

# Balinese Way of Governing Water: A Social Survey on Water Governance

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**Abstract:** The ever increasing human population demands more extraction of freshwater to fulfill our basic needs. This put more pressure to the already limited water resource. The previous studies about water governance concludes that local community needs to be actively involved in an integrated water resource management (IWRM) in order to maintain sustainability. Balinese has long been known as community which always preserve water due to their belief in their local wisdom. This article aims to investigate how Balinese local wisdom play its role in the water governance. The social survey study was conducted using descriptive analysis. The data was collected in Badung District of Bali Province with purposive sampling of 100 respondents who live in Badung for the last 10 years and of 17 years old above. The result of the study shows that Balinese may not really aware about *Tri Hita Karana* and *Sad Kertih*, but they are practising its principle in their daily life. Balinese respect water as part of nature which must be preserved.

**Keywords:** IWRM; *Sad Kertih*; *Tri Hita Karana*; Water governance

## Introduction

Water is an essential resource for all lives on Earth, especially human. We need water to survive and the lack of it will disable us from living our fullest potential. Apart from its role in keeping our life sustenance, water is actually a natural capital which can be observed both as natural resources and ecosystem service provider (Islam & Managi, 2019; Miller & Spoolman, 2016). As resource, water is used to fulfill our primary needs, such as drinking water, hygiene, and sanitation. Water also provides important service for the ecosystem. This ecosystem service is categorized into four categories (Liu et al., 2013); 1) provision service (drinking water, irrigation, etc.), 2) regulation service (purification, erosion prevention, flood regulation, etc.), 3) cultural service (recreation, tourism, cultural symbols, etc.), and 4) habitat service (aquatic habitat, spawning habitat, etc.). With this regard, water is not only important resource to keep our life, but it also has other important role for ecosystem and as the symbol of culture.

Despite its importance, water resource is getting more difficult to acquire. As the world population increases rapidly and the pressure of climate change becomes the challenge of our time, the demand for clean water is getting more challenging to meet (Reid, 2021; Witze, 2018). Currently, more than four billion people live under severe water scarcity for at least one month of the year (Mekonnen & Hoekstra, 2016). The issue of the water crisis brings an existential threat to humanity. Unfortunately, this issue is often undermined, concealed, or disproportionately addressed. Water-related impacts continue to be inadequately accounted for (United Nations, 2021). Therefore, the issue of water crisis remains obscured due to lack of incentives to re-valuing water as scarce common resource. This explains how water is still excessively used in countries that have the issue of water scarcity (Damania et al., 2017). It is important to note that how human perceives and values water are also important factors for the sustainable water governance.

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The increasing pressures on water resources demand a more robust, holistic, and inclusive water resource governance. In addition, there are much more profound and multifaceted water and human life issues. Water is not enough to merely exist or be available to use. Water is also a necessity for the livelihood of local communities who perceive water as an integral part of their culture. Hence, the availability and condition of water resources have become crucial issues and need to be strategically managed.

Bali is a small island in Indonesia which is well-known as popular tourism destination. It attracts about 6 million tourist annually from all over the world (BPS Bali, 2021). Balinese has long been known as community which has strong belief system. The local wisdom values has become inseparable part of Balinese life and culture. Traditionally, most Balinese depends on rice farming for their livelihood. Therefore, Balinese has strong local wisdom values which aimed to maintain the harmonious relationship between human and nature (Tarigan, 2014). Water for Balinese is more than just resources because they are also perceived as sacred symbol of purity (Cole & Browne, 2015) which is important in the purification and religious ceremonies (Lansing, 2006). The way how Balinese respect water can be well observed in the practice of *subak*, an ancient water governance for rice irrigation in Bali, which shows democratic and sustainable water management (Roth & Sedana, 2015).

