstract-The condition of global water resources becomes increasingly worrying as a result of extreme climate change. Bali as a world tourism paradise is faced with a risk of clean water crisis. Therefore, it requires some participation of the local government through policies which are oriented to water security aspects. This research examines two issues: First, a study on some aspects of ecology justice-based water security in Bali. Second, a study and evaluation of regional policies in realizing ecological justice-based water security in Bali. The results of this research shows that first, currently the aspect of water security in Bali still does not fulfil the targets of the Sustainable Development Goals (SDGs) and the National Medium-Term Development Plan (In Indonesian: *Rencana Pembangunan Jangka Menengah Nasional* or *RPJMN*). The imbalance between water availability and the amount of water use that occurs continuously will accelerate Bali for becoming an area at risk of experiencing clean water deficit. Secondly, viewed from regulatory aspect, regional policies in Bali have already been leading to aspects of water security. The realization of water security can be seen from the target and direction of regional policies. In addition, the Tri Hita Karana philosophy has also become a regional spirit in realizing an ecological justice-based water security. However, at the implementation level, water management still becomes an unresolved problem until now. The existing regional policies have not been able to guarantee its sustainability in the future in accordance to the SDGs and *RPJMN* targets.

Keywords-*water resources; sustainable development goals; ecological justice; bali; policy*

I. INTRODUCTION

The condition of global water resources become increasingly worrying as a result of the extreme climate change, which has resulted in the increased of water scarcity. United Nations Water notes that 2.3 billion of people have experienced water shortages, and 733 million of people have experienced water shortages at critical levels [1]. The results of research conducted by Mekonnen and Hoekstra noted that 4 billion of people live in water scarcity for 1 month in a year [2]. Furthermore, UNICEF notes that in 2021 there were 1.42 billion of people who are living in areas with high levels of water vulnerability [3].

This condition is increasingly disquieting, considering that the availability of fresh water on earth is very limited. The earth only stores 2.5 percent of fresh water, while 96.5 percent is seawater [4]. UN-Water explains that when a region consumes 25 percent of water or more, it can be said that this region is short on water. Currently, it is recorded that 5 from 11 regions in the world have water shortage index above 25 percent, 2 regions with high level of water shortage, and 1 region with extreme water shortage [1]. These facts prove that water crisis is a real disaster and should be taken into account by countries in the world.

The phenomenon of water crisis needs more attention because it will affect many sectors of life [5]. For example, water crisis will affect the food security sector. It is because in order to produce daily food, it requires 2,000 - 5,000 litres of water [6]. Therefore, it is not surprising that the World Economic Forum includes water crisis as one of the five disaster risks in the world which the countries in the world should be aware of.

From many countries in the world, Indonesia is a country which is projected to be going to face a serious water. From many regions in Indonesia, one area that has a risk of water crisis is Bali. Bali as a world tourism paradise, will face a risk of water crisis in the future. The increasing number of populations is one of the causes of water crisis in Bali. This increase occurs in line with the large number of either local or international visitors

traveling to Bali. The high demand of clean water in Bali has an impact on the reduced availability of clean water. If this condition is allowed to persist, Bali will be faced to water crisis that will give a wide impact to other sectors.

Considering the current condition of clean water availability in Bali, it is needed an awareness on the importance of sustainable water use. An alternative is the participation of the local government, by presenting regional policies that are oriented to some aspects of ecological justice-based water security This paper studies two issues: First, a study on some aspects of ecology justice-based water security in Bali. Second, a study and evaluation of regional policies in realizing ecological justice-based water security in Bali.

II. LITERATURE REVIEW

A. Regional Autonomy

The term regional autonomy is found in Article 18 paragraph (5) of the 1945 Constitution of the Republic of Indonesia, which states that regional governments are given the authority to exercise the widest possible autonomy, except for government affairs that are the authority of the central government. Furthermore, Law No. 23/2014 defines regional autonomy as the right, authority, and obligation of regions to regulate and manage their own government affairs within the framework of the Unitary State of the Republic of Indonesia.