*Subak* is inspired from local wisdom called *Tri Hita Karana* which means three causes of happiness through harmonious relationship between human and God (*Parahyangan*), fellow human (*Pawongan*), and environment (*Palemahan*). This is interesting concept because it puts the context of happiness in the the achievement of environmental sustainability. Balinese perceives nature as the manifestation of God which dictates how they live and how nature should be respected (Gunawan, 2014). Another local wisdom value, *Sad Kertih*, also highlights the importance of environment for Balinese. *Sad Kertih* is increasingly well-known after the government of Bali decided to make it as the vision for Bali Development called 'Nangun Sat Kertih Loka Bali'.

As a well-known tourism destination, Bali's economy depends on tourism development. This encourages rapid development of tourism facility in Bali which around 24% per year (BPS Bali, 2021). Tourism is an industry which requires ample amount of water resources (Sun & Hsu, 2019). Water is essential for tourism due to its role in maintaining great quality of service to tourist. Water is used for hygiene, sanitation, as well as leisure such as swimming pool, *jacuzzi*, and decoration. Tourism industry always do its best to

secure water provision for the success of their business. On the other hand, water is also used by local community for meeting their daily needs as well as by farmers for irrigation. However, the balance of power favors tourism industry as major economic sector which dominates the narrative of water management on the island (Cole, 2012).

As a small island, Bali is actually vulnerable to water scarcity (Chairunnisa et al., 2021). Recent report even stated that Bali has moderate risk of water scarcity (Hatmoko et al., 2012; Sunarta & As-syakur, 2015). This risk could be greater when Bali focuses its economy on tourism. This can also be observed in other small island countries which have major tourism industry and face water scarcity issue such as Cyprus, Mauritania, Malta, and Barbados (Sun & Hsu, 2019). The issue of water governance should not fall into the most powerful group of people. It should include all stakeholders in order to realize the sustainable water governance.

Integrated Water Resource Management (IWRM) is widely used for an ideal approach to manage water sustainably all over the world. Recent studies of IWRM suggest that water governance is more effective if it includes social and economic component as well as involves all stakeholders (Galán et al., 2009). The participation of local community in water governance is also important, especially to those who share the same water resource (Eliasson, 2015). The reason is because local community is perceived to be able to manage water sustainably (Agrawal, 2001; Cox et al., 2010). Furthermore, local community based resource management strongly correlates with local wisdoms and norms (Berkes et al., 2000; Dudley et al., 2009) which can be utilized to promote better collaboration among water users.

This study aims to investigate how Balinese local wisdom plays its role in the water governance. Due to limited resource, the study only focuses on Badung District in Bali as a study case. Badung District is the most affluent district in Bali. This is due to most tourism facility such as hotels and villas in Bali are concentrated in the southern part of the district. However, Badung still has large amount of area which depends on agriculture, especially in the northern part. Badung District becomes an interesting context which showcase the competition of water usage among tourism, domestic, and agriculture sectors.

## Method

The study adopts quantitative approach (Creswell, 2014) with the social survey in two different sub-districts in Badung namely Petang (in northern part) and Kuta Selatan (in southern part) (see Figure 1). The data is

collected with purposive sampling method with inclusion criteria; 1) those who have been living for 10 years minimum in Badung and 2) those who are minimum 17 years of age. The survey successfully gather 101 samples from the two sub-districts (50 samples from Kuta Selatan and 51 samples from Petang). Each data represent different family living in Badung. The data is then analyzed using descriptive analysis from statistics of the primary data (Holcomb, 1997).