B. Regional Policy

In the context of state administration, the concept of regional policy is also known as public policy in the regions. Thomas R Dye (1975) as quoted defines public policy as whatever government chooses to do or not to do. Based on the explanation of Article 17 paragraph (1) and Article 22 paragraph (1) of Law No. 23 of 2014, regional policies are defined as Regional Regulations, Regional Head Regulations, and Regional Head Decrees. Furthermore, regional policies are also known as regional legal products, as Article 1 Point 17 of the Regulation of the Minister of Home Affairs of the Republic of Indonesia No.120 of 2018, classifying into two regional legal products, namely in the form of regulations and in the form of decisions.

C. Water Security

Based on Article 1 point 4 of Presidential Regulation No. 37 of 2023, water security is the fulfillment of decent and sustainable water needs for life and development and the management of water-related risks, which provides a measuring tool for water security based on SDGs and *RPJMN* targets, namely the achievement of 100 percent access to decent drinking water.

D. Ecological Justice

Ecological justice is the antithesis of the anthropocentric approach that focuses on humans in viewing things. Ecological justice comes with a vision of giving equal rights to all ecological subjects (humans, living entities (non-human species/ biotic), non-living entities/ abiotic). Nicholas Low and Brendan Gleeson argue that ecological justice is not a matter of distribution, but a deeper meaning of the environment, which is related to the moral relationship between humans and non-humans [7].

III. METHOD

The research used is doctrinal legal research conducted to provide prescriptions about regional policies in realizing water security in Bali. Data analysis in this research is conducted in three stages: First, an assessment of how the condition of water security in Bali is associated with ecological justice. Second, an assessment of regional policies to realize an ecological justice-based water security in Bali. Third, drawing some conclusion in order to find out the regional policies in terms of realizing ecological justice-based water security in Bali. Ecological justice is used as an analytical tool to see whether regional policies in water management in Bali are oriented towards aspects of sustainability. This is considering that ecological justice will give equal rights to all ecological subjects, both human and non-human, including inanimate objects.

IV. RESULT AND DISCUSSION

A. Some Aspects of Ecological Justice-Based Water Security in Bali

Water security is defined as a condition where the decent and sustainable water needs are fulfilled and all risks related to water can be managed properly. Whereas something which becomes the criteria for water security are the targets of the SDGs and the *RPJMN*. SDGs is a holistic and multidimensional development agenda by 2030 to provide certainty on aspects of welfare, economy, and environmental protection. The SDGs have 17 goals with 169 targets that must be considered by policymakers in each country.

The *RPJMN* is a form of development target that must be achieved from 2020 to 2024, as regulated in Presidential Regulation Number 18 of 2020 on the *RPJMN* for 2020-2024. One of the targets of SDGs and *RPJMN* is to fulfilled 100 percent access to safe drinking water. This target is important because everyone has a right to water a part of human rights that need to be protected.

If you look at the current condition of Bali, water security in Bali has not met the SDGs and *RPJMN* targets yet. This is because access to water in Bali is still uneven. The imbalance between the availability of water and the number of water users is still problematic.

Table I. *Water users in Bali Province (people)*

District/City	2019	2020	2021
Jembrana	24.461	24.461	25.073
Tabanan	58.569	58.569	60.328
Badung	73.281	73.281	75.103
Gianyar	60.084	60.084	60.605
Klungkung	42.059	42.059	36.255
Bangli	19.225	18.899	21.003
Karangasem	38.163	38.348	40.693
Buleleng	67.362	67.402	73.754
Denpasar	87.399	87.399	89.126
Bali Province	470.603	470.502	481.940

On the one hand, Bali is still faced with the increasing number of water users every year. On the other hand, the amount of water available in Bali is always in deficit. This fact is reinforced by the findings of the Central Bureau of Statistics which projects a clean water deficit in Bali in 2025, due to the increasing of water demand from 5,951.92 litres per second in 2021 to 7,991.29 litres per second in 2025 [8].

In terms of the fulfilment of decent water, Bali region has not met the 100 percent target according to the SDGs and *RPJMN* targets. The percentage of households in Bali for the past 3 years (2020-2022) was still at 96 percent (rural areas category) and tended to be unstable. In 2022 there was a decrease of -0.20 percent from 2020 [9]. Limited piped water distribution infrastructure to village areas is one of the causes.

In terms of the percentage of households with access to clean water, Bali has also not met the 100 percent target. This condition still proves that access to clean water has not been evenly distributed to all regions in Bali Province. Of the 10 regions in Bali Province, several regions are still at 70 – 80 percent access to clean water. First, Tabanan Regency is the regency with the lowest access to clean water at 79.35 percent. Buleleng Regency is the second district with the lowest access to clean water at 80.9 percent. Bangli Regency is the third district with the lowest access to drinking water at 82.43 percent.

Judging from the status of water demand, several areas in Bali have experienced a deficit in 2021, namely Badung Regency, Gianyar Regency, and Denpasar City. The Research Report of the Ministry of Environment and Forestry, Bali and Nusa Tenggara Ecoregion Development Control Centre projects that these three regions will continue to experience water deficits in 2025, including Badung Regency, Gianyar Regency and Denpasar City.

The three regions above have been experiencing water deficits due to several reasons. Firstly, the increase in water demand for domestic and agriculture is a factor which influences the deficit of water availability in Badung Regency and Gianyar Regency. Water availability deficit in Denpasar City is influenced by the characteristics of landforms from fluvial processes.

From the aspect of underground water use, the condition of Bali's water resources is alarming. Firstly, the massive use of underground water becomes the cause and accelerates Bali's water deficit, due to the intrusion of seawater through the underground. The second reason is that the use of underground water in Bali is still ongoing without any licensing process. This is as stated by I Madi Adi Adnyana, the Head of the Water Resources Section, Regional Secretariat of the Badung Regency Government, who stated that in 2022 there were 1,646 companies without any legal permission had used underground water.

Viewed from ecological justice, some areas in Bali are faced with extreme drought. This condition causes further disasters such as forest and land fires. The Bali Regional Disaster Management Agency has recorded 75 disasters of extreme drought and forest fires occurred since August 2023 in the districts of Jembrana, Buleleng, Bangli, Badung, Denpasar City, and Karangasem. In addition, in terms of sustainability status, water management

in Bali is not yet orientated to the ecological dimension and has a low score of 61.37 [10]. This is due to the absence of policies that harmonize the balance between the dimensions of sustainable development.

B. Regional Policy in Realizing Water Security Based on Ecological Justice in Bali

In the context of water management in Bali, there is a philosophy called *Tri Hita Karana*. *Tri Hita Karana* is part of the Hindu philosophy, which harmonises life, from the universe to human beings. In its development, this philosophy is used as the basis for every policy of the Balinese local government, especially in water resources management policy. The *Tri Hita Karana* philosophy is elaborated in the form of local wisdom called *Sad Kerthi* which consists of: *Atma Kerthi* (purification of the soul), *Wana Kerthi* (forest preservation), *Danu Kerthi* (lake preservation), *Segara Kerthi* (preservation of clean water sources, sea and beaches), *Jagat Kerthi* (social and natural harmony) and *Jana Kerthi* (human resource development). This local wisdom is then translated into regional policies in Bali, including:

Table II. *Regional Policy*

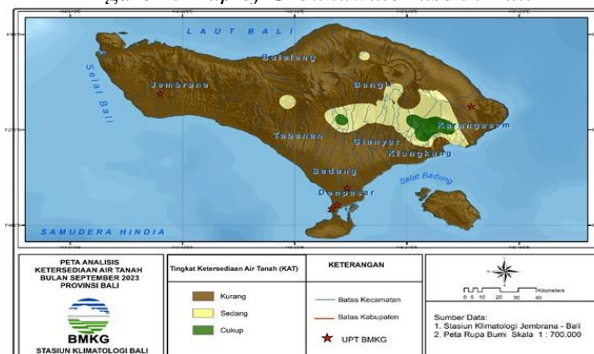
No.	Legal Products	Objects and Subjects of Arrangement
1.	Regional Regulation of the Province of Bali Number 2 of 2019	Bali Province Universally Planned Regional Long-Term Development Plan 2005-2025
2.	Regional Regulation of the Province of Bali Number 7 of 2022	Amendments to Regional Regulation Number 3 of 2019 on the Bali Province Universally Planned Regional Medium-Term Development Plan for 2018-2023
3.	Bali Governor Regulation Number 39 of 2019	Regional Action Plan for Sustainable Development Goals of Bali Province 2019-2023
4.	Bali Governor Regulation Number 24 of 2020	Protection of Lakes, Springs, Rivers, and Seas
5.	Bali Governor Regulation Number 25 of 2020	Protection Facilities for Temples, Pratima, and Religious Symbols
6.	Circular Letter of the Governor of Bali Number 04 of 2022	Order of Balinese Life Based on the Values of Sad Kerthi Local Wisdom in the New Bali Era