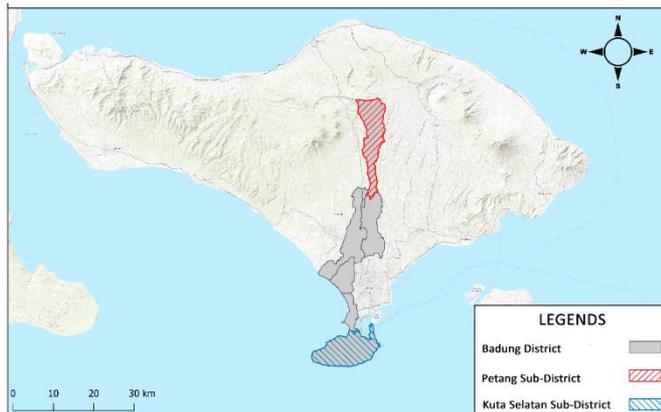


Figure 1. Research location map

## Result and Discussion

### Perception about Water Value and Condition

The result of the social survey can be observed in Table 1. Most respondents are Balinese (94 people) and others are Javanese (3 people), Chinese Tionghoa, Bataknese, Palembangnese, and Southeastern Nusa people (1 people). The result of the social survey shows that Balinese perceive water as the source of life to all living being (score 236). Alternatively, Balinese value water as important resources to fulfil basic needs (score 108) and as important economic resource for their livelihoods (score 102). Only few respondents value water as important resource for irrigation (score 11) and for tourism (score 13). These perception on water resource are based on the role of water in fulfilling basic needs (27%), the intrinsic value of water for ecosystem (23%), and based on personal observation of their environment (16%). Apparently, the perception of water value among Balinese does not really inspired from the local wisdom of *Tri Hita Karana* (11%) and *Sad Kertih* (2%) (see Figure 2). However, this does not necessarily means that Balinese no longer honour their local wisdoms. Many Balinese may not have the knowledge about the philosophy of both *Tri Hita Karana* and *Sad Kertih*, but they practice its principles in their daily life.

Table 1. Social Perception about Water Value

Cultural Background			Perception About Water Value			
			Rank 1	Rank 2	Rank 3	Total Score
Balinese	94	Water does not mean anything	7*	_*	_*	7
Javanese	3	Water as the source of life to all living being	67	14	7	236
Chinese Tionghoa	1	Water as important economic resource for livelihood	10	26	20	102
Southeastern Nusa	1	Water is part of natural environment	3	11	24	55
Bataknese	1	Water as the sacred symbol of purity	4	10	7	39
Palembangnese	1	Water as important resource for tourism	1	4	2	13
		Water as important resource to fulfill basic needs (hygiene, sanitation, consumption)	7	28	31	108
		Water as important resource for irrigation	2	1	3	11

\*The multiplier score does not apply

In Table 2 it is shown that out of 100 responses (1 skip the question) 73 respondents claimed to measure their water consumption, even when they do not use water meter from PDAM (water company). This result is still relevant in Petang sub-district which is located at the upper most part of Badung. 35 respondents in Petang claimed to measure their water consumption even when they use water resource from river and spring, compared to 16 who do not. Previous study by group of researchers in Politeknik Negeri Bali and IDEP Foundation stated that Petang actually has more abundant water resource than the most southern part of Badung of Kuta Selatan Sub-District (Yayasan IDEP,

2015). This suggests that even when they have abundance of water, Balinese still concern about their daily water consumption. Averagely Badung residents consume water 804.08 L/day for the whole family. People in Petang consume less water per day (703.98 L/day) despite having more abundant water resource than people in Kuta Selatan (906.18 L/day). This is relevant to previous study which stated water consumption at Kuta Selatan is high due to concentrated tourism facilities (Cole & Browne, 2015). Most respondents consume water at the range between 0-500 L/day (45 respondents) and 500-1.000 L/day (30 respondents). Water is primarily used for bath/shower

(total of 43,897.9 L/Day), but the most intense use of water per single day is for business (restaurants, hotels, villas, etc.) which can be up to 4,500 L/day.