Based on the regional policies mentioned above, and referring to the previous discussion, several points can be found: First, from the aspect of existing regulations in Bali, it can be said that regional policies in Bali have led to aspects of water security. The realization of water security can be seen from the target and direction of regional policy, that is by turning the water a strategic issue in making regional policies. An example is by the existence of Bali Governor Regulation Number 39 of 2019 on the Regional Action Plan for the SDGs of Bali Province 2019-2023.

In addition, the philosophy of *Tri Hita Karana*, which becomes the basis for regional policy-making, as well as stated in the vision and mission of development in Bali, also becomes a new spirit in realizing ecological justice-based water security. However, at the implementation level, water management is still an unresolved problem until now. The current regional policy has not been able to provide guarantees for aspects of water security in the future.

First, based on the percentage of households in Bali which use managed drinking water properly has not met the target of 100 percent by the SDGs and *RPJMN* targets. The Central Bureau of Statistics notes that the percentage of households in Bali (type of rural areas) that have access to decent drinking water in Bali in 2022 is only 96.89 percent. This means that to achieve the 100 percent target of the SDGs target in 2030 and *RPJMN* 2024, it is necessary to increase the percentage of equitable distribution of decent drinking water in Bali by 3.11 percent. This is a new challenge for local governments, considering that the trend of access to decent drinking water in the last 3 years has always decreased.

Figure 1. *Map of Groundwater use in Bali*



Second, based on the indicators of the six targets of the SDGs, the control and law enforcement aspects of water use still need to be improved. The goal is to avoid excessive and uncontrolled use of water resources. This is because in 2022 there were 1,646 companies did not have authorization to use underground water. Figure 1 shows that most areas of Bali have insufficient water availability. This is due to the intrusion of sea water through the ground, as well as the use of underground water in Bali which is still done without a permit process. If this condition is allowed to persist, then water security in Bali may be disrupted in the future.

Third, viewed from the aspect of natural ecosystems that provide water in Bali, it was recorded that several areas of Bali have experienced clean water crisis in 2021, including Badung Regency, Gianyar Regency, and Denpasar City. The three regions experienced a clean water deficit for several reasons. First, the increase in water demand for domestic and agriculture is a factor influencing the water availability deficit in Badung Regency and Gianyar Regency. The water availability deficit in Denpasar City is influenced by the characteristics of landforms originating from fluvial processes. If the government does not immediately give more attention to this ecological aspect, it is projected that these three regions will continue experiencing clean water crisis.

Based on the various perspectives above, the author formulates regional policies in responding to the water crisis in Bali, the principles of SDGs are used as guidelines, as well as a form of local government commitment in supporting sustainable development. These principles are universal development principles, integration, no one left behind, and inclusive principles.

V. CONCLUSION

This research provides two conclusions: Firstly, in terms of water security, currently Bali has not met the SDGs and *RPJMN* targets. The reason is due to the deficit of water availability which is getting worst due to the impact of extreme climate change and increasing number of clean water users. Secondly, from the regulatory aspect, regional policies in Bali have led to aspects of water security with the *Tri Hita Karana* philosophy. *Tri Hita Karana* is the spirit of the region in the realization of ecological justice-based water security. As for the level of implementation, regional policies have not yet provided a guarantee of sustainability in the future according to the SDGs and *RPJMN* targets.

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