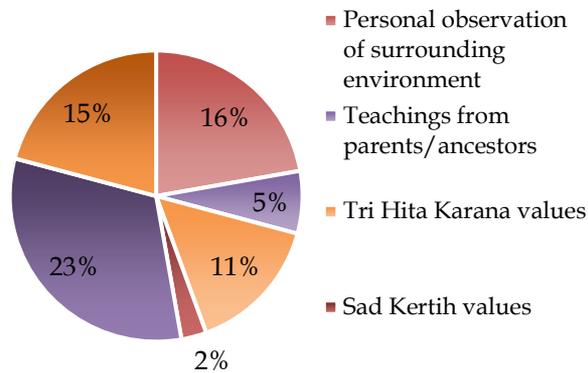


Figure 2. Source of Perception about Water

In regards of the condition of water in Badung, all respondents have positive perception. They either believe that they enough (40.6%) or very enough water (41.6%). While, the perception of the water quality is also positive ranging from either good (53.5%) to very good (28.7%). It contradicts with previous studies stated that the condition of water in Bali is increasingly degraded (Atmaja, 2016; Cole et al., 2020; Sukearsana et al., 2015; Yayasan IDEP, 2015). This does not necessarily mean that the issue of water degradation in Bali does not happen. People of Badung may perceive that they do not experience water degradation due to the characteristic of the issue itself. Water degradation is a latent issue which very hard to notice until it gets really extreme, for instance the condition when people can no longer see the water flows out of the faucet or when the degraded quality of water can be easily sensed (discoloration, odor, toxicity, and saline).

Table 2. Water Consumption Pattern and Perception about Water Condition

Water Consumption	Water Quantity		Water Quality	
	Quantity	Percentage	Quality	Percentage
Average Badung District	804,08 L/day	Not Enough	Not Good	0%
Average Petang Sub-District	703,98 L/day	Rather Enough	Rather Good	8.9%
Average Kuta Selatan Sub-District	906,18 L/day	Neutral	Neutral	8.9%
Consumption between 0-500 L/day	45 respondents	Enough	Good	53.5%
Consumption between 501-1,000 L/day	30 respondents	Very Enough	Very Good	28.7%
Consumption between 1,001-1,500 L/day	12 respondents			
Consumption between 1,501-2,000 L/day	6 respondents			
Consumption > 2,000 L/day	8 respondents			

Perception about Water Governance

Water governance is referred to a form of management which regulates water use and preservation among different actors in order to avoid potential conflict and to realize mutual gains. The survey asks three questions regarding the government performance in water governance. When asked about the perception of government performance in governing water, respondents give an average 3.5 rating out of 5. We could say that the government has quite satisfactory performance. Respondents stated that the reason of such performance is based on the water quality (37.62%) and access of water (26.73%). The cost to spend for water is also quite low. Most respondent (68.32%) stated that they pay IDR 0-250.000 (~USD 0-17.24)/month to get water.

In regard of local participation in the water governance, 46.4% respondents stated that they are not involved whatsoever. Meanwhile, others claim to be involved in ceremonies for maintaining the purity/holiness of water source (14.40%), involved in decision making about water use regulation such as in local customs/*awig-awig* (7.20%), and involved in preserving water resource by cleaning up rivers, planting trees at the bank of river, lakes, spring etc.

(32%). Such participation are either encouraged by customary village officials or by the local community initiative. This is because the government performance in encouraging local participation in the water governance is deemed to be somewhat neutral (3.21 rating out of 5).

When asked about Governor Law No. 24/2020 regarding The Protection of Lake, Spring, River, and Coast, 80.2% respondents stated they have no knowledge on that law. The law is important because it concerns about higher degree of local participation in the water governance with the establishment of local forums at village level in preserving water sources both physically and spiritually. However, it seems the implementation of such law is still not carried out perfectly. On the other hand, respondents agree that customary village has stronger role in the water governance with 36.63% and 57.43% respondents says 'important' and 'very important' consecutively. The reason behind such perception is because customary village is believed to be able to unite people (55.03%) and have strong authority in governing water (30.87%).

When it comes about water governance issues, respondents stated that water pollution (score 268) and water access (score 229) are the most urgent issues to be

solved. This is interesting because it does not refer to low quality of water and high difficulties in getting water. Previous result shows that respondents are quite satisfied with both aspects. The questions seems to attract respondents because those two aspects are deemed to be more sensitive (For other issues, see Figure 3).

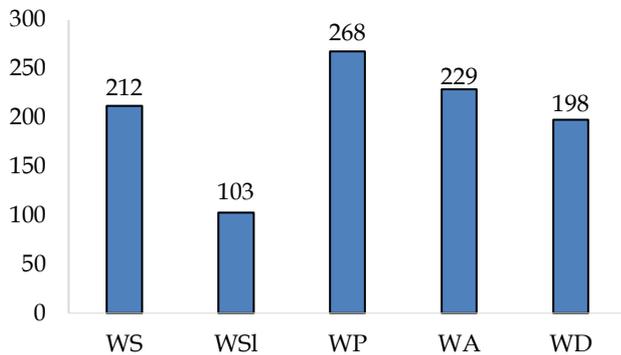


Figure 3. Water Governance Urgent Issues

Information: WS = Water Scarcity, WSI = Water Salinity, WP = Water Pollution, WA = Water Access, and WD = Water Distribution.

These perceptions about the issues are due to either personal experience (39.87%) or personal observation (37.34%). Interestingly, Balinese does not completely rely on the government to tackle such issues. Respondents believe that the most responsible stakeholder for solve such issues are the government (36.18%). However, many also believe that the local community (32.11%) and businesses (14.63%) also share the responsibility. The local perception on the government performance in tackling those issues is somewhat neutral (3.3 rating out of 5).

*The Role of Tri Hita Karana and Sad Kertih*

Balinese has strong belief system and cultural affinity. However, the survey shows different case between the local wisdom of *Tri Hita Karana* and *Sad Kertih*. Respondents are more familiar with the concept of *Tri Hita Karana* compared to *Sad Kertih*. Only 12.87% respondents says they do not have any knowledge about *Tri Hita Karana* compared to 46.53% of that *Sad Kertih*. Interestingly, 42.57% respondents stated they only have little recollection of what *Tri Hita Karana* means. 23.76% respondents claimed to have full knowledge and 20.79% of them make it as their life guidance. The source of such knowledge however is obtained through formal education in schools (36.36%) and books (24.43%). Only 13.07% have got the teaching of *Tri Hita Karana* from their ancestors' heritage.

The local wisdom of *Sad Kertih* is rather bleak. Only 5.94% people have full knowledge and 0.99% make it as

their life guidance. The knowledge of *Sad Kertih* is obtained through formal education (31.4%) and popularized by media (23.36%). Interestingly, people have more recollection of *Sad Kertih* from government policies (15.12%) rather than that *Tri Hita Karana* (3.98%). This is relevant to the background of this study which shows how the government of Bali uses *Sad Kertih* as the foundation and vision of the current development agenda. When asked about how both values manifests in the water governance, the responses are distributed rather equally (Figure 4). Most respondents agree that both values represent the duty to preserve water sources (20.77%).

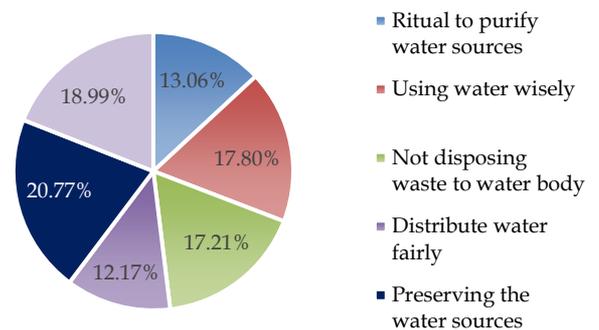


Figure 4. Perception about the manifestation of Local Wisdoms in Water Governance

The survey also tries to identify conflict potential related to water governance. However, most respondent stated there is no conflict about water (67.31%). Others claimed to have witnessed or experienced conflict with other community member (14.42%), with businesses (hotel, villa, etc.) (8.65%), and with the government (9.62%). The source of conflicts varied from dispute over water use (38.24%), water pollution (23.53%), and unfairness in the regulation of water governance (38.24%).

*Discussion*

According to the result of the study, we can see how Balinese perceive the meaning of water and how to best govern it in Balinese way. Most Balinese agree that water means the source of life. This unique perspective then inspired Balinese to have good initiative at community level in using and preserving water sources. Balinese does not want to rely heavily on the water governance. In contrast, they are eager to participate directly in the preservation of water sources, in the decision making process, and in ritual ceremonies. This is interesting because Balinese not only try to preserve water physically, but also spiritually. Water is an integral part of their culture and daily life as inspired by the principle of *Tri Hita Karana* values.

However, it is worth to note that the contemplation about local wisdom values has been transformed into more practical than philosophical. *Tri Hita Karana* and *Sad Kertih* are informed through schools' curriculum and books. These values are left to be discovered by students and practised later on by their own commitment. In the early days, these values live within the space of Balinese daily life. This is because Balinese has strong relations to nature and become fully depends on it. Such connection guarantees the practice of *subak* system and other culture of sustainable water management for centuries. It invites further questions rather than an answer whether such local wisdoms will continue to inspire Balinese in preserving water or will it become an object within the realm of knowledge, be it in books or educational subject.

In regard with the concept of IWRM, the Balinese local wisdoms show that the relations between human to water can go both ways. The services of water resource gives to environment can help transform how human perceive and value water. If most perceive water as source of life, then they will treasure and preserve it. Water could play a bigger role in social transformation (Movik, 2010), especially about the connection between human to nature. On the other hand, the concept of *Tri Hita Karana* shows how Balinese sees environment as the manifestation of God and source of happiness dictates strong norms about how water should be respected and preserved.

IWRM lays foundation principle about governing water. Sustainable water governance should maintain three pillars, namely economic efficiency, social justice, and sustainable environment. The result of this study emphasize on the other, less recognized, pillar that is the pillar of culture. The way Balinese govern water relatively consistent with the local wisdoms they believe in. Furthermore, people in Petang sub-district also has relatively the same view about water with the people living in Kuta Selatan sub-district, even though when they have different abundance of water and different use of it. It means the perception and value about water is able to across temporal and spatial borderline as long as it is situated within the same cultural sphere. Hence, we argue that the pillar of culture should become more recognized in IWRM concept as an important element. In addition, IWRM proves to be effective concept of water governance due to its flexibility on its implementation (Dirwai et al., 2021). Hence, there is a great opportunity to include more local wisdoms and culture of local community for the sustainable water governance. It is consistent with previous study stated that local wisdoms have important role in water governance because it can contribute in the decision making process of regulation about water which will be

sensitive toward the needs of local community and concerning more about their preservation (Wehn & Montalvo, 2018).

Challenges in water governance will remain exists so long as there are multiple stakeholders in its management. However, this study showcase how culture can be a good modalities in creating effective conflict settlement. The strong role of customary village in Bali as the symbol of brotherhood and manifestation of local wisdoms (through *awig-awig*) can unite people and offer equal settlement on conflicts. It proves another point that the local participation in the water governance should be strengthened as it is effective to prevent conflict and in dispute settlement. The local wisdom can complement other principles of IWRM which often faces challenges of political rivalry and weak law implementation (Al-Saidi, 2021), weak local participation (Campbell et al., 2001), and water allocation imbalance (Britz et al., 2013).

## Conclusion

The result of the study shows that Balinese may not really aware about *Tri Hita Karana* and *Sad Kertih*, but they are practising its principle in their daily life. Balinese respect water as part of nature which must be preserved. The government of Bali needs to strengthen the local participation in water governance provided that Balinese has strong duty towards their environment and have high sense of communal affinity. The implementation of Governor Law No.24/2020 should be efficient if it encourages customary village officials in it. The study also contributes to recognize the pillar of culture in the concept of IWRM. It should complement the other principles which often faces diverse challenges in water governance.

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## Author Contributions

Conceptualization, IGNGA Pradipta; methodology, IGNGA Pradipta; Data Collection, IGNGA Pradipta; writing—original draft preparation, IGNGA Pradipta; writing—review and editing, Herdis Herdiansyah and L.G. Saraswati Putri; supervision, Herdis Herdiansyah and L.G. Saraswati Putri; project administration, Herdis Herdiansyah.; funding acquisition, L.G. Saraswati Putri. All authors have read and agreed to the published version of the manuscript.

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### Conflicts of Interest

The authors declare no conflict of interest.

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